RELIABLE CUTTING TOOLS FOR EVERY MACHINE SHOP

CUTTING TOOLS

INCH | 2022



WIDIA™

HANITA™

For more than 95 years, the WIDIA™ brand has delivered high-quality milling, turning, holemaking, tapping, and systems tooling to metalcutting customers across the globe. Customers experience reliability from selection to post-delivery support through product availability, digital connectivity, and an accessible network of authorized distribution partners.

For more information regarding the WIDIA brand or products, visit **widia.com** or connect with us on Instagram, Facebook, LinkedIn, and YouTube.









WIDIA is a brand for machinists, mechanical engineers, and machine shop owners who are depending on a reliable tool to keep their shop running through the night.

The brand offers a full portfolio of standard milling, drilling, holemaking tools, technical information, and support to everyday consumers.

WIDIA tools are sold through distribution partners. Find a distributor in your area by using the distributor finder on **widia.com**.

Hanita™ solutions are developed for customers who have a passion for performance. Hanita delivers not only the tool for the job but the experience to develop a solution for the customer.

The Hanita brand offers a comprehensive range of custom and standard end mills spanning a broad range of diameters and lengths, all boasting unparalleled metal removal rates through innovative geometries.

Hanita solutions are sold primarily through WIDIA channel partners, alongside WIDIA.

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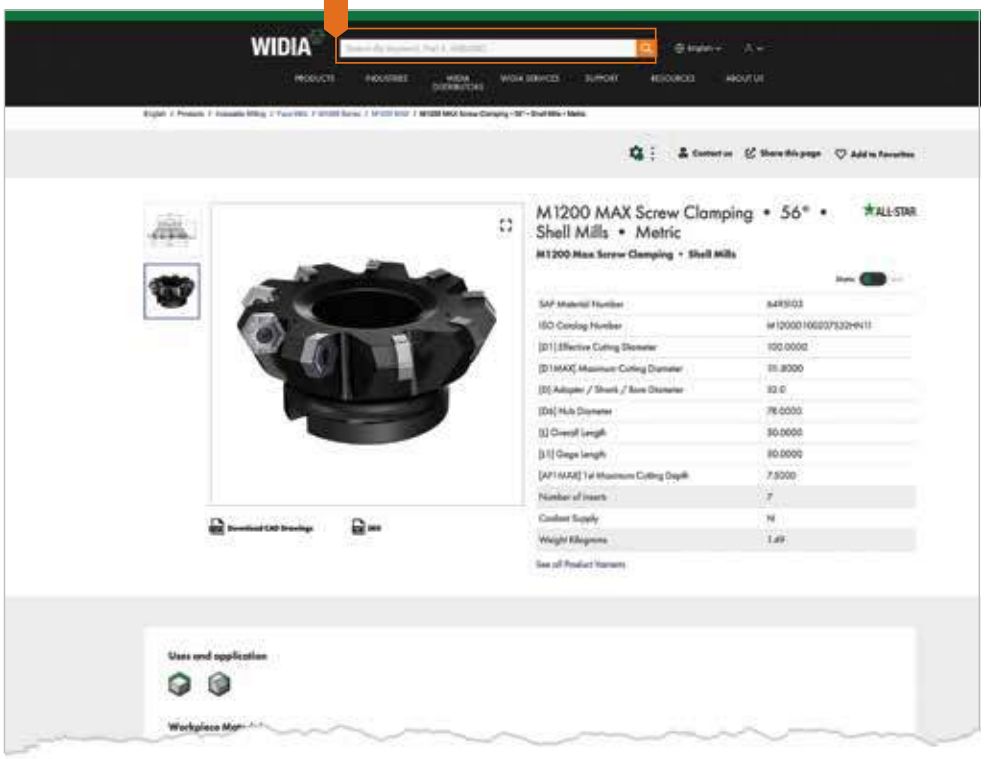
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Spare Parts & Accessories Information

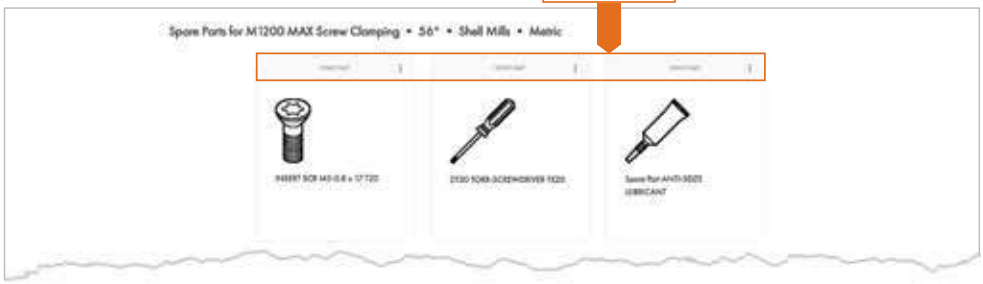
Lost a screw? Have to replace worn-out clamping wedges?
Need to find and re-order those spare parts?

Are you in need of some accessories, like a torque wrench or coolant shower plate? These tools are at your fingertips!
Go to **widia.com** and find what you need in seconds. Enter the catalog number of the corresponding tool, and it will display.

STEP 1 Enter the tool catalog number here



STEP 2 Select the spare parts & accessories



WIDIA™ Digital Solutions

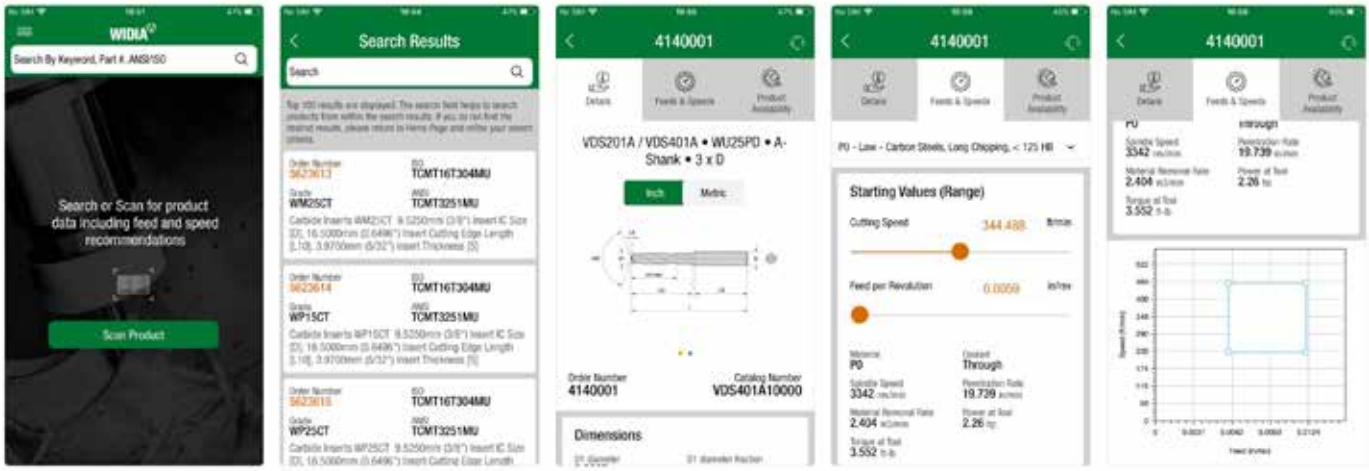
WIDIA Machining Central

WIDIA™ Machining Central Mobile App
Download for iOS or Android™:
widia.com/en/featured/WidiaMobileApp

Product Data

- Tooling Dimensional Data
- Feeds and Speeds
- Inventory Availability
- ...and More!

Tools and Resources at Your Fingertips



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WIDIA™



TO SEE ALL PRODUCT LINES, VISIT OUR DIGITAL RESOURCES

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Download for iOS or Android™:
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widia.com

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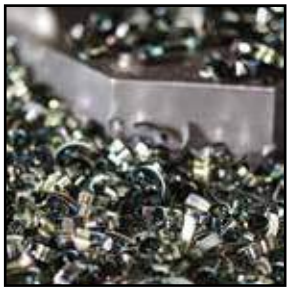
www.instagram.com/widiatools/

www.facebook.com/widiatools



Speed

The WIDIA™ brand encompasses a variety of standard tooling designed to perform well in a range of typical machine shop operations. A team of experienced application support specialists is readily available to help increase productivity in your shop via WIDIA website chat or over the phone for every step of the way.



Simplicity

Machinists can rely on the NOVO™ machining advisor or **widia.com** to easily select the right tool for the job.



Reliability

Trust our network of authorized distributors to put WIDIA tools to work for you — in your industry, in your region, and in your business. Together we will keep your machine running through the night.

For more than 95 years, the WIDIA brand has delivered quality milling, turning, holemaking, tapping, and systems tooling to metalcutting customers across the globe. Customers experience reliability from selection to post-delivery support through product availability, digital connectivity, and an accessible network of authorized distribution partners.

Test WIDIA tooling today by selecting tools from the All-Star program. The All-Star program is comprised of proven tooling solutions that are easy to find and always available. This includes solid end mills, turning tools, drills, and taps from our most popular platforms, grades, and sizes grouped into one program and guaranteed to be in stock with same-day shipping on orders placed before 6pm ET.

Visit **widia.com** to see what products are available for same-day shipping through All-Star.

WIDIA™

widia.com



widia.com

WIDIA™

Indexable Milling

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Choosing the Correct Cutter

Find and Select the Right Milling Cutter

1. Identify material to be machined:

   A Each tool has a material grid marked with a letter indicating the materials that can be machined.

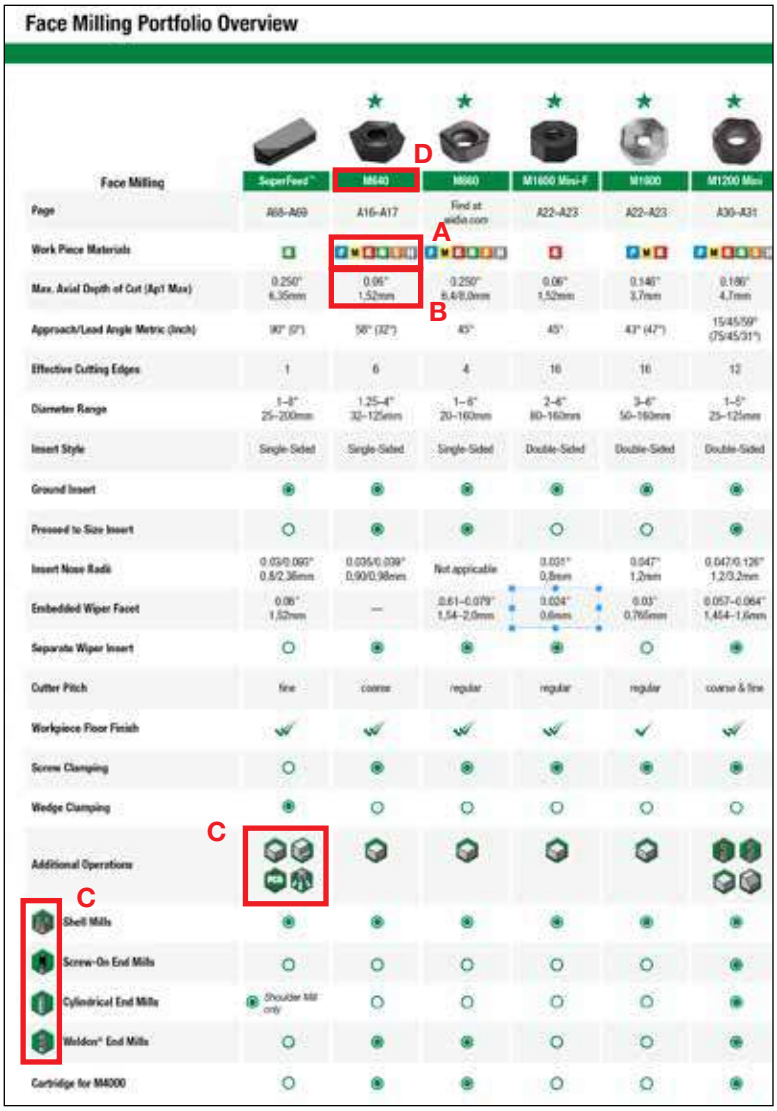
2. Select tool based on maximum depth of cut and diameter required:

   B Information is given in this area to provide specific detail as a quick reference.

   C Informational Icons. Connection type and possible operations.

3. Select product name

   D Navigate to introduction detail, toolbodies, inserts, and cutting data within section.



NOVO™

You can also use our NOVO app to guide you to the correct choice!

For more information, please visit www.widia.com/novo.

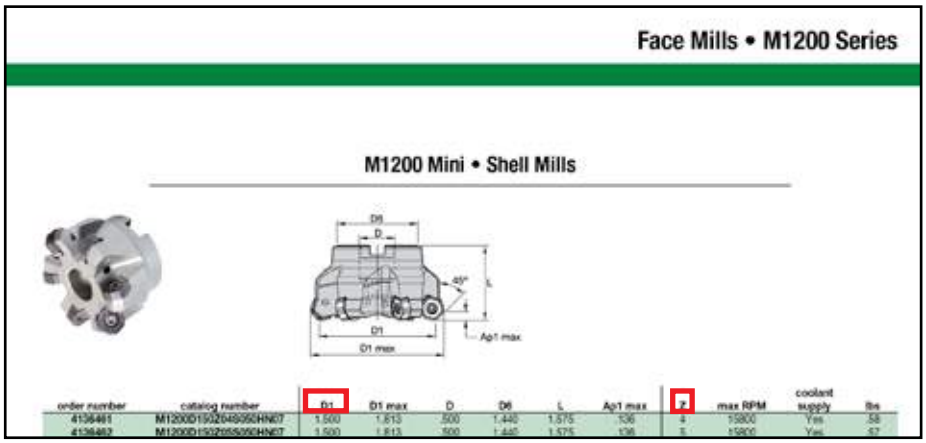
Determining Cutting Data

Selecting Tool Body, Insert, and Cutting Data

4. Choose the tool body:

Choose diameter (D1) and pitch (Z) of tool body.

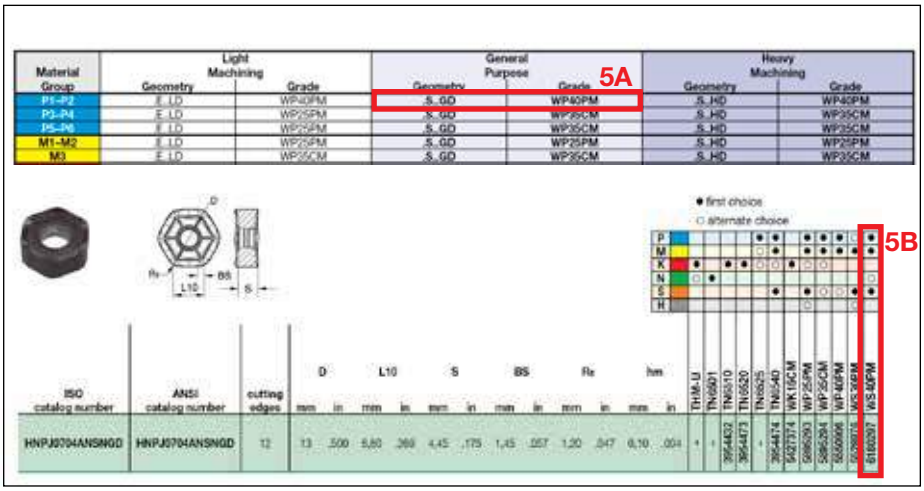
NOTE: Make sure you select the correct shank style for your toolholder. For toolholders, visit widia.com.



5. Choose the inserts with the WIDIA™ insert selection guide:

A Determine light machining, general purpose, or heavy machining according to workpiece material. See the Material Overview at the end of the catalog for material descriptions.

B Select the grade given in the insert selection guide. Use the six-digit order number to easily place your order.

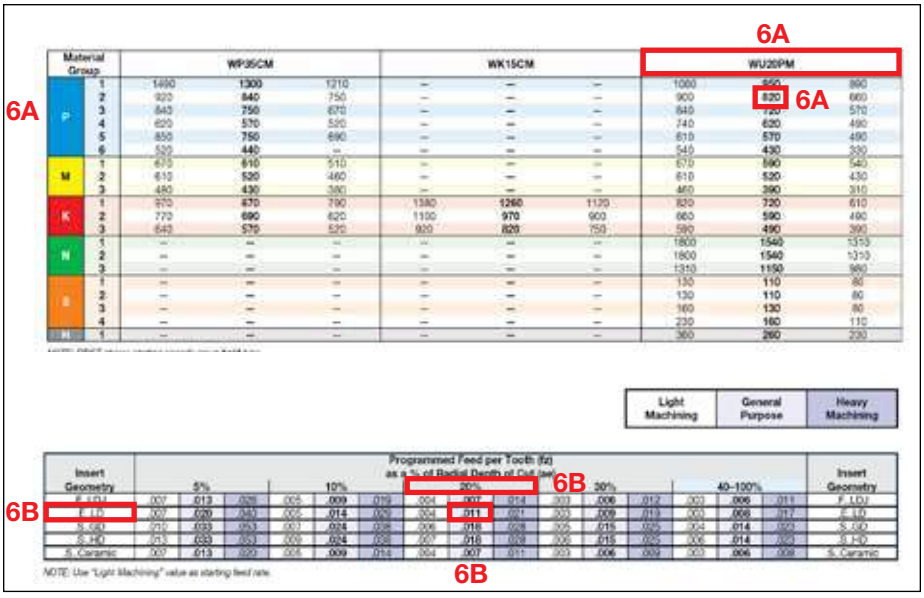


6. Determine cutting data — with the WIDIA Recommended Speeds and Feeds tables:

A Choose the recommended speed value according to the workpiece material and grade.

B Choose the recommended starting feed rate according to the insert geometry and % of radial engagement ae.

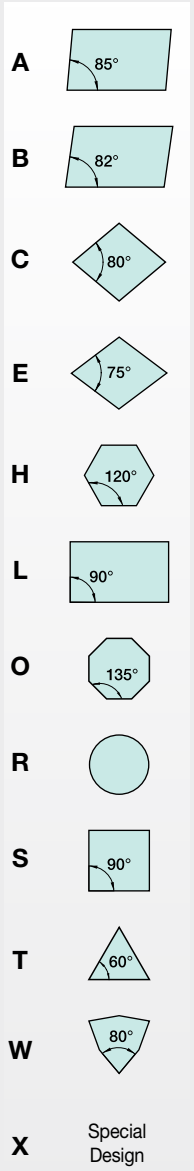
Starting values are given in bold.



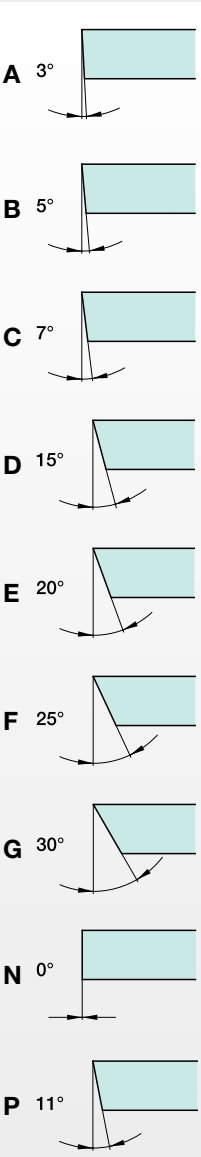
Inserts • Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

H
Insert Shape



N
Insert Clearance Angle

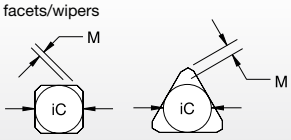


P
Tolerance Class

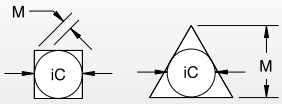
J
Geometry and Clamping Type

symbol	hole	shape of hole	chipbreaker	shape of insert's section
N	without		without	
R			single-sided	
F			double-sided	
A	with	cylindrical hole	without	
M			single-sided	
G			double-sided	
W	with	partly cylindrical hole, 40–60° countersink	without	
T			single-sided	
Q	with	partly cylindrical hole, 40–60° double countersink	without	
U			double-sided	
B	with	partly cylindrical hole, 70–90° countersink	without	
H			single-sided	
C	with	partly cylindrical hole, 70–90° double countersink	without	
J			double-sided	
X	special design			

indexable inserts with facets/wipers



indexable inserts with corner radii



insert thickness



iC	tolerances on "iC"		tolerances on "M"	
	classes J, K, L, M, N (+/–)	class U (+/–)	classes M & N (+/–)	class U (+/–)
4,76–10,00	0,051	0,076	0,076	0,127
11,11–14,29	0,076	0,127	0,127	0,203
15,00–20,64	0,102	0,178	0,152	0,279
22,00–31,16	0,127	0,254	0,178	0,381
31,75–35,00	0,152	0,254	0,2	0,381

	iC (+/–)	M (+/–)	T (+/–)		iC (+/–)	M (+/–)	T (+/–)
A	0,025	0,005	0,025	J	0,05–0,15*	0,005	0,025
B	0,025	0,005	0,013	K	0,05–0,15*	0,013	0,025
C	0,025	0,013	0,025	L	0,05–0,15*	0,025	0,025
D	0,025	0,013	0,013	M	0,05–0,15*	0,08–0,20*	0,013
E	0,025	0,025	0,025	N	0,05–0,15*	0,08–0,20*	0,025
F	0,013	0,005	0,025	P**	0,038	0,038	0,038
G	0,025	0,025	0,013	U	0,08–0,25*	0,13–0,30*	0,013
H	0,013	0,013	0,025				

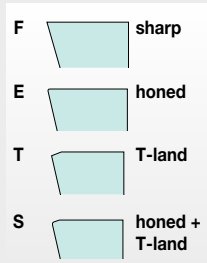
*See table above for tolerances according to insert size and class.
**WIDIA standard only.

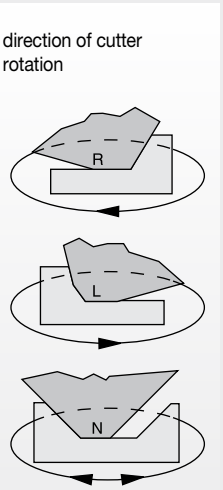
Inserts • Catalog Numbering System

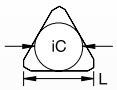
(continued)

07	04	AN	S	N	GD
Size (Cutting Edge Length)	Insert Thickness	Corner Configuration	Cutting Edge Form	Insert Hand	Edge Geometry

symbol	thickness
T1	1,98
02	2,38
03	3,18
T3	3,97
04	4,76
05	5,56
06	6,35
07	7,94

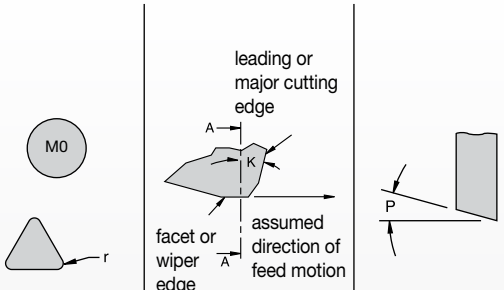






inscribed circle "iC" versus cutting edge length "L"
For shapes A, L, and X, see position #1; use length of leading cutting edge.

iC	"L" for shapes						
	S	T	R	O	C	H	E
6,00	–	–	06	–	–	–	–
6,35	06	11	06	02	06	03	06
8,00	–	–	08	–	–	–	–
9,52	09	16	09	04	09	05	09
10,00	–	–	10	–	–	–	–
12,00	–	–	12	–	–	–	–
12,70	12	22	12	05	12	07	13
15,88	15	27	15	06	16	09	16
16,00	–	–	16	–	–	–	–
19,05	19	33	19	07	19	11	19
20,00	–	–	20	–	–	–	–
25,00	–	–	25	–	–	–	–
25,40	25	4					



MO	round insert
01	0,1mm
02	0,2mm
04	0,4mm
05	0,5mm
08	0,8mm
10	1,0mm
12	1,2mm
15	1,5mm
16	1,6mm
24	2,4mm
32	3,2mm

If letter is replaced by number(s), refer to table for radius "r."

lead angle K	
A	45º
D	60º
E	75º
P	90º

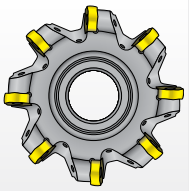
wiper edge clearance P	
A	3º
B	5º
C	7º
D	15º
E	20º
F	25º
G	30º
N	0º
P	11º

Tool Bodies • Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

M1200	D	100	Z	03	C
Series	Cutting Diameter		Number of Flutes		Shank Form

Z = Number of effective flutes



C = Cylindrical
W = Weldon®
M = Modular
S = Shell Mill

Tool Bodies • Catalog Numbering System

(continued)

100	H	N	07	L	800
Shank/Pilot Diameter	Insert Shape	Insert Clearance Angle	Insert Size (Cutting Edge Length)	Overall Length of Tool Used for all cylindrical shank and long version Weldon® if required (standard Weldon without)	

Insert Shape

A	85°	M	86°
B	82°	O	135°
C	80°	P	108°
D	55°	R	
E	75°	S	90°
H	120°	T	60°
K	55°	V	35°
L	90°	W	80°
		X	Special Design

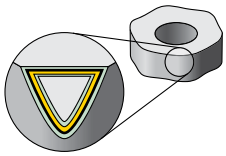
Insert Clearance Angle

C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

Optional uses as required

LH	Left Hand
C	Carbide Shank
HM	Heavy Metal Shank
J	JIS Standard

Grades and Grade Descriptions

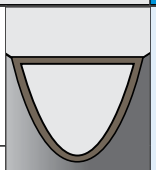
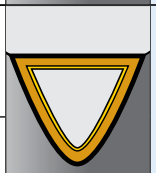
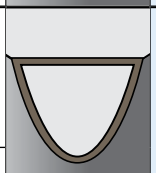
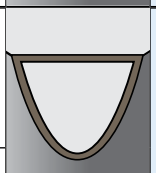
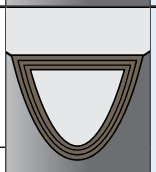
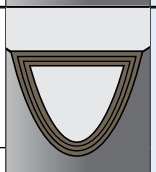


Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

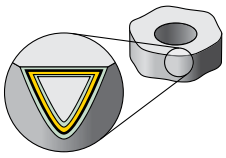
Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

primary use		alternate use	
▼▼▼	Light (finishing)	∇∇∇	Light (finishing)
▼▼	Medium	∇∇	Medium
▼	Heavy (roughing)	∇	Heavy (roughing)

Grade		P	M	K	N	S	H	dry	with coolant
TN2505 HC-H05 • PVD-TiAlN		∇∇∇		▼▼▼			▼▼▼	•	
TN2510 HC-H10 • MT-CVD/CVD-TiN-TiCN-(ZrO_2-Al_2O_3-TiOx)		∇∇		▼▼			▼▼	•	
TN2525 HC-H20 • PVD-TiAlN		▼▼		∇∇			▼▼	•	
TN6501 HC-N03 • PVD-TiB_2					▼▼▼			•	•
TN6510 HC-K10 • PVD-TiAlN Nanolayer				▼▼				•	
TN6520 HC-K20 • PVD-TiAlN Nanolayer				▼▼				•	•

Grades and Grade Descriptions

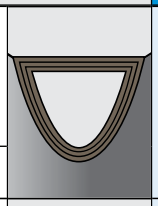
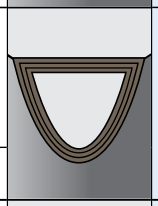
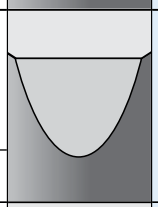
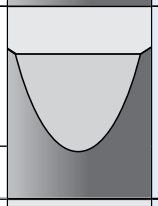
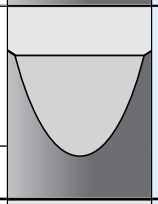
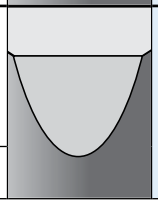


Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

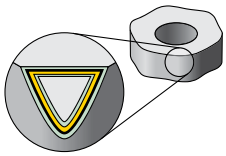
Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

primary use		alternate use	
▼▼▼	Light (finishing)	∇∇∇	Light (finishing)
▼▼	Medium	∇∇	Medium
▼	Heavy (roughing)	∇	Heavy (roughing)

Grade		P	M	K	N	S	H	dry	with coolant
TN6525 HC-P25 • PVD-TiAlN Nanolayer		▼▼	∇∇	∇∇				•	
TN6540 HC-P40 • PVD-TiAlN Nanolayer		▼	▼	∇		▼▼		•	•
TTI25 HT-P15 • Cermet		▼▼▼	∇∇∇					•	•
THM HW-K15 • Uncoated				∇	▼	∇		•	•
THM-U HF-N05 • Uncoated					▼▼▼			•	•
TTM/TTM08 HW-P25 • Uncoated		▼▼	∇∇	∇∇				•	•

Grades and Grade Descriptions

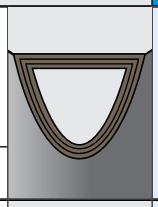
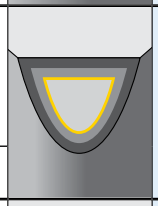
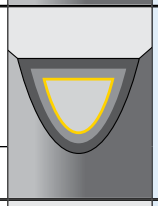
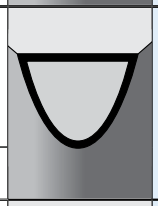
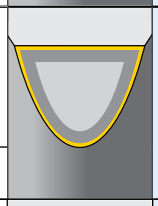
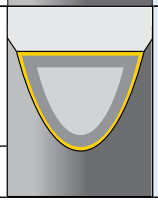


Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

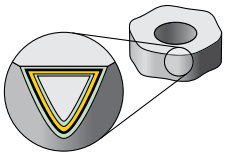
Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

primary use		alternate use	
▼▼▼	Light (finishing)	∇∇∇	Light (finishing)
▼▼	Medium	∇∇	Medium
▼	Heavy (roughing)	∇	Heavy (roughing)

Grade		P	M	K	N	S	H	dry	with coolant
WK15PM PVD-TiAlN Nanolayer				▼▼				•	•
WK15CM™ MT-CVD/TiN-TiCN-Al_2O_3				▼▼				•	
WP20CM MT-CVD/TiN-TiCN-Al_2O_3		▼▼		∇∇					
WP25PM PVD-AlTiN Multilayer		▼▼	▼▼	∇∇		▼▼	∇∇	•	•
WS30PM™ PVD-AlTiN Multilayer		∇∇	▼▼			▼▼		•	•
WS40PM PVD-TiAlN/TiN Multilayer		∇	▼			▼		•	•

Grades and Grade Descriptions

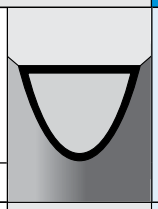
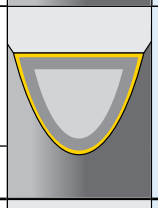
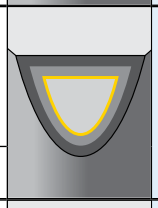
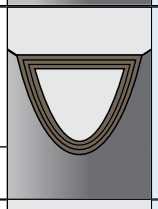
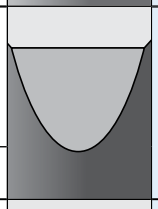
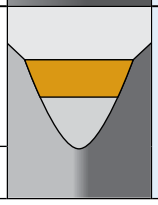


Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

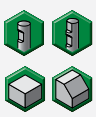
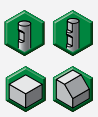
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primary use		alternate use	
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▼▼	Medium	∇∇	Medium
▼	Heavy (roughing)	∇	Heavy (roughing)

Grade		P	M	K	N	S	H	dry	with coolant
WU20PM PVD-TiAlN		▼▼	▼▼	∇∇		▼▼	∇∇	•	•
WU35PM PVD-AlTiN Multilayer		▼	▼			▼		•	•
WP35CM MT-CVD/TiN-TiCN-Al_2O_3		▼	∇	▼				•	
WP40PM™ PVD TiAlN-AlCrN Multilayer		▼	▼			∇		•	•
WK25YM Silicon Nitride				▼▼				•	
WDN00U™ Ultra-fine grain PCD					▼▼▼ ▼▼ ▼				•

Face Milling Portfolio Overview

Face Milling	 SuperFeed™	 M640	 M660	 M1600 Mini-F	 M1600	 M1200 Mini
Page	A68–A69	A16–A17	Find at widia.com	A22–A23	A22–A23	A30–A31
Work Piece Materials	N	P M K N S H	P M K N S H	K	P M K	P M K N S H
Max. Axial Depth of Cut (Ap1 Max)	0.250" 6,35mm	0.06" 1,52mm	0.250" 6,4/8,0mm	0.06" 1,52mm	0.146" 3,7mm	0.186" 4,7mm
Approach/Lead Angle Metric (Inch)	90° (0°)	58° (32°)	45°	45°	43° (47°)	15/45/59° (75/45/31°)
Effective Cutting Edges	1	6	4	16	16	12
Diameter Range	1–8" 25–200mm	1.25–4" 32–125mm	1– 6" 20–160mm	2–6" 80–160mm	3–6" 50–160mm	1–5" 25–125mm
Insert Style	Single-Sided	Single-Sided	Single-Sided	Double-Sided	Double-Sided	Double-Sided
Ground Insert	◉	◉	◉	◉	◉	◉
Pressed to Size Insert	○	◉	◉	○	○	◉
Insert Nose Radii	0.03/0.093" 0,8/2,36mm	0.035/0.039" 0,90/0,98mm	Not applicable	0.031" 0,8mm	0.047" 1,2mm	0.047/0.126" 1,2/3,2mm
Embedded Wiper Facet	0.06" 1,52mm	—	.0.61–0.079" 1,54–2,0mm	0.024" 0,6mm	0.03" 0,765mm	0.057–0.064" 1,454–1,6mm
Separate Wiper Insert	○	◉	◉	◉	○	◉
Cutter Pitch	fine	coarse	regular	regular	regular	coarse & fine
Workpiece Floor Finish	✓✓	✓✓	✓✓	✓✓	✓	✓✓
Screw Clamping	○	◉	◉	◉	◉	◉
Wedge Clamping	◉	○	○	○	○	○
Additional Operations	PCD					
Shell Mills	◉	◉	◉	◉	◉	◉
Screw-On End Mills	○	○	○	○	○	◉
Cylindrical End Mills	◉ *Shoulder Mill only*	○	○	○	○	◉
Weldon® End Mills	○	◉	◉	○	○	◉
Cartridge for M4000	○	◉	◉	○	○	◉

	M1200	M1200 Max Screw	M1200 Max Wedge	M8065HD	M8090	M8090-F	M4070	M4000
								
	A30–A31	A30–A31	A30–A31	A48–A49	A54–A55	A54–A55	A62–A63	A74–A75
	P M K N S H	P M K	K	P M K S	K	K	P K	—
	0.236" 6mm	0.295" 7,5mm	0.295" 7,5mm	0.354" 9,0mm	0.45" 11,5mm	0.039" 1mm	0.67" 17mm	—
	15/45/59° (75/45/31°)	56° (34°)	56° (34°)	64° (26°)	89° (1°)	89° (1°)	70° (20°)	—
	12	12	12	8	8	8	4	—
	2–12" 50–315mm	3–6" 80–250mm	3–6" 63–250mm	3–8" 50–315mm	4–8" 63–250mm	4–8" 80–250mm	6–12" 125–315mm	6–12" 125–315mm
	Double-Sided	Double-Sided	Double-Sided	Double-Sided	Double-Sided	Double-Sided	Double-Sided	—
	◉	○	○	○	◉	◉	◉	—
	◉	◉	◉	◉	○	○	○	—
	0.047/0.171" 1,2/4,34mm	Not applicable	Not applicable	0.047" 1,2mm	0.047" 1,2mm	0.047" 1,2mm	0.047" 1,2mm	—
	0.071" 1,8mm	0.045" 1,2mm	0.046" 1,2mm	0.093" 2,37mm	—	—	—	—
	◉	○	○	○	○	◉	○	—
	coarse & fine	regular	regular	regular	coarse & fine	regular	regular	—
	✓✓	✓	✓	✓	✓	✓✓	✓	✓✓
	◉	◉	○	◉	○	○	◉	—
	○	○	◉	○	◉	○	○	—
								
	◉	◉	◉	◉	◉	◉	◉	◉
	○	○	○	○	○	○	○	○
	○	○	○	○	○	○	○	○
	◉	○	○	○	○	○	○	○
	◉	○	○	○	○	○	○	—

✓ Good | ✓✓ Perfect | ◉ Yes | ○ No | ★ All-Star Program

Use the M640 face mill to create smooth finishes in all workpiece materials using soft cutting action on low-power machines.

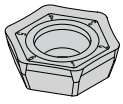


The M640 face mill's highly positive rake and six cutting edges on the insert enhances productivity in finishing operations on low-power machines and driven units.

WIPER INSERT



P M K N S H



-GD

Positive and stable geometry for medium machining. The positive stabilized cutting edge improves the milling action.



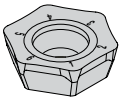
-3W

Geometry with wiper facet for best surface qualities. Only to be used in conjunction with the ground geometry -GD

INSERT

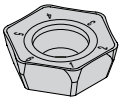


P M K N S H



-LD

Highly positive geometry for smooth and soft cutting action. Geometry with face cutting edge for finish machining.



-AL

Geometry for machining aluminum. The main and secondary cutting edges are sharp edged.

LOW CUTTING FORCES, FINISHING OPERATIONS

PRODUCT

SERIES

M640

DIAMETER RANGE

1.2598-4.2913"
(32–125mm)

SHANK TYPES

Weldon® End Mills
Shell Mills

INDUSTRY

GENERAL ENGINEERING

AEROSPACE

APPLICATIONS

FACE MILLING



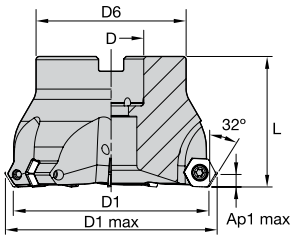
SLEEK FINISH

LOW CUTTING FORCES

Highly positive rake angle for extremely low cutting forces.

M640 • Shell Mills



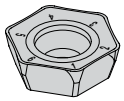


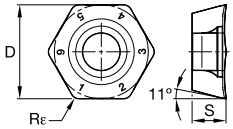
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2961910	**M640D200Z05S075HP06**	2.000	2.251	.750	1.700	1.500	.192	5	11500	Yes	.69
2961912	**M640D300Z07S100HP06**	3.000	3.251	1.000	2.300	2.000	.192	7	7900	Yes	2.25

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M640 • HPGT-LDAL



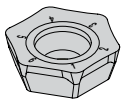


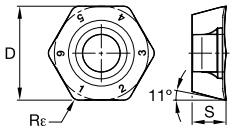
● first choice
○ alternate choice

P						●	●		●	●	○	●				
M						○	●		●	●	●	●				
K	○	●	●	●	○	○	●	○								
N	●	○										○				
S						●		●	○	●	●					
H								○		○						

catalog number	cutting edges	D	S	Rε	hm	THM	THM-U	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP40PM	WS30PM	WS40PM
HPGT225DZFRLDAL	6	.433	.158	.035	.003	2288106	2288107	-	-	-	-	-	-	-	-	-

M640 • HPGT-LD



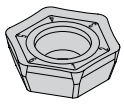


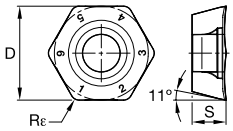
● first choice
○ alternate choice

P						●	●		●	●	○	●				
M						○	●		●	●	●	●				
K	○	●	●	●	○	○	●	○								
N	●	○										○				
S						●		●	○	●	●					
H								○		○						

catalog number	cutting edges	D	S	Rε	hm	THM	THM-U	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP40PM	WS30PM	WS40PM
HPGT225DZERLD	6	.429	.157	.039	.003	-	-	-	2957585	2957547	-	-	5895784	5895785	-	6180312

M640 • HPPT-GD



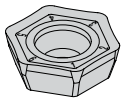


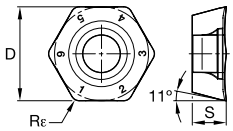
● first choice
○ alternate choice

P						●	●		●	●	○	●				
M						○	●		●	●	●	●				
K	○	●	●	●	○	○	●	○								
N	●	○										○				
S						●		●	○	●	●					
H								○		○						

catalog number	cutting edges	D	S	Rε	hm	THM	THM-U	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP40PM	WS30PM	WS40PM
HPPT225DZENGD	6	.432	.156	.039	.004	-	-	-	2957583	2957586	2957552	-	5895788	5895789	-	6180315

M640 • HPGT-GD





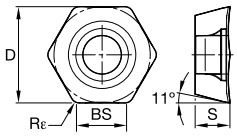
● first choice
○ alternate choice

		THM	THM-U	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP40PM	WS30PM	WS40PM
P						●	●		●	●	○	●
M						○	●		●	●	●	●
K		○	●	●	●	○	○	●	○			
N		●	○									○
S							●		●	○	●	●
H									○		○	

catalog number	cutting edges	D	S	Rε	hm	THM	THM-U	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP40PM	WS30PM	WS40PM
HPGT225DZENGD	6	.432	.156	.039	.004	-	-	2957589	-	2957588	2957546	5427387	5895782	5895783	5528978	6180313

M640 • HPGT-GD Wiper





● first choice
○ alternate choice

		THM	THM-U	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP40PM	WS30PM	WS40PM
P						●	●		●	●	○	●
M						○	●		●	●	●	●
K		○	●	●	●	○	○	●	○			
N		●	○									○
S							●		●	○	●	●
H									○		○	

catalog number	cutting edges	D	S	BS	Rε	hm	THM	THM-U	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP40PM	WS30PM	WS40PM
HPGT06T3DZERGD3W	3	.439	.158	.113	.039	.004	-	-	2957549	-	2957584	-	5427388	5895786	5895787	-	6180316

M640 • Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	.E..LD	WP40PM	**.E..GD**	**WP40PM**	.E..GD	WP40PM
P3–P4	.E..LD	WP25PM	**.E..GD**	**WS40PM**	.E..GD	WS40PM
P5–P6	.E..LD	WP25PM	**.E..GD**	**WP25PM**	.E..GD	WP25PM
M1–M2	.E..LD	WP25PM	**.E..GD**	**WP25PM**	.E..GD	WP25PM
M3	.E..LD	WP40PM	**.E..GD**	**WS30PM**	.E..GD	WS30PM
K1–K2	.E..GD	TN6510	**.E..GD**	**WK15CM**	.E..GD	WK15CM
K3	.E..LD	TN6520	**.E..GD**	**WP25PM**	.E..GD	WP25PM
N1–N2	.E..LD	WS40PM	**.E..GD**	**WS40PM**	.E..GD	WS40PM
N3	.E..LD	WS40PM	**.E..GD**	**WS40PM**	.E..GD	WS40PM

M640 • Recommended Starting Speeds [SFM]

Material Group		THM			THM-U			TN6510			TN6520			TN6525			TN6540		
P	1	–	–	–	–	–	–	–	–	–	–	–	–	1340	**1045**	925	1180	**925**	785
	2	–	–	–	–	–	–	–	–	–	–	–	–	1045	**830**	710	830	**630**	550
	3	–	–	–	–	–	–	–	–	–	–	–	–	925	**710**	610	710	**550**	450
	4	–	–	–	–	–	–	–	–	–	–	–	–	770	**550**	475	590	**430**	355
	5	–	–	–	–	–	–	–	–	–	–	–	–	1025	**770**	650	785	**590**	490
	6	–	–	–	–	–	–	–	–	–	–	–	–	670	**535**	430	535	**395**	335
M	1	–	–	–	–	–	–	–	–	–	–	–	–	630	**395**	260	430	**260**	200
	2	–	–	–	–	–	–	–	–	–	–	–	–	395	**260**	155	260	**155**	140
	3	–	–	–	–	–	–	–	–	–	–	–	–	415	**260**	180	275	**155**	140
K	1	475	**355**	295	750	**670**	590	1570	**1140**	845	1475	**1045**	750	905	**805**	725	725	**670**	590
	2	490	**395**	275	–	–	–	1380	**925**	670	1280	**830**	630	710	**630**	590	570	**510**	450
	3	510	**370**	235	–	–	–	1105	**845**	650	985	**750**	535	590	**535**	475	510	**475**	415
N	1	3540	**2365**	1970	7870	**4720**	3935	–	–	–	–	–	–	–	–	–	–	–	–
	2	2695	**1830**	1520	5370	**3210**	2615	–	–	–	–	–	–	–	–	–	–	–	–
	3	1770	**1105**	785	3150	**1970**	1570	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	155	**120**	95
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	80	**60**	40
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	235	**140**	95
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	200	**95**	80
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		WK15CM			WP25PM			WP40PM			WS30PM			WS40PM		
P	1	–	–	–	1295	**1120**	1060	**1165**	**1025**	965	–	–	–	915	**800**	750
	2	–	–	–	1080	**940**	785	**985**	**845**	710	–	–	–	770	**670**	555
	3	–	–	–	1000	**845**	690	**905**	**770**	630	–	–	–	705	**605**	490
	4	–	–	–	890	**725**	590	**805**	**670**	535	–	–	–	635	**520**	425
	5	–	–	–	725	**670**	590	**670**	**610**	535	–	–	–	520	**455**	425
	6	–	–	–	650	**490**	395	**590**	**450**	355	–	–	–	455	**360**	275
M	1	–	–	–	805	**710**	650	**770**	**670**	610	890	**785**	725	850	**620**	375
	2	–	–	–	725	**630**	510	**690**	**590**	490	805	**710**	570	750	**555**	340
	3	–	–	–	550	**475**	370	**510**	**450**	355	610	**535**	415	620	**455**	260
K	1	1655	**1520**	1340	905	**805**	725	–	–	–	–	–	–	–	–	–
	2	1320	**1165**	1080	710	**630**	590	–	–	–	–	–	–	–	–	–
	3	1105	**985**	905	590	**535**	475	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–	3525	**3100**	3100
	2	–	–	–	–	–	–	–	–	–	–	–	–	3100	**2870**	2770
	3	–	–	–	–	–	–	–	–	–	–	–	–	2870	**2490**	2490
S	1	–	–	–	155	**140**	95	**155**	**140**	120	180	**155**	120	200	**145**	85
	2	–	–	–	155	**140**	95	**155**	**140**	120	180	**155**	120	180	**130**	85
	3	–	–	–	200	**155**	95	**200**	**155**	120	215	**180**	120	205	**150**	95
	4	–	–	–	275	**200**	140	**260**	**200**	140	335	**235**	155	295	**215**	135
H	1	–	–	–	–	–		–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M640 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.F..LDAL	.005	**.013**	.018	.004	**.010**	.013	.003	**.007**	.010	.003	**.006**	.009	.002	**.006**	.008	.F..LDAL
.E..LD	.005	**.013**	.018	.004	**.010**	.013	.003	**.007**	.010	.003	**.006**	.009	.002	**.006**	.008	.E..LD
.E..GD	.005	**.019**	.021	.004	**.014**	.015	.003	**.010**	.011	.003	**.009**	.010	.002	**.008**	.009	.E..GD

NOTE: Use "Light Machining" value as starting feed rate.

M1600 Series

M1600, M1600 Mini-F Face Mills

The M1600 Series includes versatile, 16-edged face mills for roughing, semi-finishing, and finishing in steel, cast iron, and nodular iron materials that will run in low-power machines, unstable and non-rigid set-ups, and long overhang conditions.



M1600 MINI-F

The M1600 Mini-F face mill is the finishing solution with an Ap max of 0.0827" (2,1mm) to achieve surface finish below Ra 1.6.



M1600

The M1600 standard sized face mill is a reliable semi-finishing and roughing tool with an Ap max of 0.1457" (4mm) and lead angle of 47 degrees.

M1600 MINI-F INSERTS

SEMI-FINISH INSERTS



WK15CM

K

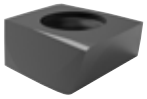
WU10PM

K H

WU20PM

P M K N S H

WIPER INSERTS



THM-F

K N

WU10PM

K H

M1600 INSERTS

-MM



WK15CM

K

WK15CM is a wear-resistant grade with balanced toughness for general milling of cast irons. Best results in dry machining, but can also be used wet.

WP35CM

P K

WP35CM has a wide range of applications in general and rough milling of steels and cast iron. Performs best in dry, but can also be used under wet conditions.

WU20PM

P M K N S H

WU20PM is a universal grade for machining of steel, stainless steel, and high-temperature alloys. Also suitable for machining of gray and nodular irons. Resists breakage and offers improved wear resistance and increased strength. Can be used for both dry and wet machining.

VERSATILE FACE MILL FOR ALL MACHINE CONDITIONS

PRODUCT		INSERTS		
SERIES	DIAMETER RANGE	INSERT TYPE	GRADE	MATERIALS
M1600 MINI-F	3–6.2992" (80–160mm)	MM, Wiper	WK15CM, WU10PM, WU20PM Wiper: THM-F, WU10PM	K
M1600	1.9685–6.2992" (50–160mm)	MM	WK15CM, WP35CM, WU20PM	P M K N S H

APPLICATIONS

FACE MILLING

INDUSTRY

TRANSPORTATION

AEROSPACE

ENERGY

GENERAL ENGINEERING

47°

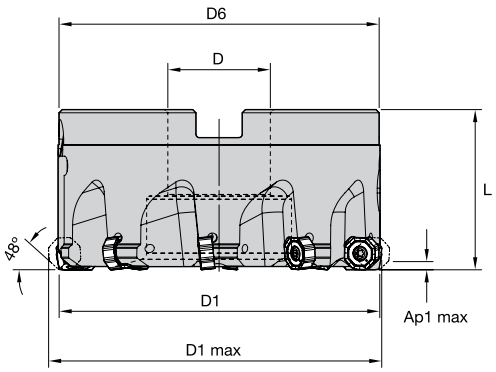
LEAD ANGLE

redistributes cutting forces in the spindle z-axis direction.



M1600 Mini-F • 48° • Shell Mills • Inch





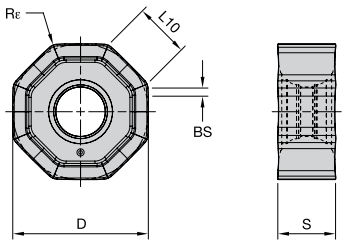
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	coolant supply	lbs
6921235	**M1600U300Z08W2S100ON04**	3.000	3.403	1.000	3.150	1.969	0.083	8	No	3.31
6921236	**M1600U400Z10W2S150ON04**	4.000	4.254	1.500	3.810	1.969	0.083	10	No	4.75
6921237	**M1600U600Z16W4S200ON04**	6.000	6.254	2.000	4.875	2.480	0.083	16	No	13.02

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M1600 Mini-F • ONGX-MM





● first choice
○ alternate choice

| | | |

M1600 Mini-F • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	.S..MM	WU10PM	**.S..MM**	**WU10PM**	.S..MM	WU20PM
P3–P4	.S..MM	WU10PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
P5–P6	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
M1–M2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
M3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
K1–K2	.S..MM	WK15CM	**.S..MM**	**WK15CM**	.S..MM	WU20PM
K3	.S..MM	WU20PM	**.S..MM**	**WU10PM**	.S..MM	WK15CM
N1–N2	.S..MM	WU10PM	**.S..MM**	**WU10PM**	.S..MM	WU20PM
N3	.S..MM	WU10PM	**.S..MM**	**WU10PM**	.S..MM	WU20PM
S1–S2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S4	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
H1	.S..MM	WU10PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM

M1600 Mini-F • Recommended Starting Speeds [SFM]

Material Group		WK15CM			WU10PM			WU20PM			THM-F		
P	1	–	–	–	–	–	–	1080	**950**	890	–	–	–
	2	–	–	–	–	–	–	900	**820**	660	–	–	–
	3	–	–	–	–	–	–	840	**720**	570	–	–	–
	4	–	–	–	800	**660**	560	740	**620**	490	–	–	–
	5	–	–	–	–	–	–	610	**570**	490	–	–	–
	6	–	–	–	–	–	–	540	**430**	330	–	–	–
M	1	–	–	–	–	–	–	670	**590**	540	–	–	–
	2	–	–	–	–	–	–	610	**520**	430	–	–	–
	3	–	–	–	–	–	–	460	**390**	310	–	–	–
K	1	1380	**1260**	1120	970	**870**	790	820	**720**	610	620	**560**	490
	2	1100	**970**	900	750	**670**	620	660	**590**	490	–	–	–
	3	920	**820**	750	640	**570**	520	590	**490**	390	–	–	–
N	1	–	–	–	2100	**1870**	1720	1800	**1540**	1310	2610	**2280**	1970
	2	–	–	–	2100	**1870**	1720	1800	**1540**	1310	2610	**2280**	1970
	3	–	–	–	1900	**1760**	1610	1310	**1150**	980	–	–	–
S	1	–	–	–	–	–	–	130	**110**	80	–	–	–
	2	–	–	–	–	–	–	130	**110**	80	–	–	–
	3	–	–	–	–	–	–	160	**130**	80	–	–	–
	4	–	–	–	–	–	–	230	**160**	110	–	–	–
H	1	–	–	–	520	**430**	300	360	**260**	230	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M1600 Mini-F • Recommended Starting Feeds [IPT]

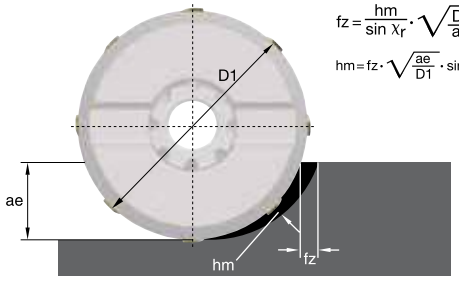
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.S..MM	.007	**.023**	.046	.005	**.016**	.033	.004	**.012**	.024	.003	**.011**	.021	.003	**.010**	.019	.S..MM

*NOTE: FIRST choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

$$fz = \frac{hm}{\sin \chi_r} \cdot \sqrt{\frac{D1}{ae}}$$

$$hm = fz \cdot \sqrt{\frac{ae}{D1}} \cdot \sin \chi_r$$

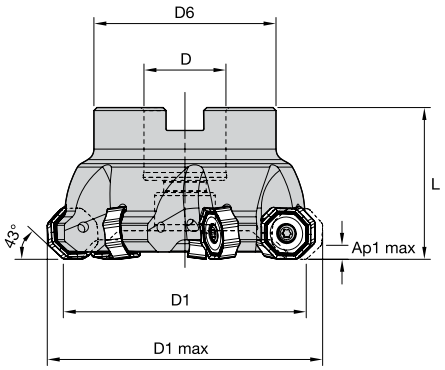


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MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M1600 • 47° • Shell Mills • Inch

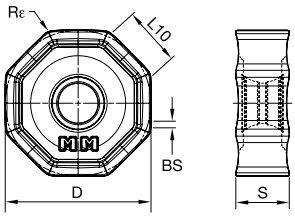




order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
6921229	**M1600U200Z04S075ON06**	2.000	2.423	.750	1.750	1.575	.146	4	—	Yes	.69
6921230	**M1600U250Z05S075ON06**	2.500	2.923	.750	1.750	1.575	.146	5	—	Yes	1.03
6921231	**M1600U300Z07S100ON06**	3.000	3.423	1.000	2.750	1.750	.146	7	—	Yes	2.05
6921232	**M1600U400Z09S150ON06**	4.000	4.423	1.500	3.380	2.000	.146	9	—	Yes	3.28
6921233	**M1600U500Z11S150ON06**	5.000	5.423	1.500	3.810	2.380	.146	11	6900	Yes	5.99
6921234	**M1600U600Z13S200ON06**	6.000	6.423	2.000	4.875	2.380	.146	13	—	Yes	9.31

M1600 • ONGX-MM • General Purpose Face Milling





● first choice
○ alternate choice

P		●	●
M		●	●
K	●	○	○
N			○
S		○	○
H			○

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	WK15CM	WP35CM	WU20PM
ONGX060512ANSNMM	ONGX060512ANSNMM	16	17	.665	6,87	.271	5,47	.216	0,77	.030	1,20	.047	0,04	.002	6072424	-	-
ONGX060512ANSNMM	ONGX060512ANSNMM	16	17	.665	6,87	.271	5,47	.216	0,77	.030	1,20	.047	0,06	.002	-	6852431	3778942

M1600 • Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WU20PM
P3–P4	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WU20PM
P5–P6	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WP35CM
M1–M2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
M3	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WP35CM
K1–K2	.S..MM	WK15CM	**.S..MM**	**WK15CM**	.S..MM	WU20PM
K3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WK15CM
N1–N2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
N3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S1–S2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S4	.S..MM	WP35CM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
H1	.S..MM	WU20PM	–	–	–	–

M1600 • Recommended Starting Speeds [SFM]

Material Group		WP35CM			WK15CM			WU20PM		
P	1	1490	**1300**	1210	–	–	–	1080	**950**	890
	2	920	**840**	750	–	–	–	900	**820**	660
	3	840	**750**	670	–	–	–	840	**720**	570
	4	620	**570**	520	–	–	–	740	**620**	490
	5	850	**750**	690	–	–	–	610	**570**	490
	6	520	**440**	–	–	–	–	540	**430**	330
M	1	670	**610**	510	–	–	–	670	**590**	540
	2	610	**520**	460	–	–	–	610	**520**	430
	3	480	**430**	380	–	–	–	460	**390**	310
K	1	970	**870**	790	1380	**1260**	1120	820	**720**	610
	2	770	**690**	620	1100	**970**	900	660	**590**	490
	3	640	**570**	520	920	**820**	750	590	**490**	390
N	1	–	–	–	–	–	–	1800	**1540**	1310
	2	–	–	–	–	–	–	1800	**1540**	1310
	3	–	–	–	–	–	–	1310	**1150**	980
S	1	–	–	–	–	–	–	130	**110**	80
	2	–	–	–	–	–	–	130	**110**	80
	3	–	–	–	–	–	–	160	**130**	80
	4	–	–	–	–	–	–	230	**160**	110
H	1	–	–	–	–	–	–	360	**260**	230

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M1600 • Recommended Starting Feeds [IPT]

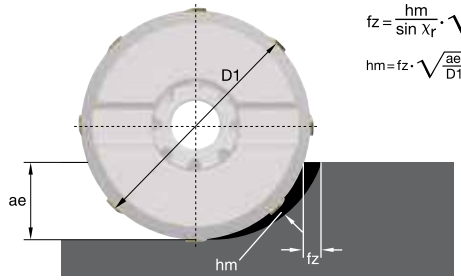
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.S..MM	.010	**.034**	.056	.007	**.024**	.040	.005	**.018**	.030	.005	**.016**	.026	.004	**.014**	.024	.S..MM

*NOTE: FIRST choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

$$fz = \frac{hm}{\sin \chi_r} \cdot \sqrt{\frac{D1}{ae}}$$

$$hm = fz \cdot \sqrt{\frac{ae}{D1}} \cdot \sin \chi_r$$



M1200 Series

M1200 Mini, M1200, M1200 MAX Face Mills



M1200 MINI

The M1200 mini face mill is a first-choice for low DOC face milling that will improve productivity on taper 40 spindle milling machines.



M1200

The M1200 standard sized face mill is an all-inclusive series that will improve productivity on taper 50 spindle milling machines and driven tools using 75-, 45-, and 31-degree lead angles.



M1200 MAX SCREW CLAMPING • FOR BIGGER STOCK REMOVAL

The M1200 Max is a 12-edged face mill for customers who need to run at a higher DOC (up to 0.295" [7,5mm]) in steel, stainless steel, gray cast iron, and nodular iron.

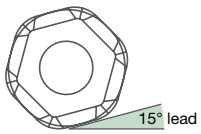


M1200 MAX WEDGE CLAMPING • FOR CAST IRON COMPONENTS

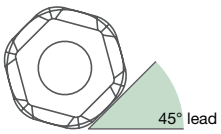
The M1200 Max wedge clamping is a 12-edged face mill for medium roughing - semi-finishing while running higher DOC (up to 0.295" [7,5mm]) in gray cast iron and nodular iron components.

ONE INSERT STYLE FITS INTO ALL DIFFERENT CUTTER BODY VERSIONS

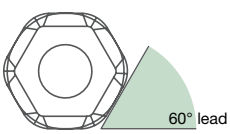
M1200 & M1200 MINI HF
High-Feed 15°



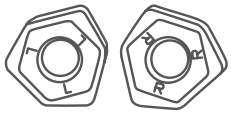
M1200 & M1200 MINI
45°



M1200 & M1200 MINI HD
60°



WIPER
(XNGJ)



3RH + 3LH

12-EDGED FACE MILL

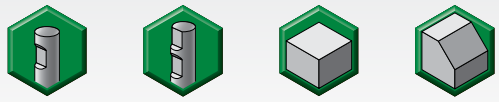
PRODUCT

SERIES	DIAMETER RANGE
M1200 MINI HNPJ0905... - PRESSED AND SINTERED TO SIZE HNGJ0905... - PRECISION GROUND	1.5–5" (25–125mm)
M1200 HNPJ0905... - PRESSED AND SINTERED TO SIZE HNGJ0905... - PRECISION GROUND	2–12" (40–315mm)
M1200 MAX HNMU1107...- PRESSED AND SINTERED TO SIZE HNMF1107...-PRESSED AND SINTERED TO SIZE	3–6" 63–250mm

INSERTS

GEOMETRY	GRADE	MATERIALS
LDJ — Machining Aluminum	WK15CM, WK25YM	K
	WP35CM, WP25PM	P M S
LD — Light Machining	WP40PM	P M
GD — General Purpose	WS30PM	S
	WS40PM	P M S
HD — Heavy Machining	TN6501, THM-U	N
MM — Medium Machining	WK15CM, WP35CM, WU20PM	P M K

APPLICATIONS



WELDON® SHANK | WELDON: 2 FLAT | FACE MILLING | EASED CHAMFER

INDUSTRY

TRANSPORTATION

AEROSPACE

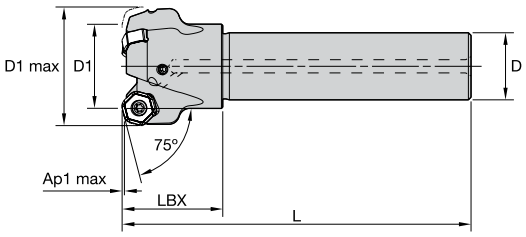
ENERGY

GENERAL ENGINEERING



M1200 Mini High Feed • Cylindrical Shank

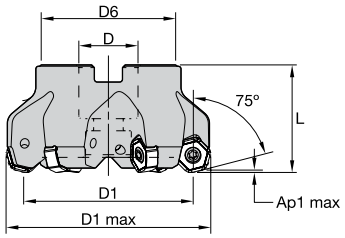




order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
4136453	M1200HF100Z02C075HN07L480	1.556	1.000	.750	4.800	1.250	.068	2	19800	Yes	.73

M1200 Mini High Feed • Shell Mills



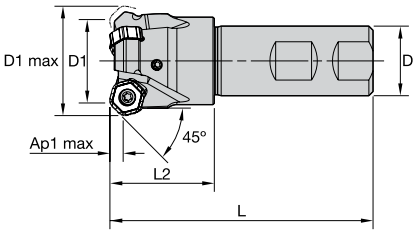


order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136457	M1200HF150Z05S050HN07	1.500	2.057	.750	1.440	1.575	.068	5	15800	Yes	.62
4136458	M1200HF200Z05S075HN07	2.000	2.557	.750	1.750	1.575	.068	5	12500	Yes	1.12
4136459	M1200HF250Z06S075HN07	2.500	3.056	.750	1.750	1.575	.068	6	10000	Yes	1.48
4136460	M1200HF300Z08S100HN07	3.000	3.556	1.000	2.189	1.750	.068	8	8300	Yes	2.32

NOTE: Socket-head cap screw with coolant groove must be ordered separately.

M1200 Mini • Weldon® Shank

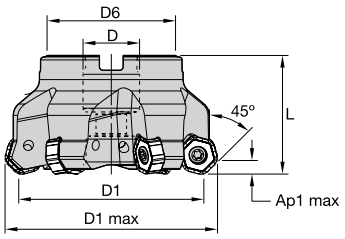




order number	catalog number	D1	D1 max	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
3953893	M1200D100Z02W075HN07	1.000	1.343	.750	3.280	1.250	.138	2	19800	Yes	.46
3953894	M1200D100Z03W075HN07	1.000	1.343	.750	3.280	1.250	.138	3	19800	Yes	.45
3953896	M1200D125Z04W100HN07	1.250	1.593	1.000	3.783	1.500	.138	4	17700	Yes	.88

M1200 Mini • Shell Mills



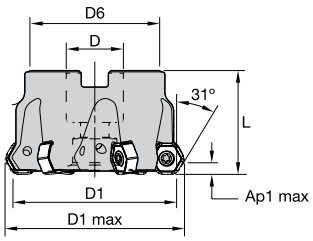


order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136461	M1200D150Z04S050HN07	1.500	1.813	.500	1.440	1.575	.136	4	15800	Yes	.58
4136462	M1200D150Z05S050HN07	1.500	1.813	.500	1.440	1.575	.136	5	15800	Yes	.57
3954485	M1200D200Z04S075HN07	2.000	2.343	.750	1.750	1.575	.138	4	12500	Yes	1.00
3954486	M1200D200Z05S075HN07	2.000	2.343	.750	1.750	1.575	.138	5	12500	Yes	1.01
3954487	M1200D200Z06S075HN07	2.000	2.343	.750	1.750	1.575	.138	5	12500	Yes	1.01
3954488	M1200D250Z04S075HN07	2.500	2.843	.750	1.750	1.575	.138	4	10000	Yes	1.27
3954489	M1200D250Z06S075HN07	2.500	2.843	.750	1.750	1.575	.138	6	10000	Yes	1.40
3954490	M1200D250Z08S075HN07	2.500	2.843	.750	1.750	1.575	.138	8	10000	Yes	1.36
3954491	M1200D300Z05S100HN07	3.000	3.343	1.000	2.189	1.750	.138	5	8300	Yes	2.00
3954492	M1200D300Z08S100HN07	3.000	3.343	1.000	2.189	1.750	.138	8	8300	Yes	2.26
3954503	M1200D300Z10S100HN07	3.000	3.343	1.000	2.189	1.750	.138	10	8300	Yes	2.12
3954504	M1200D400Z06S150HN07	4.000	4.342	1.500	3.661	1.750	.138	6	6300	Yes	3.73
3954505	M1200D400Z09S150HN07	4.000	4.342	1.500	3.661	1.750	.138	9	6300	Yes	3.68
3954506	M1200D400Z12S150HN07	4.000	4.342	1.500	3.661	1.750	.138	12	6300	Yes	3.65
4130534	M1200D500Z08S150HN07	5.000	5.343	1.500	3.652	2.380	.138	8	5000	Yes	6.32

NOTE: Socket-head cap screw with coolant groove must be ordered separately.

M1200 Mini 30° • Shell Mills





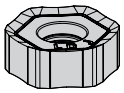
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136418	M1200HD200Z05S075HN07	2.000	2.266	.750	1.750	1.575	.186	5	12500	Yes	.91
4136421	M1200HD300Z05S100HN07	3.000	3.266	1.000	2.188	1.750	.186	5	8300	Yes	1.95
4136433	M1200HD400Z06S150HN07	4.000	4.266	1.500	3.661	1.750	.185	6	6300	Yes	3.33
4136435	M1200HD500Z08S150HN07	5.000	5.265	1.500	3.661	2.380	.185	8	5000	Yes	6.29

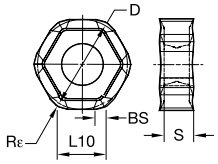
NOTE: Socket-head cap screw with coolant groove must be ordered separately.

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M1200 Mini • HNGJ-LDJ • HN0704



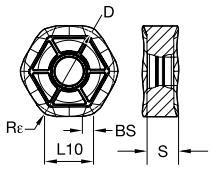


● first choice
○ alternate choice

| | | |

M1200 Mini • HNPJ-GD • HN0704

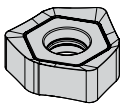


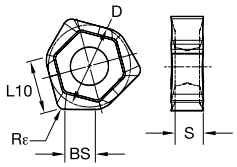


● first choice
○ alternate choice

| | | |

M1200 Mini • XNGJ-LDJ-3 Wiper • XN0704





● first choice
○ alternate choice

| | | |

M1200 Mini • Recommended Starting Speeds [SFM]

Material Group		THM-U			TN6501			TN6510			TN6520			TN6525			TN6540		
P	1	–	–	–	–	–	–	–	–	–	–	–	–	1340	**1045**	925	1180	**925**	785
	2	–	–	–	–	–	–	–	–	–	–	–	–	1045	**830**	710	830	**630**	550
	3	–	–	–	–	–	–	–	–	–	–	–	–	925	**710**	610	710	**550**	450
	4	–	–	–	–	–	–	–	–	–	–	–	–	770	**550**	475	590	**430**	355
	5	–	–	–	–	–	–	–	–	–	–	–	–	1025	**770**	650	785	**590**	490
	6	–	–	–	–	–	–	–	–	–	–	–	–	670	**535**	430	535	**395**	335
M	1	–	–	–	–	–	–	–	–	–	–	–	–	630	**395**	260	430	**260**	200
	2	–	–	–	–	–	–	–	–	–	–	–	–	395	**260**	155	260	**155**	140
	3	–	–	–	–	–	–	–	–	–	–	–	–	415	**260**	180	275	**155**	140
K	1	–	–	–	–	–	–	1570	**1140**	845	1475	**1045**	750	905	**805**	725	725	**670**	590
	2	–	–	–	–	–	–	1380	**925**	670	1280	**830**	630	710	**630**	590	570	**510**	450
	3	–	–	–	–	–	–	1105	**845**	650	985	**750**	535	590	**535**	475	510	**475**	415
N	1	7870	**4720**	3935	7870	**4720**	3935	–	–	–	–	–	–	–	–	–	–	–	–
	2	5370	**3210**	2615	5370	**3210**	2615	–	–	–	–	–	–	–	–	–	–	–	–
	3	3150	**1970**	1570	3150	**1970**	1570	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	155	**120**	95
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	80	**60**	40
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	235	**140**	95
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	200	**95**	80
H	1	–	–	–	–	–	–	475	**360**	230	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	475	**360**	230	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	380	**260**	150	–	–	–	–	–	–	–	–	–

Material Group		WK15CM			WP25PM			WP35CM			WP40PM			WS30PM			WS40PM		
P	1	–	–	–	1295	**1120**	1060	1790	**1555**	1460	970	**855**	805	–	–	–	–	–	–
	2	–	–	–	1080	**940**	785	1105	**1000**	905	820	**705**	590	–	–	–	–	–	–
	3	–	–	–	1000	**845**	690	1000	**905**	805	755	**640**	525	–	–	–	–	–	–
	4	–	–	–	890	**725**	590	750	**690**	630	675	**560**	445	–	–	–	–	–	–
	5	–	–	–	725	**670**	590	1025	**905**	830	560	**510**	445	–	–	–	560	**475**	395
	6	–	–	–	650	**490**	395	630	**535**	430	490	**375**	295	–	–	–	490	**360**	260
M	1	–	–	–	805	**710**	650	805	**725**	610	640	**560**	510	890	**785**	725	690	**560**	460
	2	–	–	–	725	**630**	510	725	**630**	550	575	**490**	410	805	**710**	570	590	**475**	395
	3	–	–	–	550	**475**	370	570	**510**	450	425	**375**	295	610	**535**	415	475	**360**	280
K	1	1655	**1520**	1340	905	**805**	725	1165	**1045**	940	–	–	–	–	–	–	–	–	–
	2	1320	**1165**	1080	710	**630**	590	925	**830**	750	–	–	–	–	–	–	–	–	–
	3	1105	**985**	905	590	**535**	475	770	**690**	630	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	155	**140**	95	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	2	–	–	–	155	**140**	95	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	3	–	–	–	200	**155**	95	–	–	–	–	–	–	215	**180**	120	165	**130**	80
	4	–	–	–	275	**200**	140	260	**200**	130	–	–	–	335	**235**	155	195	**165**	100
H	1	–	–	–	475	**355**	275	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M1200 Mini • Recommended Starting Feeds [IPT]

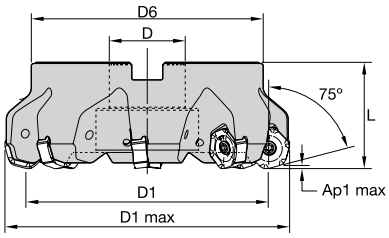
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%				
.F..LDJ	.019	**.035**	.072	.014	**.025**	.051	.010	**.019**	.038	.009	**.016**	.033	.008	**.015**	.030		.F..LDJ
.E..LD	.019	**.055**	.112	.014	**.039**	.079	.010	**.029**	.058	.009	**.025**	.051	.008	**.023**	.046		.E..LD
.S..GD	.036	**.093**	.153	.026	**.066**	.106	.019	**.049**	.078	.017	**.042**	.068	.015	**.039**	.062		.S..GD
.S..HD	.036	**.093**	.153	.026	**.066**	.106	.019	**.049**	.078	.017	**.042**	.068	.015	**.039**	.062		.S..HD

NOTE: Use "Light Machining" value as starting feed rate.

M1200 • 15° • High Feed • Shell Mills • Inch



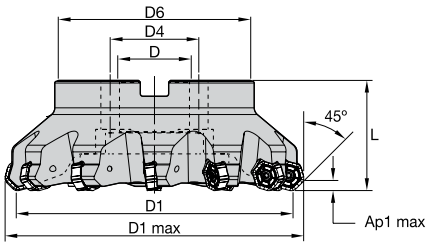


order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
3954510	M1200HF200Z04S075HN09	2.000	2.704	.750	1.593	1.575	.087	4	11300	Yes	1.17
3954511	M1200HF250Z05S075HN09	2.500	3.204	.750	1.986	1.575	.087	5	8900	Yes	1.56
3954512	M1200HF300Z06S100HN09	3.000	3.704	1.000	2.189	1.750	.087	6	7400	Yes	2.25
3954563	M1200HF400Z08S150HN09	4.000	4.703	1.500	3.661	1.750	.086	8	5800	Yes	3.96
3954564	M1200HF500Z09S150HN09	5.000	5.704	1.500	3.652	2.380	.087	9	4700	Yes	6.88

NOTE: Socket head cap screw with coolant grooves, coolant lock screw assembly, coolant lock screw, and coolant cap must be ordered separately.

M1200 • 45° • Shell Mills • Inch



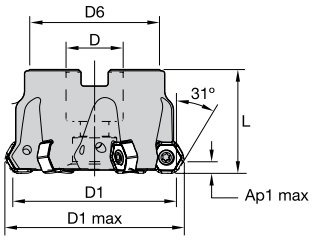


order number	catalog number	D1	D1 max	D	D4	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
3323871	M1200D200Z04S075HN09	2.000	2.434	.750	—	1.750	1.570	.177	4	12500	Yes	.81
3323872	M1200D200Z05S075HN09	2.000	2.434	.750	—	1.750	1.570	.177	5	12500	Yes	.82
3323873	M1200D250Z06S075HN09	2.500	2.933	.750	—	2.144	1.570	.177	6	10000	Yes	1.32
3323874	M1200D250Z07S075HN09	2.500	2.933	.750	—	2.144	1.570	.177	7	10000	Yes	1.34
3650540	M1200D300Z05S100HN09	3.000	3.433	1.000	—	2.189	1.750	.177	5	8300	Yes	1.86
3323875	M1200D300Z06S100HN09	3.000	3.433	1.000	—	2.189	1.750	.177	6	8300	Yes	1.79
3323876	M1200D300Z09S100HN09	3.000	3.433	1.000	—	2.189	1.750	.177	9	8300	Yes	1.97
3650541	M1200D400Z06S125HN09	4.000	4.432	1.250	—	2.722	1.750	.177	6	6300	Yes	3.17
3323877	M1200D400Z08S125HN09	4.000	4.432	1.250	—	2.880	1.750	.177	8	6300	Yes	2.93
3958019	M1200D400Z06S150HN09	4.000	4.432	1.500	—	3.661	1.750	.177	6	6300	Yes	4.15
3958020	M1200D400Z08S150HN09	4.000	4.432	1.500	—	3.661	1.750	.177	8	6300	Yes	3.46
3958021	M1200D400Z11S150HN09	4.000	4.432	1.500	—	3.661	1.750	.172	11	6300	Yes	3.50
3650542	M1200D500Z08S150HN09	5.000	5.431	1.500	—	3.652	2.380	.177	8	5000	Yes	6.20
3323879	M1200D500Z10S150HN09	5.000	5.431	1.500	—	3.810	2.380	.177	10	5000	Yes	5.94
3323880	M1200D500Z14S150HN09	5.000	5.431	1.500	—	3.810	2.380	.177	14	5000	Yes	6.21
4086796	M1200D600Z09S200HN09	6.000	6.430	2.000	—	4.722	2.380	.177	9	4100	Yes	9.08
3323881	M1200D600Z12S200HN09	6.000	6.432	2.000	—	4.879	2.380	.177	12	4100	Yes	9.10
3323882	M1200D600Z16S200HN09	6.000	6.432	2.000	—	4.879	2.380	.177	16	4100	Yes	9.36
3954507	M1200D800Z16S250HN09	8.000	8.432	2.500	4.000	5.118	2.380	.180	16	3130	Yes	13.22
4086797	M1200D800Z10S250HN09	8.000	8.433	2.500	4.000	5.118	2.380	.177	10	3130	Yes	13.01
4086798	M1200D1000Z12S250HN09	10.000	10.433	2.500	4.000	7.120	2.380	.177	12	2510	Yes	24.22
3954508	M1200D1000Z20S250HN09	10.000	10.433	2.500	4.000	7.120	2.380	.177	20	2510	Yes	24.52
4086799	M1200D1200Z14S250HN09	12.000	12.433	2.500	4.000	9.016	3.150	.177	14	2090	Yes	41.50

NOTE: Socket-head cap screw with coolant groove, coolant lock screw assembly, coolant lock screw, and coolant cap must be ordered separately.

M1200 HD • Shell Mills





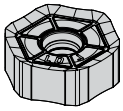
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4147879	**M1200HD250Z06S075HN09**	2.500	2.836	.750	1.986	1.575	.236	6	10000	Yes	1.36
4147880	**M1200HD300Z05S100HN09**	3.000	3.336	1.000	2.189	1.750	.236	5	8300	Yes	1.98
4147881	**M1200HD300Z08S100HN09**	3.000	3.336	1.000	2.189	1.750	.236	8	8300	Yes	2.01

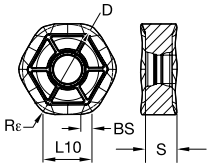
NOTE: Socket-head cap screw with coolant groove, coolant screw assembly, coolant lock screw, and coolant cap must be ordered separately.

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M1200 • HNGJ-LDJ • HN0905



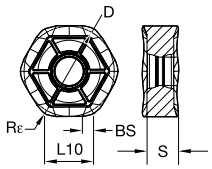


● first choice
○ alternate choice

| | | |

M1200 • HNGJ-GD • HN0905





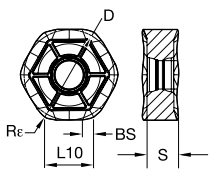
● first choice
○ alternate choice

P						●	●			●	●	●	○	●													
M						○	●			●	●	●	●	●													
K	●		●	●		○	○	●	●	○	○																
N	○	●												○													
S							●			●	○	○	●	○													
H										○			○														

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNGJ0905ANSNGD	HNGJ535ANSNGD	12	16	.625	8,59	.338	5,56	.219	1,71	.068	1,20	.047	0,10	.004	-	-	-	3119541	3614650	3037596	5427370	-	5400965	5895349	5895350	5528974	6180280

M1200 • HNPJ-HD • HN0905



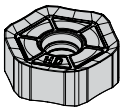


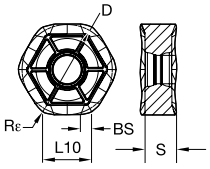
● first choice
○ alternate choice

P						●	●			●	●	●	○	●													
M						○	●			●	●	●	●	●													
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N	○	●												○													
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H										○			○														

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNPJ090543ANSNHD	HNPJ53511ANSNHD	12	16	.625	8,50	.334	5,44	.214	—	—	4,35	.171	0,13	.005	-	-	-	3670866	-	3670865	-	-	5895378	5895379	5895380	-	6180294
HNPJ0905ANSNHD	HNPJ535ANSNHD	12	16	.625	8,59	.338	5,46	.215	1,65	.065	1,20	.047	0,18	.007	-	-	-	3670864	-	3670842	5427371	-	5895376	5895377	5550909	-	6180279

M1200 • HNGJ-HD • HN0905



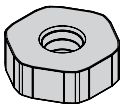


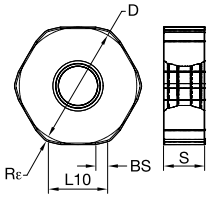
● first choice
○ alternate choice

P							●	●			●	●	●	○	●											
M							○	●			●	●	●	●	●											
K		●		●	●		○	○	●	●	○	○														
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H											○			○												

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNGJ090543ANSNHD	HNGJ53511ANSNHD	12	16	.625	8,50	.335	5,44	.214	—	—	4,35	.171	0,20	.008	-	-	-	3564083	3564084	3564085	-	-	-	-	-	-	6180292
HNGJ0905ANSNHD	HNGJ535ANSNHD	12	16	.625	8,59	.338	5,46	.215	1,65	.065	1,20	.047	0,17	.007	-	-	-	3563900	3563901	3563902	-	-	5895371	5895372	5895373	-	6180291

M1200 • HNEW-AN • HN0905



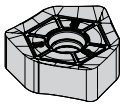


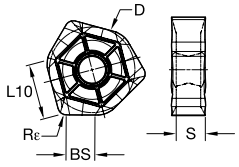
● first choice
○ alternate choice

P							●	●			●	●	●	○	●											
M							○	●			●	●	●	●	●											
K		●		●	●		○	○	●	●	○	○														
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H											○			○												

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNEC0905ANSN	HNEC535ANSN	12	16	.625	9,17	.361	5,56	.219	1,95	.077	1,20	.047	0,19	.008	-	-	-	-	-	-	-	5910033	-	-	-	-	-

M1200 • XNGJ-GD3 Wiper • HN0905





● first choice
○ alternate choice

		THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
P						●	●			●	●	●	○	●
M						○	●			●	●	●	●	●
K		●		●	●	○	○	●	●	○	○			
N		○	●											○
S							●			●	○	○	●	●
H										○			○	

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in
XNGJ0905ANSNGD3W	XNGJ535ANSNGD3W	6	16	.625	9,56	.377	5,51	.217	6,00	.230	1,60	.063	0,09	.004

THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
-	-	3117962	3524707	3523620	3066479	5622622	-	5895381	-	5895382	-	6180277

M1200 • Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	.E..LD	WP40PM	**.S..GD**	**WP40PM**	.S..HD	WP40PM
P3–P4	.E..LD	WP25PM	**.S..GD**	**WP35CM**	.S..HD	WP35CM
P5–P6	.E..LD	WP25PM	**.S..GD**	**WP35CM**	.S..HD	WP35CM
M1–M2	.E..LD	WP25PM	**.S..GD**	**WP25PM**	.S..HD	WP25PM
M3	.E..LD	WP35CM	**.S..GD**	**WP35CM**	.S..HD	WP35CM
K1–K2	.E..LD	TN6520	**.S..GD**	**WK15CM**	.S..HD	WK15CM
K3	.E..LD	WP35CM	**.S..GD**	**WP35CM**	.S..HD	WP35CM
N1–N2	.F..LDJ	TN6501	**.F..LDJ**	**TN6501**	.F..LDJ	TN6501
N3	.F..LDJ	TN6501	**.F..LDJ**	**TN6501**	.F..LDJ	TN6501
S1–S2	.E..LD	WS30PM	**.S..GD**	**WS30PM**	.S..HD	WP25PM
S3	.E..LD	WS30PM	**.S..GD**	**WS30PM**	.S..HD	WP40PM
S4	.E..LD	WS30PM	**.S..GD**	**WS30PM**	.S..HD	WP40PM

M1200 • Recommended Starting Speeds [SFM]

Material Group		THM-U			TN6501			TN6510			TN6520			TN6525			TN6540			WK15CM		
P	1	–	–	–	–	–	–	–	–	–	–	–	–	1340	**1045**	925	1180	**925**	785	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	1045	**830**	710	830	**630**	550	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	925	**710**	610	710	**550**	450	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	770	**550**	475	590	**430**	355	–	–	–
	5	–	–	–	–	–	–	–	–	–	–	–	–	1025	**770**	650	785	**590**	490	–	–	–
	6	–	–	–	–	–	–	–	–	–	–	–	–	670	**535**	430	535	**395**	335	–	–	–
M	1	–	–	–	–	–	–	–	–	–	–	–	–	630	**395**	260	430	**260**	200	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	395	**260**	155	260	**155**	140	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	415	**260**	180	275	**155**	140	–	–	–
K	1	750	**670**	590	–	–	–	1310	**950**	705	1475	**1045**	750	905	**805**	725	725	**670**	590	1655	**1520**	1340
	2	–	–	–	–	–	–	1145	**770**	555	1280	**830**	630	710	**630**	590	570	**510**	450	1320	**1165**	1080
	3	–	–	–	–	–	–	915	**705**	540	985	**750**	535	590	**535**	475	510	**475**	415	1105	**985**	905
N	1	7870	**4720**	3935	7870	**4720**	3935	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	5370	**3210**	2615	5370	**3210**	2615	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	3150	**1970**	1570	3150	**1970**	1570	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	155	**120**	95	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	80	**60**	40	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	235	**140**	95	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	200	**95**	80	–	–	–
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		WK25YM			WP25PM			WP35CM			WP40PM			WS30PM			WS40PM		
P	1	–	–	–	1295	**1120**	1060	1790	**1555**	1460	970	**855**	805	–	–	–	–	–	–
	2	–	–	–	1080	**940**	785	1105	**1000**	905	820	**705**	590	–	–	–	–	–	–
	3	–	–	–	1000	**845**	690	1000	**905**	805	755	**640**	525	–	–	–	–	–	–
	4	–	–	–	890	**725**	590	750	**690**	630	675	**560**	445	–	–	–	–	–	–
	5	–	–	–	725	**670**	590	1025	**905**	830	560	**510**	445	–	–	–	560	**475**	395
	6	–	–	–	650	**490**	395	630	**535**	430	490	**375**	295	–	–	–	490	**360**	260
M	1	–	–	–	805	**710**	650	805	**725**	610	640	**560**	510	890	**785**	725	690	**560**	460
	2	–	–	–	725	**630**	510	725	**630**	550	575	**490**	410	805	**710**	570	590	**475**	395
	3	–	–	–	550	**475**	370	570	**510**	450	425	**375**	295	610	**535**	415	475	**360**	280
K	1	3170	**2880**	2560	905	**805**	725	1165	**1045**	940	–	–	–	–	–	–	–	–	–
	2	2510	**2240**	2090	710	**630**	590	925	**830**	750	–	–	–	–	–	–	–	–	–
	3	2110	**1870**	1720	590	**535**	475	770	**690**	630	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	155	**140**	95	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	2	–	–	–	155	**140**	95	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	3	–	–	–	200	**155**	95	–	–	–	–	–	–	215	**180**	120	165	**130**	80
	4	–	–	–	275	**200**	140	260	**200**	130	–	–	–	335	**235**	155	195	**165**	100
H	1	–	–	–	475	**355**	275	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M1200 • Recommended Starting Feeds [IPT]

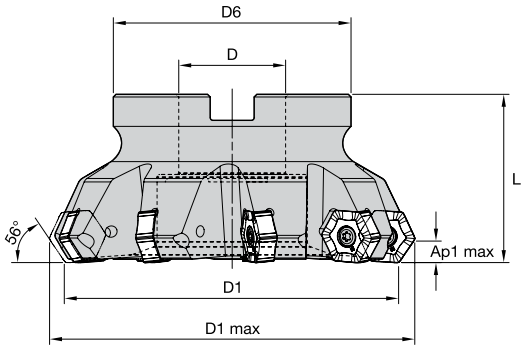
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.F..LDJ	.007	**.013**	.026	.005	**.009**	.019	.004	**.007**	.014	.003	**.006**	.012	.003	**.006**	.011	.F..LDJ
.E..LD	.007	**.020**	.040	.005	**.014**	.029	.004	**.011**	.021	.003	**.009**	.019	.003	**.008**	.017	.E..LD
.S..GD	.010	**.033**	.053	.007	**.024**	.038	.006	**.018**	.028	.005	**.015**	.025	.004	**.014**	.023	.S..GD
.S..HD	.013	**.033**	.053	.009	**.024**	.038	.007	**.018**	.028	.006	**.015**	.025	.006	**.014**	.023	.S..HD
.S..Ceramic	.007	**.013**	.020	.005	**.009**	.014	.004	**.007**	.011	.003	**.006**	.009	.003	**.006**	.008	.S..Ceramic

NOTE: Use "Light Machining" value as starting feed rate.

M1200 Max Screw Clamping • 56° • Shell Mills • Metric





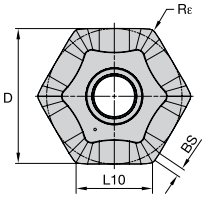
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	kg
6921238	**M1200U300Z05S100HN11**	76	88,0	25	70	44	7,5	5	—	No	0,87
6581490	**M1200D080Z05S27HN11**	80	91,8	27	60	50	7,5	5	—	No	0,99
6495103	**M1200D100Z07S32HN11**	100	111,8	32	78	50	7,5	7	8100	No	1,49
6921239	**M1200U400Z07S150HN11**	102	113,4	38	86	51	7,5	7	—	No	1,55
6495104	**M1200D125Z09S40HN11**	125	136,7	40	89	63	7,5	9	—	No	2,72
6921240	**M1200U600Z10S200HN11**	152	164,1	51	124	60	7,5	10	—	No	4,25
6581561	**M1200D160Z10S40HN11**	160	171,7	40	90	63	7,5	10	—	No	3,81
6626921	**M1200D200Z12S60HN11**	200	211,7	60	130	63	7,5	12	—	No	6,88
6852419	**M1200D250Z14S60HN11**	250	261,7	60	130	63	7,5	14	—	No	6,88

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M1200 Max Screw Clamping Inserts • HNMU-MM • Heavy-Duty Face Milling





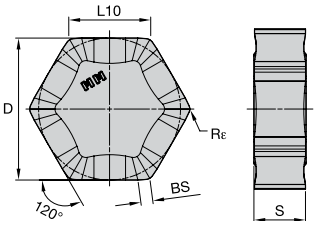
● first choice
○ alternate choice

P		●	●
M		●	●
K	●	○	○
N			○
S		○	○
H			○

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	WK15CM	WP35CM	WU20PM
HNMU110710ZNSNMM	HNMU110710ZNSNMM	12	19	.750	10,75	.423	6,92	.272	1,20	.046	1,00	.039	0,06	.002	6495106	6495105	6852420

M1200 Max Screw Clamping Inserts • HNMF-MM





● first choice
○ alternate choice

P			●
M			●
K		●	○
N			
S			○
H			

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	WK15CM	WP35CM
HNMF110710ZNSNMM	HNMF110710ZNSNMM	12	19	.750	10,75	.423	6,87	.271	1,20	.046	1,00	.039	0,06	.002	6465300	6870109

M1200 Max • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WU20PM
P3–P4	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WU20PM
P5–P6	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WP35CM
M1–M2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
M3	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WP35CM
K1–K2	.S..MM	WK15CM	**.S..MM**	**WK15CM**	.S..MM	WU20PM
K3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WK15CM
N1–N2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
N3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S1–S2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S4	.S..MM	WP35CM	**.S..MM**	**WU20PM**	.S..MM	WU20PM

M1200 Max • Recommended Starting Speeds [SFM]

Material Group		WP35CM			WK15CM			WU20PM		
P	1	1490	**1300**	1210	–	**–**	–	1080	**950**	890
	2	920	**840**	750	–	**–**	–	900	**820**	660
	3	840	**750**	670	–	**–**	–	840	**720**	570
	4	620	**570**	520	–	**–**	–	740	**620**	490
	5	850	**750**	690	–	**–**	–	610	**570**	490
	6	520	**440**	–	–	**–**	–	540	**430**	330
M	1	670	**610**	510	–	**–**	–	670	**590**	540
	2	610	**520**	460	–	**–**	–	610	**520**	430
	3	480	**430**	380	–	**–**	–	460	**390**	310
K	1	970	**870**	790	1380	**1260**	1120	820	**720**	610
	2	770	**690**	620	1100	**970**	900	660	**590**	490
	3	640	**570**	520	920	**820**	750	590	**490**	390
N	1	–	**–**	–	–	**–**	–	1800	**1540**	1310
	2	–	**–**	–	–	**–**	–	1800	**1540**	1310
	3	–	**–**	–	–	**–**	–	1310	**1150**	980
S	1	–	**–**	–	–	**–**	–	130	**110**	80
	2	–	**–**	–	–	**–**	–	130	**110**	80
	3	–	**–**	–	–	**–**	–	160	**130**	80
	4	–	**–**	–	–	**–**	–	230	**160**	110
H	1	–	**–**	–	–	**–**	–	360	**260**	230

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M1200 Max • Recommended Starting Feeds [IPT]

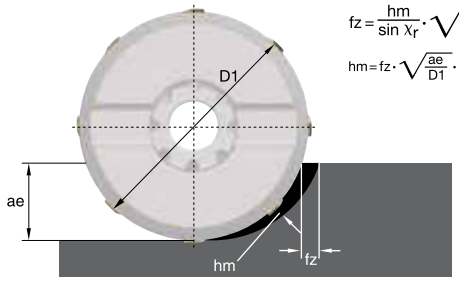
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.S..MM	.008	**.028**	.045	.006	**.020**	.032	.004	**.015**	.024	.004	**.013**	.021	.004	**.012**	.019	.S..MM

*NOTE: FIRST choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

$$fz = \frac{hm}{\sin \chi_r} \cdot \sqrt{\frac{D1}{ae}}$$

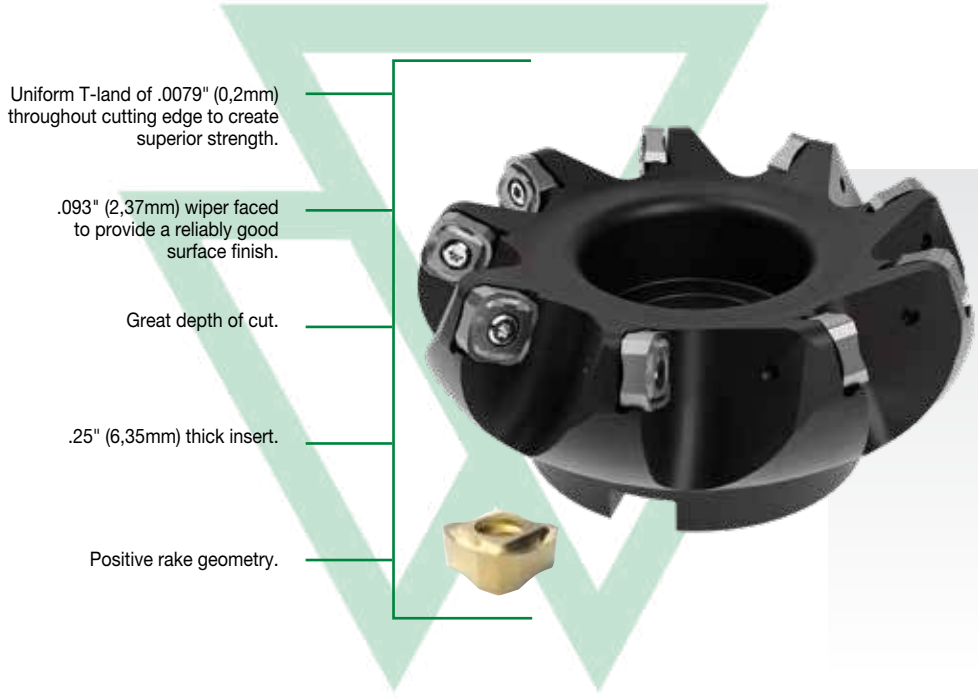
$$hm = fz \cdot \sqrt{\frac{ae}{D1}} \cdot \sin \chi_r$$



M8065HD

M8065HD Face Mill

Use the M8065HD to easily confront heavy-duty milling jobs in steel and cast-iron materials by applying deep depths of cut while consistently maintaining high metal removal rates.



The M8065HD face mill features a thick insert with 8 cutting edges, ideal for heavy duty applications requiring bigger stock removal.

-MM



WK15CM

K

WK15CM is a wear-resistant grade with balanced toughness for general milling of cast irons. Best results in dry machining, but can also be used wet.

WP35CM

P K

WP35CM has a wide range of applications in general and rough milling of steels and cast iron. Performs best in dry, but can also be used under wet conditions.

WU20PM

P M K N S H

WU20PM is a universal grade for machining of steel, stainless steel, and high-temperature alloys. Also suitable for machining of gray and nodular irons. Resists breakage and offers improved wear resistance and increased strength. Can be used for both dry and wet machining.

DIVE INTO THE DOC WITH M8065HD

PRODUCT

SERIES

M8065HD

DIAMETER RANGE

3.0–8.0" (50–315 mm)

SHANK TYPES

Shell Mills

INDUSTRY

ENERGY

GENERAL ENGINEERING

TRANSPORTATION

APPLICATIONS



FACE MILLING



SIDE/SHOULDER MILLING: EASED CHAMFER

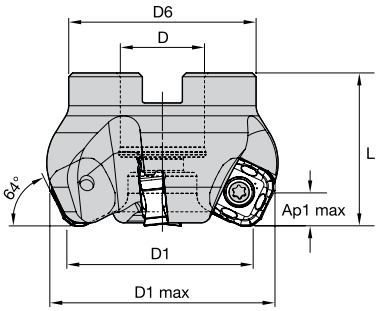
HEAVY DUTY

RELIABLE



M8065HD • 26° • Shell Mills • Inch





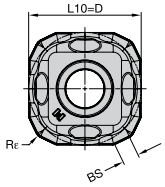
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	coolant supply	lbs
6921244	**M8065HU300Z06S100SN15**	3.000	3.348	1.000	2.750	1.750	.354	6	No	2.31
6921245	**M8065HU400Z07S150SN15**	4.000	4.348	1.250	2.875	2.000	.354	7	No	8.64
6921246	**M8065HU500Z09S150SN15**	5.000	5.348	1.500	3.810	2.380	.354	9	No	7.21
6921247	**M8065HU600Z11S200SN15**	6.000	6.348	2.000	4.875	2.380	.354	11	No	9.99
6921248	**M8065HU800Z14S250SN15**	8.000	8.348	2.500	5.118	2.380	.354	14	No	15.37

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M8065HD • SNMX-MM • Heavy-Duty Face Milling





● first choice
○ alternate choice

| | | |

M8065HD • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WU20PM
P3–P4	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WU20PM
P5–P6	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WP35CM
M1–M2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
M3	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MM	WP35CM
K1–K2	.S..MM	WK15CM	**.S..MM**	**WK15CM**	.S..MM	WU20PM
K3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WK15CM
N1–N2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
N3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S1–S2	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S3	.S..MM	WU20PM	**.S..MM**	**WU20PM**	.S..MM	WU20PM
S4	.S..MM	WP35CM	**.S..MM**	**WU20PM**	.S..MM	WU20PM

M8065HD • Recommended Starting Speeds [SFM]

Material Group		WP35CM			WK15CM			WU20PM		
P	1	1490	**1300**	1210	–	**–**	–	1080	**950**	890
	2	920	**840**	750	–	**–**	–	900	**820**	660
	3	840	**750**	670	–	**–**	–	840	**720**	570
	4	620	**570**	520	–	**–**	–	740	**620**	490
	5	850	**750**	690	–	**–**	–	610	**570**	490
	6	520	**440**	–	–	**–**	–	540	**430**	330
M	1	670	**610**	510	–	**–**	–	670	**590**	540
	2	610	**520**	460	–	**–**	–	610	**520**	430
	3	480	**430**	380	–	**–**	–	460	**390**	310
K	1	970	**870**	790	1380	**1260**	1120	820	**720**	610
	2	770	**690**	620	1100	**970**	900	660	**590**	490
	3	640	**570**	520	920	**820**	750	590	**490**	390
N	1	–	**–**	–	–	**–**	–	1800	**1540**	1310
	2	–	**–**	–	–	**–**	–	1800	**1540**	1310
	3	–	**–**	–	–	**–**	–	1310	**1150**	980
S	1	–	**–**	–	–	**–**	–	130	**110**	80
	2	–	**–**	–	–	**–**	–	130	**110**	80
	3	–	**–**	–	–	**–**	–	160	**130**	80
	4	–	**–**	–	–	**–**	–	230	**160**	110
H	1	–	**–**	–	–	**–**	–	360	**260**	230

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M8065HD • Recommended Starting Feeds [IPT]

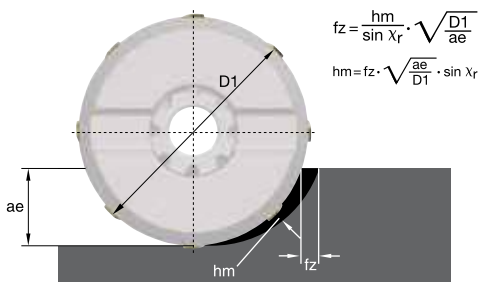
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.S..MM	.008	**.026**	.042	.006	**.018**	.030	.005	**.014**	.023	.004	**.012**	.020	.004	**.011**	.018	.S..MM

*NOTE: FIRST choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

$$fz = \frac{hm}{\sin \chi_r} \cdot \sqrt{\frac{D1}{ae}}$$

$$hm = fz \cdot \sqrt{\frac{ae}{D1}} \cdot \sin \chi_r$$





widia.com

WIDIA™

M8090 Series

M8090, M8090-F Face Mills

The M8090 Series is a fine pitch face milling series for rough, semi-finish and finish milling of a variety of cast and nodular irons at high-feed rates.

- Fine pitch.
- Insert with eight cutting edges.
- 89-degree approach angle to machine close to the fixture.
- Clamping wedge with double thread screw.
- Rigid 'monoblock' cutter body design.



M8090

The M8090 face mill is designed with a 1° approach angle for rough and semi-finish milling applications in cast iron and nodular iron with the added flexibility of using carbide or ceramic inserts on the same cutter depending on productivity needs.

- Fine pitch cutter with fixed pocket for semi-finisher inserts and adjustable pockets for wiper inserts.
- Inserts with eight cutting edges, wiper inserts with four cutting edges.
- Axial adjustable wiper pocket seats to set up axial run-out within .0002" (0,005mm).
- Precision ground inserts and wiper.



M8090-F

The M8090-F finish mill is designed to achieve a surface finish <1.6 microns Ra in cast iron finish milling applications at high feeds.

INSERTS OFFERED IN CARBIDE GRADE WK15PM, CERAMICS WK25YM, AND PCBN WBK40U



SNEN Insert

K

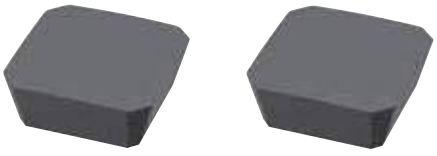
Ceramic insert with eight effective cutting edges



-MM Insert

K

Insert with eight effective cutting edges and a positive geometry to work on weak fixtures.



M8090-F Wiper Insert

K

Wiper inserts with four effective cutting edges.

HIGH-FEED CAST IRON ROUGHING, SEMI-FINISHING, AND FINISHING

PRODUCT

SERIES

M8090,
M8090-F

DIAMETER RANGE

M8090:
3–6" (63–250mm)

M8090-F:
4–8" (80–250mm)

SHANK TYPES

Shell Mills

INDUSTRY

TRANSPORTATION

GENERAL ENGINEERING

APPLICATIONS

FACE MILLING



IRON MILLING

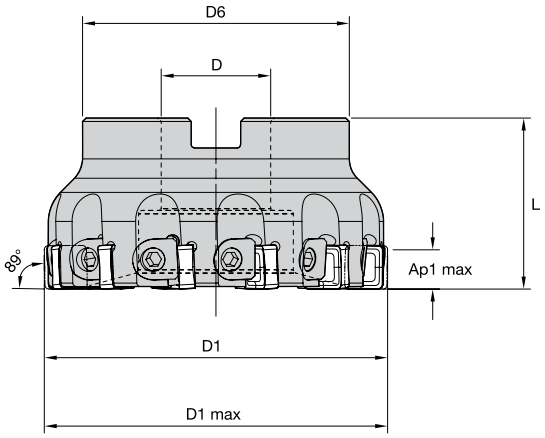
Versatile, productive face mill for cast iron and ductile iron.

HIGH-FEED

Multiple insert configurations provide high surface quality at high cutting parameters in cast iron.

M8090 • 1° • Shell Mills • Inch





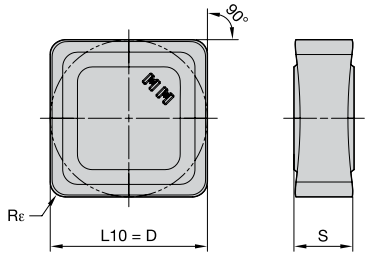
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	coolant supply	lbs
6921193	**M8090U400Z10S150SN12**	4.000	4.015	1.250	2.875	2.000	.453	10	No	3.92
6921194	**M8090U400Z12S150SN12**	4.000	4.015	1.250	2.875	2.000	.453	12	No	3.85
6921195	**M8090U600Z15S200SN12**	6.000	6.015	2.000	4.875	2.380	.453	15	No	10.66
6921196	**M8090U600Z18S200SN12**	6.000	6.015	2.000	4.875	2.380	.453	18	No	10.56
6921197	**M8090U800Z18S250SN12**	8.000	8.015	2.500	5.118	2.380	.453	18	No	15.21
6921198	**M8090U800Z24S250SN12**	8.000	8.015	2.500	5.118	2.380	.453	24	No	15.01

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M8090 • Roughing Inserts • SNHF





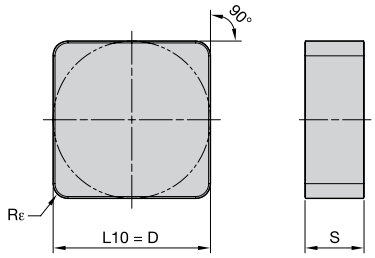
● first choice
○ alternate choice

	WK15CM	WK15PM	WK25YM
P			
M			
K	●	●	●
N			
S			
H			

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	hm mm	hm in	WK15CM	WK15PM	WK25YM
SNHF120412SNMM	SNHF120412SNMM	8	12,70	.500	12,70	.500	4,76	.188	1,20	.047	0,05	.002	-	6870510	-
SNHF120412SNMM	SNHF120412SNMM	8	12,70	.500	12,70	.500	4,76	.188	1,20	.047	–	–	6342141	-	-

M8090 • Ceramic Inserts • SNEN





● first choice
○ alternate choice

	WK15CM	WK15PM	WK25YM
P			
M			
K	●	●	●
N			
S			
H			

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	hm mm	hm in	WK15CM	WK15PM	WK25YM
SNEN120412SNHN	SNEN120412SNHN	4	12,70	.500	12,70	.500	4,76	.188	1,20	.047	0,04	.001	-	-	6880278

M8090 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	–	–	–	–	–	–
P3–P4	–	–	–	–	–	–
P5–P6	–	–	–	–	–	–
M1–M2	–	–	–	–	–	–
M3	–	–	–	–	–	–
K1–K2	.S..HN	WK25YM	**.S..MM**	**WK15CM**	.S..MM	WK15CM
K3	.S..MM	WK15PM	**.S..MM**	**WK15PM**	.S..MM	WK15PM
N1–N2	–	–	–	–	–	–
N3	–	–	–	–	–	–
S1–S2	–	–	–	–	–	–
S3	–	–	–	–	–	–
S4	–	–	–	–	–	–

M8090 • Recommended Starting Speeds [SFM]

Material Group		WK15CM			WK15PM			WK25YM		
P	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–
	6	–	–	–	–	–	–	–	–	–
M	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
K	1	1380	**1260**	1120	1060	**965**	845	3170	**2875**	2555
	2	1100	**970**	900	830	**750**	690	2500	**2245**	2090
	3	920	**820**	750	690	**630**	570	2105	**1870**	1710
N	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–
H	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M8090 • Recommended Starting Feeds [IPT]

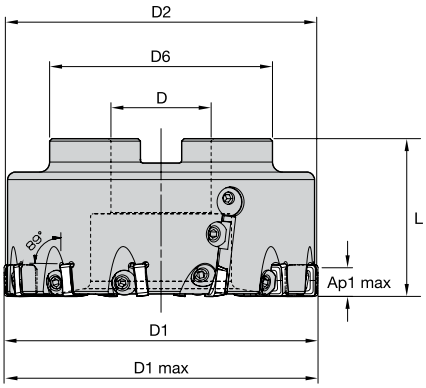
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%				
.S..MM	.007	**.023**	.037	.005	**.017**	.027	.004	**.013**	.020	.003	**.011**	.017	.003	**.010**	.016		.S..MM
.S..HN	.005	**.016**	.032	.003	**.012**	.023	.003	**.009**	.018	.002	**.008**	.015	.002	**.007**	.014		.S..HN

NOTE: Use "Light Machining" value as starting feed rate.
For new applications, starting at a lighter feed rate is recommended.
% = ae/Dc X 100 (ae = radial depth of cut, Dc = cutting diameter)

M8090-F • 1° • Shell Mills • Inch

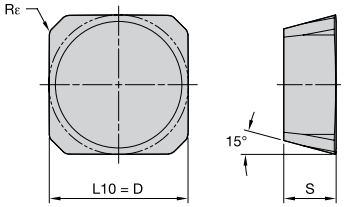




order number	catalog number	D1	D1 max	D	D2	D6	L	Ap1 max	Z	coolant supply	lbs
6921199	**M8090FU400Z10W2S150SN12**	4.000	4.015	1.250	3.921	3.780	2.000	.453	10	No	5.12
6921200	**M8090FU600Z18W2S200SN12**	6.000	6.015	2.000	5.921	4.815	2.480	.453	18	No	13.16
6921221	**M8090FU800Z24W4S250SN12**	8.000	8.015	2.500	7.921	5.118	2.480	.453	24	No	22.11

M8090-F • Wiper Inserts • SDEN





● first choice
○ alternate choice

													THM-F	WBK40U	WK15CM	WK15PM	WK25YM
P																	
M																	
K													●	●	●	●	●
N													●				
S																	
H																	

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	THM-F	WBK40U	WK15CM	WK15PM	WK25YM
SDEN1204PDEN4WC	**SDEN1204PDEN4WC**	4	12,70	.500	12,70	.500	4,76	.188	9,00	.354	6458851	6296241	ı	ı	ı

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M8090 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	–	–	–	–	–	–
P3–P4	–	–	–	–	–	–
P5–P6	–	–	–	–	–	–
M1–M2	–	–	–	–	–	–
M3	–	–	–	–	–	–
K1–K2	.S..HN	WK25YM	**.S..MM**	**WK15CM**	.S..MM	WK15CM
K3	.S..MM	WK15PM	**.S..MM**	**WK15PM**	.S..MM	WK15PM
N1–N2	–	–	–	–	–	–
N3	–	–	–	–	–	–
S1–S2	–	–	–	–	–	–
S3	–	–	–	–	–	–
S4	–	–	–	–	–	–

M8090-F • Recommended Starting Speeds [SFM]

Material Group		THM-F			WBK40U			WK15CM			WK15PM			WK25YM		
P	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
M	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
K	1	475	**360**	295	4590	**2620**	1800	1380	**1260**	1120	1060	**965**	845	3170	**2875**	2555
	2	490	**390**	275	3280	**2180**	1640	1100	**970**	900	830	**750**	690	2500	**2245**	2090
	3	505	**375**	225	325	**2180**	1640	920	**820**	750	690	**630**	570	2105	**1870**	1710
N	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M8090 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.S..MM	.007	**.023**	.037	.005	**.017**	.027	.004	**.013**	.020	.003	**.011**	.017	.003	**.010**	.016	.S..MM
.S..HN	.005	**.016**	.032	.003	**.012**	.023	.003	**.009**	.018	.002	**.008**	.015	.002	**.007**	.014	.S..HN

NOTE: Use "Light Machining" value as starting feed rate.
For new applications, starting at a lighter feed rate is recommended.
% = ae/Dc X 100 (ae = radial depth of cut, Dc = cutting diameter)

The M4070 heavy-duty face mill has powerful features trusted to continuously perform in demanding machining conditions while running high cutting parameters on uneven, non-uniform surfaces.

Positive cutting edge geometry to enable smooth cutting.

Tangential design with a M6 insert clamping screw for secure insert seating and predictable performance in high depth of cut (DOC) applications.

Hardened anvils for extended tool body life.

Enlarged chip gash design for clean chip evacuation.





The M4070 heavy-duty face mill is equipped with hardened anvils and tangentially mounted inserts (20° inch/70° metric) to power through as forged and cast surfaces with uneven stock.

-MH



WK15CM

K

WK15CM is a wear-resistant grade with balanced toughness for general milling of cast irons. Best results in dry machining, but can also be used wet.

WP35CM

P M K S

WP35CM has a wide range of applications in general and rough milling of steels and cast iron. Performs best in dry, but can also be used under wet conditions.

RELIABILITY AND SECURITY WITH M4070

PRODUCT

SERIES

M4070

DIAMETER RANGE

6.0–12.0" (125–315mm)

SHANK TYPES

Shell Mills

INDUSTRY

GENERAL ENGINEERING

ENERGY

TRANSPORTATION

APPLICATIONS

FACE MILLING



RELIABILITY

Hardened anvils to protect the cutter body from heavy-duty machining conditions.

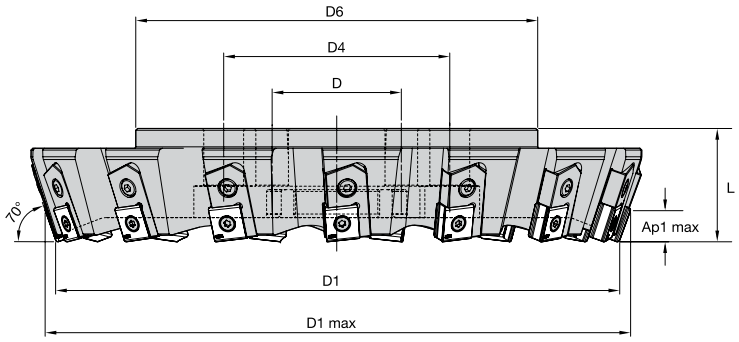
SECURITY

Tangential design with an M6 insert clamping screw for secure insert seating.

TO TACKLE HEAVY-DUTY MACHINING CONDITIONS

M4070 • 20° • Shell Mills • Inch





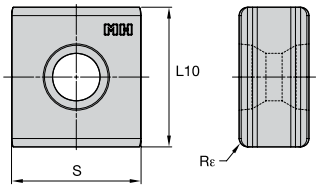
order number	catalog number	D1	D1 max	D	D4	D6	L	Ap1 max	Z	coolant supply	lbs
6921222	**M4070U600Z08S200LN20**	6.000	6.502	2.000	—	4.875	2.380	.681	8	No	12.90
6921223	**M4070U800Z10S250LN20**	8.000	8.501	2.500	4.000	5.118	2.380	.681	10	No	20.79
6921224	**M4070U1000Z12S250LN20**	10.000	10.501	2.500	4.000	8.857	2.380	.681	12	No	36.20
6921225	**M4070U1200Z15S250LN20**	12.000	12.501	2.500	4.000	8.875	3.150	.681	15	No	66.85

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M4070 • LNGX-MH





● first choice
○ alternate choice

			L10		S		Rε		hm			
ISO catalog number	ANSI catalog number	cutting edges	mm	in	mm	in	mm	in	mm	in	WK15CM	WP35CM
LNGU201012SNMH	LNGU201012SNMH	4	20,00	.787	10,00	.394	1,20	.047	0,07	.003	6852417	6852418

P		●
M		●
K	●	○
N		
S		○
H		

M4070 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	.S..MH	WP35CM	**.S..MH**	**WP35CM**	.S..MH	WP35CM
P3–P4	.S..MH	WP35CM	**.S..MH**	**WP35CM**	.S..MH	WP35CM
P5–P6	.S..MH	WP35CM	**.S..MH**	**WP35CM**	.S..MH	WP35CM
M1–M2	.S..MH	WP35CM	**.S..MH**	**WP35CM**	.S..MH	WP35CM
M3	.S..MH	WP35CM	**.S..MH**	**WP35CM**	.S..MH	WP35CM
K1–K2	.S..MH	WK15CM	**.S..MH**	**WK15CM**	.S..MH	WK15CM
K3	.S..MH	WK15CM	**.S..MH**	**WK15CM**	.S..MH	WK15CM
N1–N2	–	–	**–**	**–**	–	–
N3	–	–	**–**	**–**	–	–
S1–S2	–	–	**–**	**–**	–	–
S3	–	–	**–**	**–**	–	–
S4	.S..MH	WP35CM	**.S..MH**	**WP35CM**	.S..MH	WP35CM

M4070 • Recommended Starting Speeds [SFM]

Material Group		WP35CM			WK15CM		
P	1	1790	**1555**	1460	—	**—**	—
	2	1105	**1000**	905	—	**—**	—
	3	1000	**905**	805	—	**—**	—
	4	750	**690**	630	—	**—**	—
	5	1025	**905**	830	—	**—**	—
	6	630	**535**	360	—	**—**	—
M	1	805	**725**	610	—	**—**	—
	2	725	**630**	550	—	**—**	—
	3	570	**510**	450	—	**—**	—
K	1	1165	**1045**	940	1655	**1520**	1340
	2	925	**830**	750	1320	**1165**	1080
	3	770	**690**	630	1105	**985**	905
N	1	—	**—**	—	—	**—**	—
	2	—	**—**	—	—	**—**	—
	3	—	**—**	—	—	**—**	—
S	1	—	**—**	—	—	**—**	—
	2	—	**—**	—	—	**—**	—
	3	—	**—**	—	—	**—**	—
	4	260	**200**	130	—	**—**	—
H	1	—	**—**	—	—	**—**	—
	2	—	**—**	—	—	**—**	—
	3	—	**—**	—	—	**—**	—

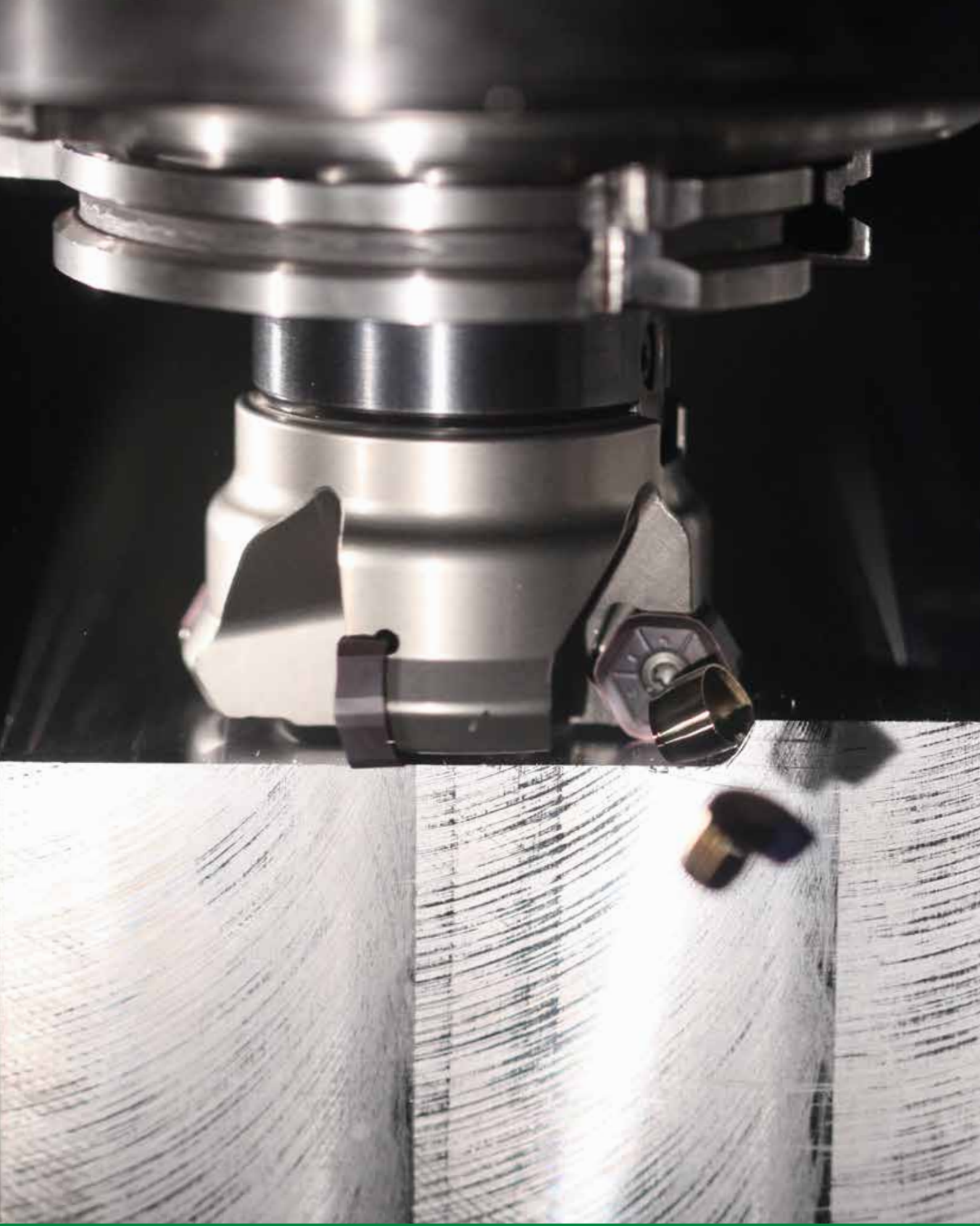
*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M4070 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.S..MH	.010	**.025**	.039	.007	**.018**	.028	.005	**.013**	.021	.005	**.012**	.019	.004	**.011**	.017	.S..MH

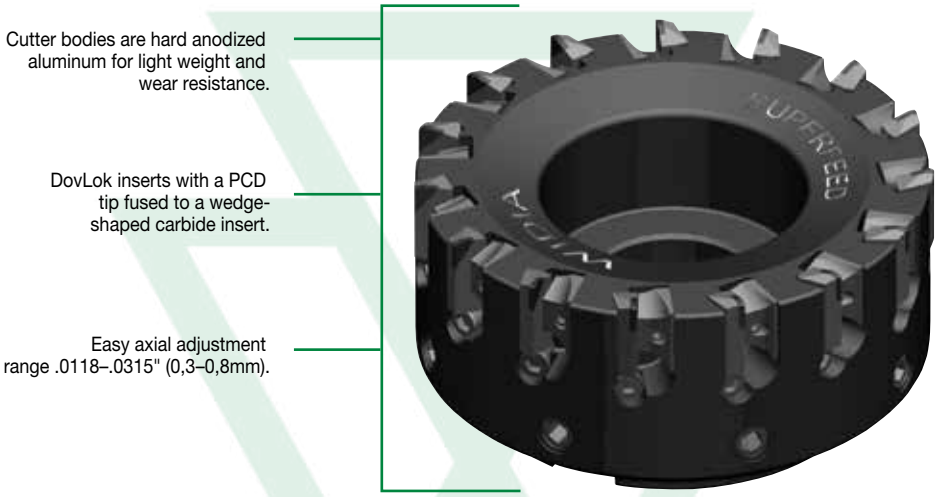
NOTE: Use "Light Machining" value as starting feed rate.
For new applications, starting at a lighter feed rate is recommended.
% = ae/Dc X 100 (ae = radial depth of cut, Dc = cutting diameter)



widia.com

WIDIA™

The SuperFeed is a PCD face mill for finishing milling of non-ferrous materials.



INSERTS OFFERED IN GRADE WDN00U

FOR SHOULDER MILLING



EDR Insert

N

Corner radii .0315" (0,8mm).
Axial DOC .25" (6,35mm) max).

FOR FACE MILLING



SDR Insert

N

Corner radii .0315" (0,8mm) and .0929" (2,36mm).
Axial DOC .25" (6,35mm) max.

NON-FERROUS PCD FACE MILILNG

PRODUCT

SERIES

SuperFeed™

DIAMETER RANGE

2.5–8" (63–200mm)

SHANK TYPES

Shell Mills
Cylindrical End Mills

INDUSTRY

GENERAL ENGINEERING

TRANSPORTATION

APPLICATIONS

FACE MILLING

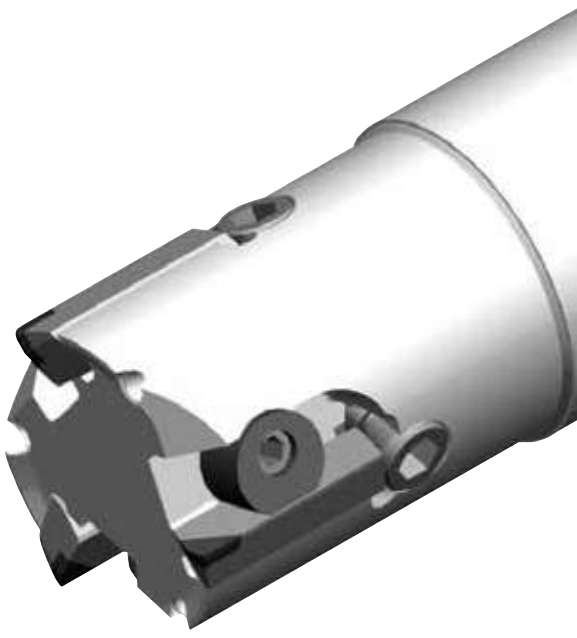
THROUGH COOLANT: RADIAL: INDEXABLE MILLING

PCD

SIDE MILLING/ SHOULDER MILLING: SQUARE END

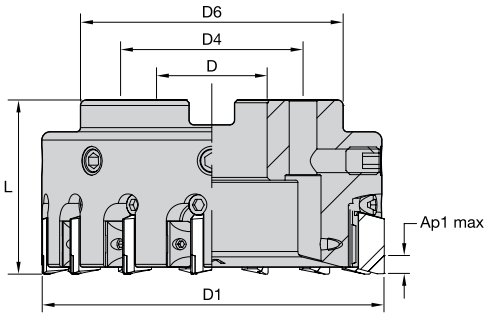
NON-FERROUS

PCD



SuperFeed • Face Mills • Inch



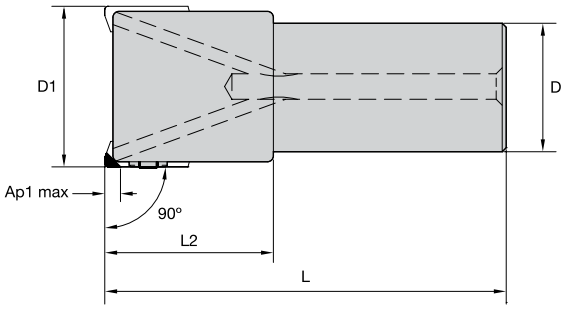


order number	catalog number	D1	D	D4	D6	L	Ap1 max	Z	Z ADJ	lbs	max RPM
5363040	SF02506RH	2.50	1.00	—	2.38	2.00	.25	6	6	1.00	20000
5363041	SF0308RH	3.00	1.00	—	2.88	2.00	.25	8	8	1.40	20000
5363042	SF0412RH	4.00	1.25	—	3.88	2.00	.25	12	12	2.50	17320
5363043	SF0515RH	5.00	1.50	—	4.88	2.38	.25	15	15	5.10	15500
5363044	SF0618RH	6.00	1.50	—	5.88	2.38	.25	18	18	7.00	14150
5363045	SF0824RH	8.00	2.50	4.00	7.94	2.38	.25	24	24	9.30	12240

NOTE: Z = Number of cartridges
Z ADJ = Number of adjustable cartridges
NOTE: Coolant cap screw or coolant shower plate must be ordered separately.
SDR insert

SuperFeed • End Mills • Inch





order number	catalog number	D1	D	L2	L	Ap1 max	Z	Z ADJ	lbs	max RPM
5363198	WSSEM1002RH	1.00	.75	1.50	3.50	.25	2	2	0.50	35500
5363199	WSSEM12503RH	1.25	1.00	1.75	4.00	.25	3	3	1.20	31700
5363250	WSSEM1504RH	1.50	1.00	1.75	4.00	.25	4	4	1.15	29000
5363251	WSSEM2005RH	2.00	1.00	1.70	4.50	.25	5	5	1.10	25100

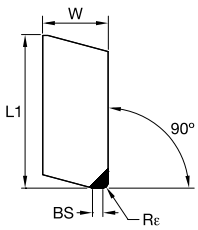
NOTE: Z = Number of cartridges
Z ADJ = Number of adjustable cartridges
NOTE: For setting procedure, see page A73.
EDR insert

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

SuperFeed • PCD Inserts • Face Mills • SDR





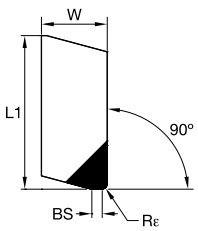
● first choice
○ alternate choice

catalog number	cutting edges	L1	BS	W	Rε	hm	WDN00U
SDR100031E0NW	1	22,23	–	9,53	0,80	0,02	5358450
SDR100031E0W4	1	22,23	1,52	9,53	0,80	0,02	5358407
SDR100031E1W4	1	22,23	1,52	9,53	0,80	0,02	5358408
SDR100093E1W4	1	22,23	1,52	9,53	2,36	0,02	5358409
SDR102	1	22,22	–	9,52	3,17	0,02	5358451

NOTE: hm = Average chip thickness
BS = Wiper facet length

SuperFeed • PCD Inserts • End Mills • EDR





● first choice
○ alternate choice

catalog number	cutting edges	L1	BS	W	Rε	hm	WDN00U
EDR100031E1W4	1	22,23	1,52	6,36	0,79	0,02	5358452

NOTE: hm = Average chip thickness
BS = Wiper facet length
E0 = 2,5 ap1 max
E1 = 6,3 ap1 max.

SuperFeed • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	–	–	–	–	–	–
P3–P4	–	–	–	–	–	–
P5–P6	–	–	–	–	–	–
M1–M2	–	–	–	–	–	–
M3	–	–	–	–	–	–
K1–K2	–	–	–	–	–	–
K3	–	–	–	–	–	–
N1–N2	SDR…/EDR…	WDN00U	**SDR…/EDR…**	**WDN00U**	SDR…/EDR…	WDN00U
N3	SDR…/EDR…	WDN00U	**SDR…/EDR…**	**WDN00U**	SDR…/EDR…	WDN00U
S1–S2	–	–	–	–	–	–
S3	–	–	–	–	–	–
S4	–	–	–	–	–	–
H1	–	–	–	–	–	–

SuperFeed • Recommended Starting Speeds [SFM]

Material Group		WDN00U		
P	1	–	–	–
	2	–	–	–
	3	–	–	–
	4	–	–	–
	5	–	–	–
	6	–	–	–
M	1	–	–	–
	2	–	–	–
	3	–	–	–
K	1	–	–	–
	2	–	–	–
	3	–	–	–
N	1–2	3000	**6500**	16000
	3	1500	**2000**	2500
S	1	–	–	–
	2	–	–	–
	3	–	–	–
	4	–	–	–
H	1	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased

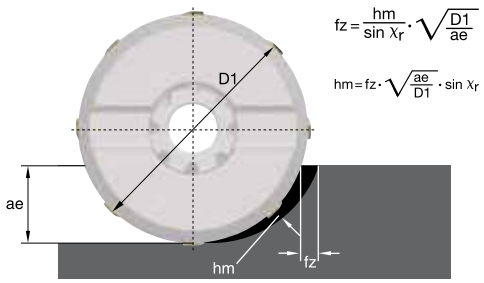
SuperFeed • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
SDR…	.003	**.007**	.011	.003	**.005**	.008	.002	**.004**	.007	.002	**.004**	.006	.002	**.004**	.006	SDR…
EDR…	.003	**.007**	.011	.003	**.005**	.008	.002	**.004**	.007	.002	**.004**	.006	.002	**.004**	.006	EDR…

*NOTE: FIRST choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1



$$fz = \frac{hm}{\sin \chi_r} \cdot \sqrt{\frac{D1}{ae}}$$

$$hm = fz \cdot \sqrt{\frac{ae}{D1}} \cdot \sin \chi_r$$

Insert Setting and Fine Adjustment Procedure

General

- Non-contact gages are preferred.
- Contact gages can be used with the following precautions:
  - Indicator must be flat and parallel to the base.
  - Always approach the PCD cartridge from the relief angle under the PCD segment.
  - Do NOT let the indicator drop on the PCD segment.
- Remove all worn PCD cartridges.
- Clean the pockets of the cutter completely.

Face Mills

- Apply a small amount of lubricant to the following areas:
  - Pocket area where the wedge slides.
  - Threads of the cartridge locking screw.
  - Threads of the axial adjustment screw.
- Install cartridges applying light torque to the wedge assembly locking screw.
- Turn axial adjustment screw until the cartridge is 0,01–0,015mm below the final set height.
- Tighten the wedge assembly locking screw to 4 Nm.
- Turn the axial adjustment screw moving the PCD cartridge 0,005mm to the final set height position.
- Set all cartridges as above.

End Mills

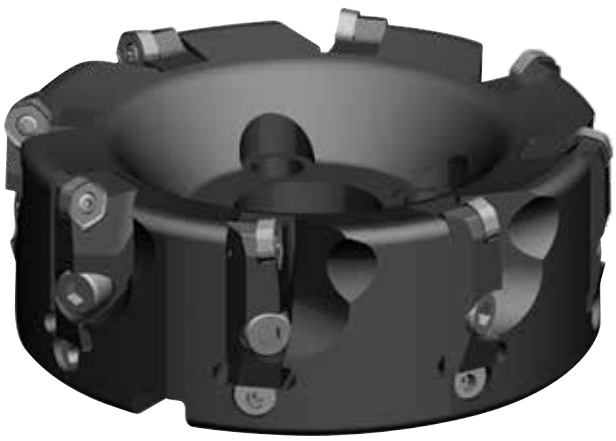
- Apply a small amount of lubricant to the following areas:
  - Threads of the cartridge locking screw.
  - Threads of the axial adjustment screw.
- Install cartridges applying light torque to the locking screws.
- Turn axial adjustment screw until the cartridge is 0,01–0,015mm below the final set height.
- Tighten the locking screw (left-hand threads) to 8 Nm leaving 0,005mm below the final set height.
- Turn the axial adjustment screw moving the PCD cartridge 0,005mm to the final set height position.
- Set all cartridges as above.

M4000

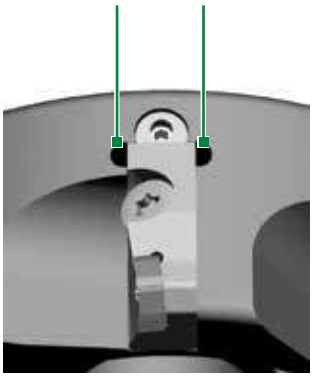
Cartridge Milling System

The M4000 cartridge milling system is a roughing and finishing solution with a single tool featuring easy-change cartridges with different insert styles and lead angles.





Quick cartridge stop — ready to go in a minute with no adjustment for roughing.



ROUGHING AND FINISHING USING

PRODUCT

SERIES

M4000

DIAMETER RANGE

4.921–12.400"
(125–315mm)

SHANK TYPES

Face Mills

INDUSTRY

TRANSPORTATION

GENERAL ENGINEERING

APPLICATIONS



FACE MILLING



SIDE MILLING/ SHOULDER MILLING: SQUARE END

VSM890-12

CARTRIDGE FOR M4000

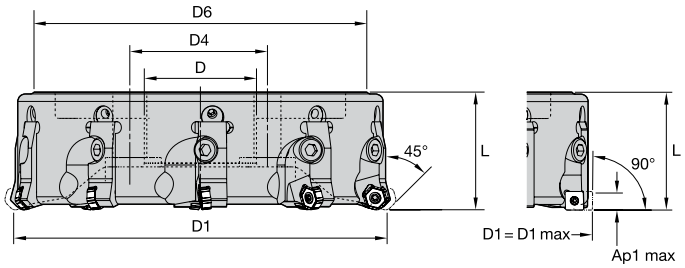
M4000CA-SNHX12
(MM6602179)





M4000 • Face Mills • Inch



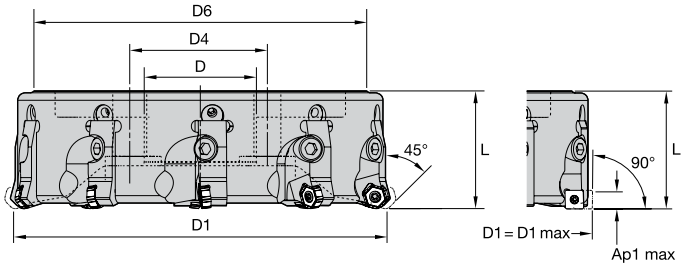


order number	catalog number	D1	D	D4	D6	L	L1	number of cartridges	max RPM	coolant supply	lbs
4136312	M4000D600Z08ADJ	6.000	2.000	—	5.394	2.480	2.480	8	1800	No	9.73
4136353	M4000D600Z12ADJ	6.000	2.000	—	5.394	3.150	3.150	12	1800	No	13.53
4136358	M4000D1200Z16ADJ	12.000	2.500	4.000	11.260	3.150	3.150	16	1000	No	50.57
4136359	M4000D1200Z22ADJ	12.000	2.500	4.000	11.260	3.150	3.150	22	1000	No	50.42

** For all details regarding insert offering and cutting conditions, please refer to the master platforms.*

Face Mills • M4000 • Cartridge Milling System • Inch





order number	catalog number	insert style	master platform *	Ap max
3968124	M4000CA-HN07	HN.J0704/XNGJ0704	M1200 Mini	.138
4159018	M4000CA-HN07HD	HN.J0704	M1200 Mini	.186
4159017	M4000CA-HN07HF	HN.J0704	M1200 Mini	.040
3126691	M4000CA-HN09	HN.J0905/XNGJ0905	M1200	.171
4159019	M4000CA-HN09HD	HN.J0905	M1200	.236
2511344	M4000CA-HP06	HP.T06T3	M640	.189
2006361	M4000CA-MDHX10	MDHX1004	M76	.040
2006346	M4000CA-RC1606	RC.T1606	M100	.315
2067492	M4000CA-SD1204	SDM.1204	M690	.459
2006359	M4000CA-SD1506	SDM.1506	M690	.587
2033495	M4000CA-SE1204	SE.N1204/SE.R1204	M68	—
2006377	M4000CA-SE1504	SE.N1504/SE.R1504	M68	—
2006348	M4000CA-SN12	SN.T1205/XNKT1205	M660	2.480
2006360	M4000CA-SN15	SN.T1505	M660	—
6602179	M4000CA-SNHX12	SNHX1204	VSM890-12	.387
2006362	M4000CA-SP12	121358680	M40Wiper	.354
2006373	M4000CA-SP1203	SP.N1203/SP.R1203	M40	—
2006376	M4000CA-SP1504	SP.N1504	M40	—
2033496	M4000CA-TP1603	TP.N1603/TP.R1603	M40	—
6152926	M4000CA-XDPT11	XDCT / XDET / XDPT / XDCW 1104	VSM11	.453
6152927	M4000CA-XDPT17	XDCT / XDET / XDPT 1704	VSM17	.625
6433216	M4000CA-XN10	XNPU / XNGU 1004	VSM490-10	.394
6357989	M4000CA-XN15	XNPU / XNGU 15T6	VSM490-15	.621
2006347	M4000CA-XP16	XP.T1604	M680	—

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

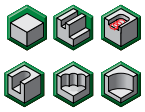
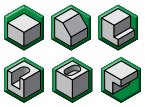
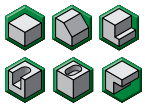
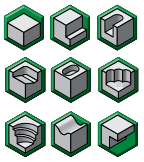
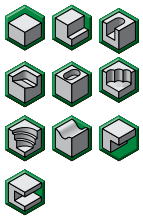
MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

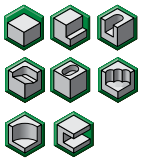
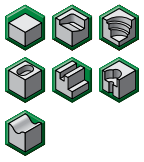
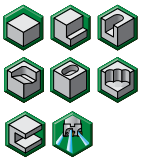
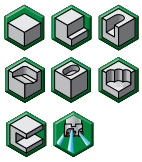
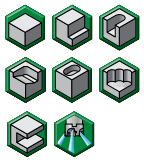


widia.com

WIDIA

Shoulder Milling Portfolio Overview

Product	VSM890™-12	VSM490™-15	VSM490™-10	VSM11™	VSM17™
	★ 	★ 	★ 	★ 	★ 
Page	A122–A123	A106–A107	A106–A107	A80–A81	A90–A91
Victory™ – High-Performance	✓✓	✓✓	✓✓	✓✓	✓✓
Versatility	✓✓	✓	✓	✓✓	✓✓
Insert Style	Double-Sided	Double-Sided	Double-Sided	Single-Sided	Single-Sided
Pressed Inserts (PSTS)	○	◉	◉	◉	◉
Ground Inserts	◉	◉	◉	◉	◉
Cutting Edge	8	4	4	2	2
Corner Radii	.032–.063" (0,8–1,6mm)	.016–.079" (0,4–2,0mm)	.016–.062" (0,4–1,6mm)	.0–.125" (0,2–2,4mm)	.0–.235" (0,4–6,0mm)
Max Depth-of-Cut	.3873" (9,8mm)	.6102" (15mm)	.394" (10mm)	.461" (11mm)	.647" (16mm)
Internal Coolant Supply	◉	◉	◉	◉	◉
Materials	P M K N S H	P M K N S	P M K N S	P M K N S	P M K N S
Achievable Surface Quality Wall	✓✓	✓✓	✓✓	✓✓	✓✓
Achievable Surface Quality Bottom	✓✓	✓✓	✓✓	✓✓	✓✓
Additional Opperations					
Shell Mills	2–10" (40–250mm)	1.5–6" (40–125mm)	1.5–5" (40–125mm)	1.5–3" (40–125mm)	1.5–6" (40–160mm)
Shank Mills – Cylindrical	–	1–1.5" (25–32mm)	.625–1.5" (16–32mm)	.5–1" (12–32mm)	1–1.5" (25–40mm)
Shank Mills – Weldon®	1.25–1.5" (32mm)	1–1.5" (25–32mm)	.625–1.5" (16–40mm)	.625–1.25" (12–32mm)	1–1.5" (25–40mm)
Screw-On	–	– (25–35mm)	– (16–32mm)	.75–1.5" (16–40mm)	1–1.5" (25–40mm)
M4000 Cartridge	◉	◉	◉	◉	◉
Helical Mills	○	○	○	◉	◉

	VSM22™	VHSC	M680	M680+	M680-09	M690-12	M690-15
	★	★					
							
	A100–A101	A146–A147	A128–A129	A128–A129	A128–A129	A134–A135	A134–A135
	✓	✓✓	✓✓	✓	✓	✓	✓
	✓	✓✓	✓	✓	✓	✓	✓
	Single-Sided	Single-Sided	Single-Sided	Single-Sided	Single-Sided	Single-Sided	Single-Sided
	○	○	◉	○	○	○	○
	◉	◉	◉	◉	○	◉	◉
	2	2	2	2	2	4	4
	.0469 (1,2mm)	.010–.205" (0,4–5mm)	.016–.157" (0,4–4,0mm)	.0313" (0,8mm)	.015–.080" (0,4–2,0mm)	.0313–.126" (0,4–3,2mm)	.0469–.0625" (1,2–1,6mm)
	.7874" (20mm)	.630" (16mm)	.6046" (14mm)	.374" (9,5mm)	.3543" (9mm)	.4" (10mm)	.5" (12mm)
	◉	◉	○	○	○	○	○
	P M K	N	P M K N S H	P M K N	P M K N	P M K N S H	P M K S H
	✓	✓✓	✓	✓	✓	✓	✓
	✓	✓✓	✓	✓	✓	✓	✓
							
	3–6" (50–125mm)	1.5–4" (40–80mm)	.75" (40–125mm)	– (40mm)	–	2–3" (50–125mm)	3–4" (50–125mm)
	–	1–1.5" (25–32mm)	–	–	.625–1.25" (16–32mm)	–	–
	–	–	1" (25–40mm)	– (32mm)	–	1.5" –	–
	–	–	– (25–40mm)	– (25–32mm)	–	–	–
	○	○	◉	◉	◉	○	◉
	○	○	◉	◉	○	◉	○

✓ Good	✓✓ Perfect	◉ Yes	○ No	★ All-Star Program

VSM Single-Sided Series

VSM11™ Shoulder Mill

The VSM11 shoulder mill will thrive in precise machining to medium roughing applications. Its two-edged, single-sided inserts deliver low horsepower consumption and soft cutting action on a variety of workpieces.

Body:
Internal coolant supply.

Optimized chip gash for improved cutter stability and chip flow.

Insert:
Embedded wiper facet for great surface floor finish.

Multiple corner nose radii R.008" to R.125" (.20–3.20mm) available; includes uses for aerospace applications.

Super-positive rake design for soft cutting action and low machine power consumption.



The VSM11 shoulder mill is built for high DOC scenarios with Ap capabilities up to .453" (11mm) and a super-positive rake design for soft cutting action and low machine power consumption.

Six insert geometries are available to apply in a variety of applications and materials.

GEOMETRIES FOR ALL MATERIAL GROUPS IN SHOULDER MILLING APPLICATIONS

-ALP



N

Roughing and finishing of aluminum alloys. High precision. Periphery ground.

-PCD



N

Roughing and finishing of aluminum alloys. Abrasive non-ferrous materials. High precision. Periphery ground.

-ML



P M S H

Light machining and finishing. First choice for stainless steel and titanium. Periphery ground.

-MM



P M K S H

Medium machining. First choice for general purpose. Precision pressed to size.

-MH



P M K S

First choice for heavy-duty machining. Steel and cast iron materials. Precision pressed to size.

-MU



P M K N S

First choice for low to medium cutting parameters. Precision pressed to size and periphery ground.

Finishing Capabilities/Lower Cutting Forces

Geometry Strengthening

LOW POWER CONSUMPTION, HIGH DEPTH OF CUT

PRODUCT

SERIES

VSM11™

DIAMETER RANGE

Screw-On: .75–1.5" (16–40mm)
Weldon: .625–1.25" (12–32mm)
Cylindrical: .5–1.25" (12–32mm)
Shell: 1.5–4" (40–125mm)
Helical: 1–2" (25–50mm)

SHANK TYPES

Screw-On End Mills
Weldon® End Mills
Cylindrical End Mills
Shell Mills
Helical End Mills

INDUSTRY

TRANSPORTATION
GENERAL ENGINEERING
AEROSPACE

APPLICATIONS


SIDE MILLING/ SHOULDER MILLING: SQUARE END


SLOTTING: SQUARE END


FACE MILLING


RAMPING BLANK


POCKETING


PLUNGE MILLING


HELICAL INTERPOLATION/ POCKET MILLING


3D PROFILING


SIDE MILLING/ SHOULDER MILLING: BOTTOM SHOULDERING

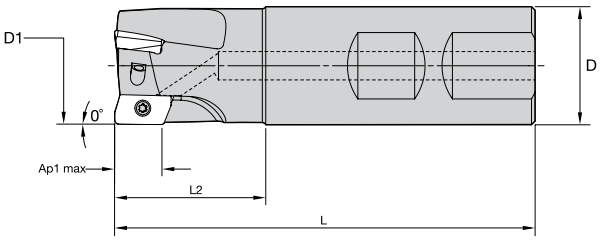
LOW POWER CONSUMPTION

SINGLE-SIDED INSERTS



VSM11™ • Weldon® End Mills • Inch





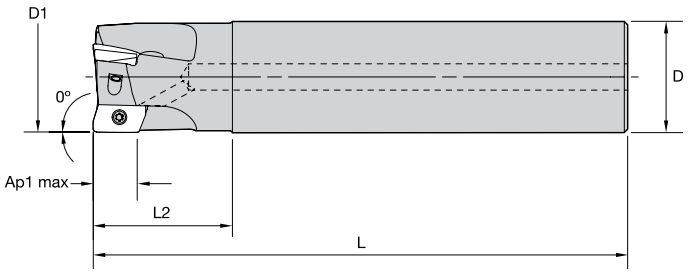
order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416416	VSM11D062Z02W062XD11	.625	.625	2.750	.844	.454	2	12.5°	41700	Yes	.18
5416417	VSM11D075Z02W075XD11	.750	.750	3.200	1.170	.455	2	8.6°	36300	Yes	.30
5416418	VSM11D075Z03W075XD11	.750	.750	3.200	1.170	.455	3	8.6°	36300	Yes	.31
6025663	VSM11D100Z03W075XD11	1.000	.750	3.250	1.220	.453	3	5.1°	29900	Yes	.37
5416419	VSM11D100Z03W100XD11	1.000	1.000	3.500	1.220	.453	3	5.1°	29900	Yes	.62
5416450	VSM11D100Z04W100XD11	1.000	1.000	3.500	1.220	.453	4	5.1°	29900	Yes	.64
5416451	VSM11D125Z04W125XD11	1.250	1.250	4.000	1.720	.451	4	3.6°	25900	Yes	1.12
5416452	VSM11D125Z05W125XD11	1.250	1.250	4.000	1.720	.451	5	3.6°	25900	Yes	1.12

NOTE: Weldon type not recommended for finishing operations.

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page A96.

VSM11 • Cylindrical End Mills (regular and long version) • Inch



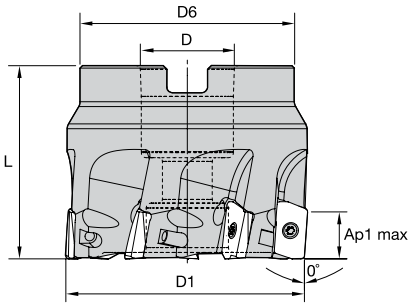


order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416485	VSM11D050Z01C062XD11L400	.500	.625	4.000	.800	.461	1	4.2°	50400	Yes	.29
5416486	VSM11D062Z02C062XD11L400	.625	.625	4.000	1.000	.454	2	12.5°	41700	Yes	.28
5416487	VSM11D075Z02C075XD11L450	.750	.750	4.500	1.100	.455	2	8.6°	36300	Yes	.46
5416726	VSM11D075Z02C075XD11L670	.750	.750	6.700	1.610	.455	2	8.6°	36300	Yes	.69
5416488	VSM11D075Z03C075XD11L450	.750	.750	4.500	1.100	.455	3	8.6°	36300	Yes	.47
5416727	VSM11D075Z03C075XD11L670	.750	.750	6.700	1.610	.455	3	8.6°	36300	Yes	.70
6025664	VSM11D100Z03C075XD11L480	1.000	.750	4.800	1.282	.453	3	5.1°	29900	Yes	—
5416489	VSM11D100Z03C100XD11L480	1.000	1.000	4.800	1.250	.453	3	5.1°	29900	Yes	.90
5416728	VSM11D100Z03C100XD11L800	1.000	1.000	8.000	2.100	.453	3	5.1°	29900	Yes	1.54
5416520	VSM11D100Z04C100XD11L480	1.000	1.000	4.800	1.250	.453	4	5.1°	29900	Yes	.92
5416729	VSM11D100Z04C100XD11L800	1.000	1.000	8.000	2.100	.453	4	5.1°	29900	Yes	1.56
5416750	VSM11D125Z03C125XD11L980	1.250	1.250	9.800	2.510	.451	3	3.6°	25900	Yes	3.00
5416522	VSM11D125Z05C125XD11L520	1.250	1.250	5.200	1.600	.451	5	3.6°	25900	Yes	1.56

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page A96.

VSM11™ • Shell Mills • Inch



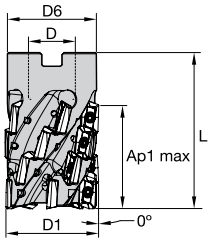


order number	catalog number	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416391	VSM11D150Z04S075XD11	1.500	.750	1.420	1.575	.449	4	2.8°	23300	Yes	.41
5416392	VSM11D150Z06S075XD11	1.500	.750	1.420	1.575	.449	6	2.8°	23300	Yes	.42
5416393	VSM11D200Z05S075XD11	2.000	.750	1.750	1.575	.446	5	1.9°	19700	Yes	.79
5416394	VSM11D200Z08S075XD11	2.000	.750	1.750	1.575	.446	8	1.9°	19700	Yes	.80
5416395	VSM11D250Z06S075XD11	2.500	.750	1.750	1.575	.446	6	1.5°	17400	Yes	1.19
5416396	VSM11D250Z09S075XD11	2.500	.750	1.750	1.575	.446	9	1.5°	17400	Yes	1.21
5416397	VSM11D300Z08S100XD11	3.000	1.000	2.190	1.750	.446	8	1.2°	15700	Yes	1.96
5416399	VSM11D400Z09S150XD11	4.000	1.500	3.380	2.000	.446	9	.9°	13500	Yes	3.95

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page A96.

VSM11 • Helical Shell Mills • Inch





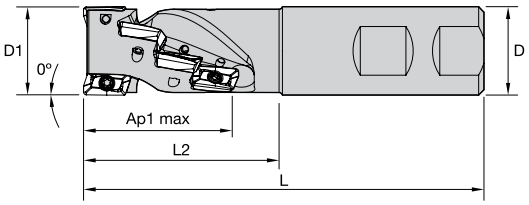
order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6081973	VHM11D200Z06S300XD11	2.000	1.000	1.910	3.000	2.032	30	6	1.8°	19700	Yes	1.60

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM11H™ • Helical End Mills with Weldon® Shank • Inch



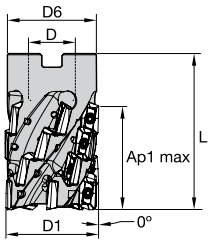


order number	catalog number	D1	D	L	L2	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6740596	**VSM11H100Z02W100XD11**	1.000	1.000	4.530	2.250	1.700	8	2	4.4°	29700	Yes	.74
6740598	**VSM11H125Z03W125XD11**	1.250	1.250	4.530	2.250	1.700	12	3	3.2°	26500	Yes	1.20
6740599	**VSM11H125Z04W125XD11**	1.250	1.250	4.530	2.250	1.701	16	4	3.2°	26500	Yes	1.16

NOTE: Z = number of pockets; ZU = number of flutes.

VSM11H • Helical Shell Mills • Inch





order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6740600	**VSM11H150Z04S075XD11**	1.500	.750	1.350	2.500	1.700	16	4	2.5°	23300	Yes	.65
6740671	**VSM11H150Z05S075XD11**	1.500	.750	1.350	2.500	1.650	20	5	2.5°	23300	Yes	.64
6740672	**VSM11H200Z04S075XD11**	2.000	.750	1.750	2.750	2.030	20	4	1.8°	19700	Yes	1.51
6740673	**VSM11H200Z06S075XD11**	2.000	.750	1.750	2.750	2.030	30	6	1.8°	19700	Yes	1.43

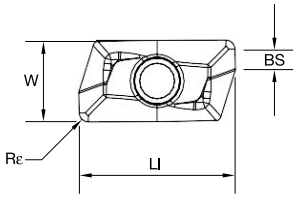
NOTE: Z = number of pockets; ZU = number of flutes.

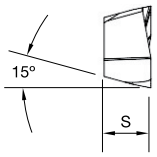
FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM11™ • XDCT-ALP







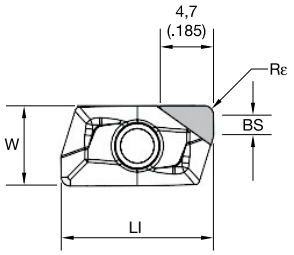
● first choice
○ alternate choice

		WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU20PM	WU35PM
P							●	●	●	○	●	●	●
M							●	●	●	●	●	●	●
K			●	●			○	○				○	
N		●			●	●					○	○	
S							●	○	○	●	●	○	●
H							○			○		○	

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU20PM	WU35PM
XDCT110402PDFRALP	XDCT1100RALP	2	13,42	.529	2,29	.090	4,00	.157	6,90	.272	0,20	.008	—	—	'	'	'	6407444	6407445	'	'	'	'	'	'	'
XDCT110404PDFRALP	XDCT1101RALP	2	13,43	.529	2,09	.082	4,00	.157	6,90	.272	0,40	.016	0,02	.001	'	'	'	5933940	5417054	'	'	'	'	'	'	'
XDCT110408PDFRALP	XDCT1102RALP	2	13,44	.529	1,69	.067	4,00	.157	6,90	.272	0,80	.031	0,02	.001	'	'	'	5936171	5417053	'	'	'	'	'	'	'
XDCT110412PDFRALP	XDCT1103RALP	2	13,44	.529	1,29	.051	4,00	.157	6,90	.272	1,20	.047	0,02	.001	'	'	'	6055634	6055635	'	'	'	'	'	'	'
XDCT110416PDFRALP	XDCT1104RALP	2	13,44	.529	0,88	.035	4,00	.157	6,89	.271	1,60	.063	0,02	.001	'	'	'	6055598	6055599	'	'	'	'	'	'	'
XDCT110420PDFRALP	XDCT1105RALP	2	13,44	.529	0,49	.019	4,00	.157	6,89	.271	2,00	.078	—	—	'	'	'	6407446	6407447	'	'	'	'	'	'	'
XDCT110424PDFRALP	XDCT1106RALP	2	13,44	.529	0,16	.006	4,00	.157	6,88	.271	2,40	.095	0,02	.001	'	'	'	6055600	6055631	'	'	'	'	'	'	'
XDCT110432PDFRALP	XDCT1108RALP	2	12,86	.506	—	—	4,00	.157	6,89	.271	3,20	.125	0,02	.001	'	'	'	6055632	6055633	'	'	'	'	'	'	'

VSM11™ • XDCW-PCD



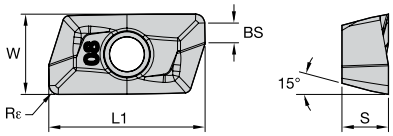


● first choice
○ alternate choice

| | | |

VSM11™ • XDET-MU



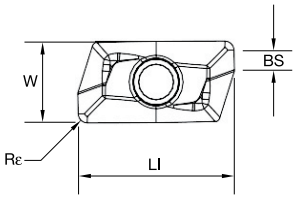


● first choice
○ alternate choice

| | | |

VSM11™ • XDPT-MH





● first choice
○ alternate choice

| | | |

VSM11™ • Recommended Starting Speeds [SFM]

Material Group		WDN10U			WK15CM			WK15PM			WN10HM			WN25PM			WP25PM		
P	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1085	**935**	885
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	900	**785**	655
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	835	**705**	575
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	740	**605**	490
	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	605	**560**	490
	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	540	**410**	330
M	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	675	**590**	540
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	605	**525**	425
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	460	**395**	310
K	1	–	–	–	1380	**1265**	1115	885	**805**	705	–	–	–	–	–	–	755	**675**	605
	2	–	–	–	1100	**970**	900	690	**625**	575	–	–	–	–	–	–	590	**525**	490
	3	–	–	–	920	**820**	755	575	**525**	475	–	–	–	–	–	–	490	**445**	395
N	1	13155	**11500**	9810	–	–	–	–	–	–	2605	**2275**	1965	3525	**3100**	2870	–	–	–
	2	5250	**4905**	4595	–	–	–	–	–	–	2605	**2275**	1965	3100	**2870**	2495	–	–	–
	3	5250	**4905**	4595	–	–	–	–	–	–	1835	**1590**	1375	3100	**2870**	2495	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	80
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	80
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	165	**130**	80
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	230	**165**	115
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	395	**295**	230

Material Group		WP35CM			WP40PM			WS30PM			WS40PM			WU20PM			WU35PM		
P	1	1495	**1295**	1215	970	**855**	805	–	–	–	–	–	–	1080	**950**	885	855	**755**	705
	2	920	**835**	755	820	**705**	590	–	–	–	–	–	–	900	**820**	655	720	**625**	525
	3	835	**755**	675	755	**640**	525	–	–	–	–	–	–	835	**720**	570	655	**560**	460
	4	625	**575**	525	675	**560**	445	–	–	–	–	–	–	735	**620**	490	590	**490**	395
	5	855	**755**	690	560	**510**	445	–	–	–	560	**475**	395	605	**570**	490	490	**445**	395
	6	525	**445**	360	490	**375**	295	–	–	–	490	**360**	260	540	**425**	325	425	**330**	260
M	1	675	**605**	510	640	**560**	510	740	**655**	605	690	**560**	460	670	**590**	540	560	**490**	445
	2	605	**525**	460	575	**490**	410	675	**590**	475	590	**475**	395	605	**520**	425	510	**425**	360
	3	475	**425**	375	425	**375**	295	510	**445**	345	475	**360**	280	455	**390**	310	375	**330**	260
K	1	970	**870**	785	–	–	–	–	–	–	–	–	–	820	**720**	605	–	–	–
	2	770	**690**	625	–	–	–	–	–	–	–	–	–	655	**590**	490	–	–	–
	3	640	**575**	525	–	–	–	–	–	–	–	–	–	590	**490**	390	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–	1800	**1540**	1310	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	1800	**1540**	1310	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	1310	**1145**	980	–	–	–
S	1	–	–	–	–	–	–	150	**130**	100	130	**115**	80	130	**110**	80	115	**100**	80
	2	–	–	–	–	–	–	150	**130**	100	130	**115**	80	130	**110**	80	115	**100**	80
	3	–	–	–	–	–	–	180	**150**	100	165	**130**	80	160	**130**	80	150	**115**	80
	4	–	–	–	–	–	–	230	**195**	130	195	**165**	100	225	**160**	110	195	**150**	100
H	1	–	–	–	–	–	–	–	–	–	–	–	–	360	**260**	225	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

VSM11 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

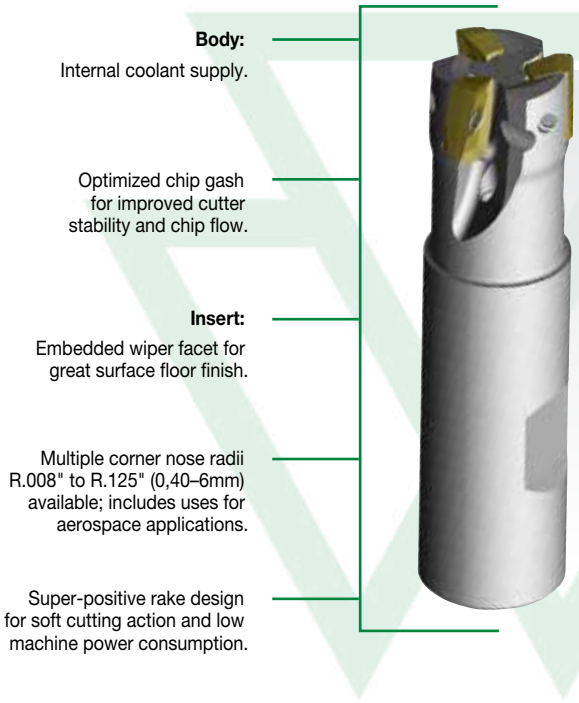
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%				
.F..PCD	.005	**.007**	.011	.003	**.005**	.008	.003	**.004**	.006	.002	**.003**	.005	.002	**.003**	.005		.F..PCD
.F..ALP	.005	**.009**	.013	.003	**.006**	.009	.003	**.005**	.007	.002	**.004**	.006	.002	**.004**	.005		.F..ALP
.E..ML	.007	**.011**	.014	.005	**.008**	.010	.004	**.006**	.008	.003	**.005**	.007	.003	**.005**	.006		.E..ML
.S..MM/.S..MU	.009	**.013**	.019	.007	**.009**	.013	.005	**.007**	.010	.004	**.006**	.009	.004	**.006**	.008		.S..MM/.S..MU
.S..MH	.009	**.014**	.022	.007	**.010**	.016	.005	**.008**	.012	.004	**.007**	.010	.004	**.006**	.009		.S..MH

NOTE: Use "Light Machining" values as starting feed rate.

VSM Single-Sided Series

VSM17™ Shoulder Mill

The VSM17 shoulder mill will thrive in precise machining to medium roughing applications. Its two-edged, single-sided inserts deliver low horsepower consumption and soft cutting action on a variety of workpieces.



The VSM17 shoulder mill is built for high DOC scenarios with Ap capabilities up to .638" (16mm) and a super-positive rake design for soft cutting action and low machine power consumption.

Six insert geometries are available to apply in a variety of applications and materials.

GEOMETRIES FOR ALL MATERIAL GROUPS IN SHOULDER MILLING APPLICATIONS

-ALP



N

Roughing and finishing of aluminum alloys. High precision. Periphery ground.

-ML



P M S H

Light machining and finishing. First choice for stainless steel and titanium. Periphery ground.

-MM



P M K S H

Medium machining. First choice for general purpose. Precision pressed to size.

-MH



P M K S

First choice for heavy-duty machining. Steel and cast iron materials. Precision pressed to size.

-MU



P M K N S

First choice for low to medium cutting parameters. Precision pressed to size and periphery ground.

Finishing Capabilities/Lower Cutting Forces

Geometry Strengthening

LOW POWER CONSUMPTION, HIGH DEPTH OF CUT

PRODUCT

SERIES

VSM17™

DIAMETER RANGE

Screw-On: .1–1.5" (25–40mm)
Weldon: 1–1.25" (25–40mm)
Cylindrical: 1–1.5" (25–40mm)
Shell: 1.5–6" (40–125mm)
Helical: 2–2.5" (50–80mm)

SHANK TYPES

Screw-On End Mills
Weldon® End Mills
Cylindrical End Mills
Shell Mills
Helical End Mills

INDUSTRY

TRANSPORTATION
GENERAL ENGINEERING
AEROSPACE


SIDE MILLING/ SHOULDER MILLING: SQUARE END


SIDE MILLING/ SHOULDER MILLING: BOTTOM SHOULDERING


SLOTTING: SQUARE END


SLOTTING SIDE


FACE MILLING

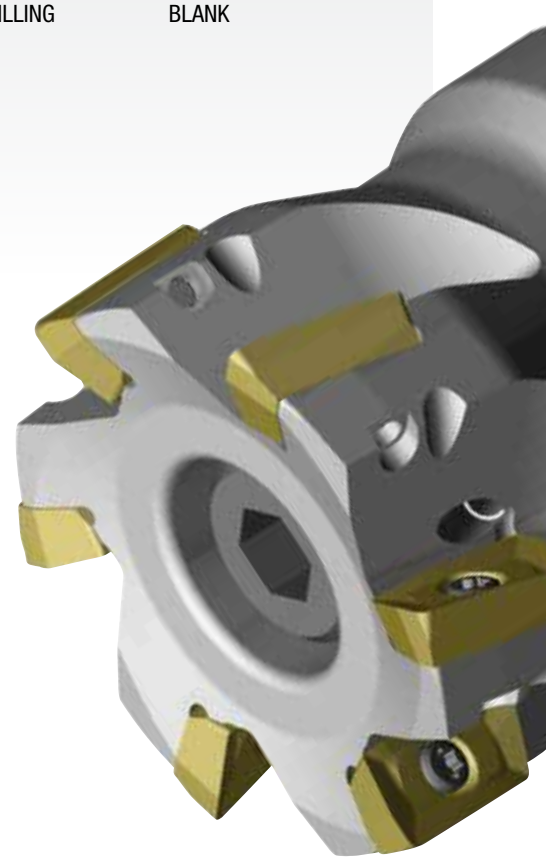

RAMPING BLANK


HELICAL INTERPOLATION/ POCKET MILLING


3D PROFILING


POCKETING


PLUNGE MILLING

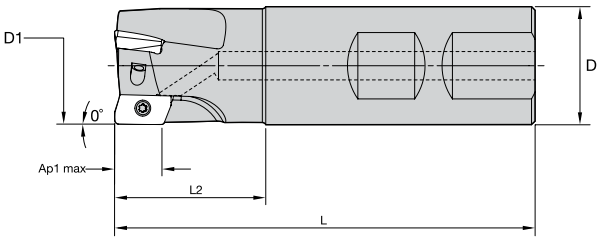


LOW POWER CONSUMPTION

SINGLE-SIDED INSERTS

VSM17™ • Weldon® End Mills • Inch



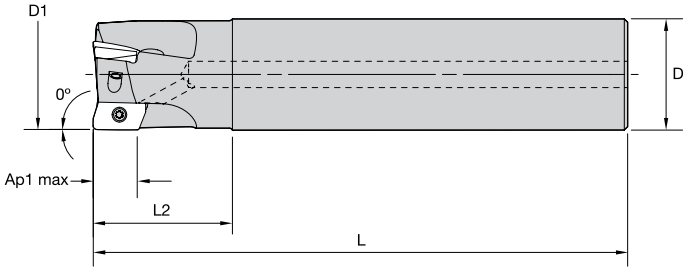


order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988028	**VSM17D100Z02W100XD17**	1.000	1.000	3.500	1.220	.642	2	8.5°	41300	Yes	.59
5988052	**VSM17D125Z02W125XD17**	1.250	1.250	4.000	1.720	.641	2	5.8°	34700	Yes	1.06
5988029	**VSM17D125Z03W125XD17**	1.250	1.250	4.000	1.720	.641	3	5.8°	34700	Yes	1.05
5988051	**VSM17D150Z03W150XD17**	1.500	1.500	4.500	1.810	.638	3	4.3°	30700	Yes	1.77
5988030	**VSM17D150Z04W150XD17**	1.500	1.500	4.500	1.810	.638	4	4.3°	30700	Yes	1.77

NOTE: Weldon type not recommended for finishing operations.
NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page A96.

VSM17 • Cylindrical End Mills (regular and long version) • Inch





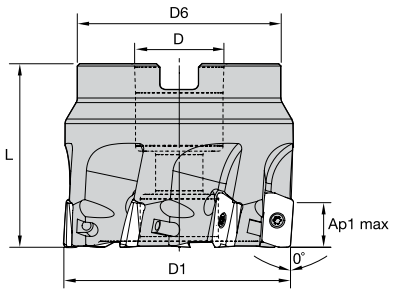
order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988011	**VSM17D100Z02C100XD17L450**	1.000	1.000	4.500	1.750	.642	2	8.5°	41300	Yes	.78
5988012	**VSM17D100Z02C100XD17L670**	1.000	1.000	6.700	1.750	.642	2	8.5°	41300	Yes	1.23
5988013	**VSM17D125Z03C125XD17L480**	1.250	1.250	4.800	2.000	.641	3	5.8°	34700	Yes	1.31
5988014	**VSM17D125Z03C125XD17L800**	1.250	1.250	8.000	2.000	.641	3	5.8°	34700	Yes	2.36
5988043	**VSM17D150Z03C150XD17L520**	1.500	1.500	5.200	2.000	.638	3	4.3°	30700	Yes	2.11
5988044	**VSM17D150Z03C150XD17L980**	1.500	1.500	9.800	2.000	.638	3	4.3°	30700	Yes	4.33
5988015	**VSM17D150Z04C150XD17L520**	1.500	1.500	5.200	2.000	.638	4	4.3°	30700	Yes	2.11
5988016	**VSM17D150Z04C150XD17L980**	1.500	1.500	9.800	2.000	.638	4	4.3°	30700	Yes	4.33

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page A96.

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.
MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM17™ • Shell Mills • Inch



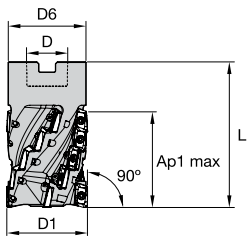


order number	catalog number	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988020	VSM17D150Z04S075XD17	1.500	.750	1.417	1.575	.638	4	4.3°	30700	Yes	.38
5988021	VSM17D200Z04S075XD17	2.000	.750	1.750	1.575	.635	4	3.0°	25600	Yes	.68
5988022	VSM17D200Z05S075XD17	2.000	.750	1.750	1.575	.635	5	3.0°	25600	Yes	.71
5988050	VSM17D200Z06S075XD17	2.000	.750	1.750	1.575	.635	6	3.0°	25600	Yes	.66
5988023	VSM17D250Z05S075XD17	2.500	.750	1.750	1.575	.629	5	2.1°	22300	Yes	.98
5988048	VSM17D250Z06S075XD17	2.500	.750	1.750	1.575	.629	6	2.1°	22300	Yes	.97
5988024	VSM17D300Z06S100XD17	3.000	1.000	2.188	1.750	.626	6	1.7°	20100	Yes	1.73
5988047	VSM17D300Z07S100XD17	3.000	1.000	2.188	1.750	.626	7	1.7°	20100	Yes	1.68
5988025	VSM17D400Z08S150XD17	4.000	1.500	3.375	2.000	.623	8	1.2°	17100	Yes	3.52
5988026	VSM17D500Z09S150XD17	5.000	1.500	3.375	2.000	.617	9	.9°	15100	Yes	5.07
5988027	VSM17D600Z12S150XD17	6.000	1.500	3.375	2.000	.616	12	.7°	13700	Yes	6.88

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page A96.

VSM17H • Helical Shell Mills • Long Reach • Inch



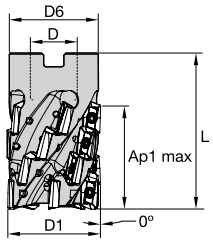


order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6083082	VHM17D200Z04S350XD17	2.000	1.000	1.910	3.500	2.380	16	4	3.0°	25600	Yes	1.79
6083085	VHM17D200Z04S550XD17	2.000	1.000	1.910	5.500	4.120	28	4	3.0°	25600	Yes	2.81

NOTE: Z = number of pockets; ZU = number of flutes.

VSM17H™ • Helical Shell Mills • Inch

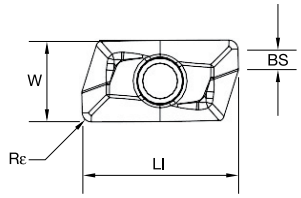




order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6740681	VSM17H200Z04S075XD17	2.000	.750	1.750	3.500	2.380	16	4	2.8°	25500	Yes	1.85
6740682	VSM17H200Z05S075XD17	2.000	.750	1.750	3.500	2.380	20	5	2.8°	25500	Yes	1.81
6740683	VSM17H250Z04S100XD17	2.500	1.000	2.190	4.000	2.950	20	4	2.1°	22300	Yes	3.39
6740684	VSM17H250Z05S100XD17	2.500	1.000	2.190	4.000	2.900	25	5	2.1°	22300	Yes	3.30
6740685	VSM17H300Z05S125XD17	3.000	1.250	2.875	4.000	2.950	25	5	1.7°	20000	Yes	5.41

VSM17™ • XDCT-ALP



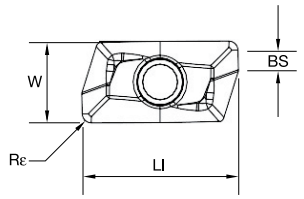


● first choice
○ alternate choice

| | | |

VSM17™ • XDCT-ML



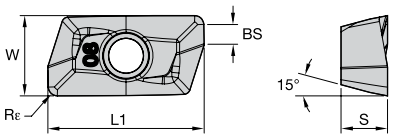


● first choice
○ alternate choice

| | | |

VSM17™ • XDET -MU



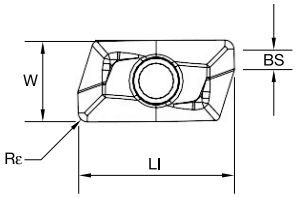


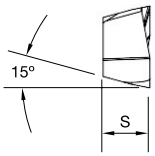
● first choice
○ alternate choice

| | | |

VSM17™ • XDPT-MM





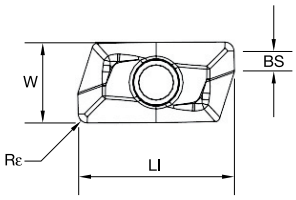


● first choice
○ alternate choice

| | | |

VSM17™ • XDPT-MH





● first choice
○ alternate choice

| | | |

VSM17™ • Insert Selection Guide

Material Group	Light Machining		General Purpose		Universal		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	XDCT-ML	WP40PM	**XDPT-MM**	**WP40PM**	**XD..-MU**	**WU20PM**	XDPT-MH	WP40PM
P3–P4	XDCT-ML	WP40PM	**XDPT-MM**	**WP40PM**	**XD..-MU**	**WU20PM**	XDPT-MH	WP40PM
P5–P6	XDPT-MM	WP25PM	**XDPT-MM**	**WP35CM**	**XD..-MU**	**WU20PM**	XDPT-MH	WP40PM
M1–M2	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	**XD..-MU**	**WU20PM**	XDPT-MM	WS40PM
M3	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	**XD..-MU**	**WU20PM**	XDPT-MH	WS40PM
K1–K2	XDPT-MM	WK15CM	**XDPT-MM**	**WK15CM**	**XD..-MU**	**WU20PM**	XDPT-MH	WK15CM
K3	XDPT-MM	WP35CM	**XDPT-MM**	**WP35CM**	**XD..-MU**	**WU20PM**	XDPT-MH	WP35CM
N1–N2	XDCT-ALP	WN10HM	**XDCT-ALP**	**WN25PM**	–	–	XDCT-ALP	WN25PM
N3	XDCT-ALP	WN10HM	**XDCT-ALP**	**WN25PM**	–	–	XDCT-ALP	WN25PM
S1–S2	XDCT-ML	WP25PM	**XDPT-MM**	**WS40PM**	**XD..-MU**	**WU20PM**	XDPT-MM	WS40PM
S3	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	**XD..-MU**	**WU20PM**	XDPT-MM	WS40PM
S4	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	**XD..-MU**	**WU20PM**	XDPT-MM	WS40PM
H1	–	–	–	–	**XD..-MU**	**WU20PM**	–	–

NOTE: Use XDCT/XDET for precision.

VSM17 • Recommended Starting Speeds [SFM]

Material Group		WK15CM			WK15PM			WN10HM			WN25PM			WP25PM			WP35CM			WP40PM			WS40PM			WU20PM			WU35PM		
P	1	–	–	–	–	–	–	–	–	–	–	–	–	1085	**935**	885	1495	**1295**	1215	970	**855**	805	–	–	–	1080	**950**	885	855	**755**	705
	2	–	–	–	–	–	–	–	–	–	–	–	–	900	**785**	655	920	**835**	755	820	**705**	590	–	–	–	900	**820**	655	720	**625**	525
	3	–	–	–	–	–	–	–	–	–	–	–	–	835	**705**	575	835	**755**	675	755	**640**	525	–	–	–	835	**720**	570	655	**560**	460
	4	–	–	–	–	–	–	–	–	–	–	–	–	740	**605**	490	625	**575**	525	675	**560**	445	–	–	–	735	**620**	490	590	**490**	395
	5	–	–	–	–	–	–	–	–	–	–	–	–	605	**560**	490	855	**755**	690	560	**510**	445	560	**475**	395	605	**570**	490	490	**445**	395
	6	–	–	–	–	–	–	–	–	–	–	–	–	540	**410**	330	525	**445**	360	490	**375**	295	490	**360**	260	540	**425**	325	425	**330**	260
M	1	–	–	–	–	–	–	–	–	–	–	–	–	675	**590**	540	675	**605**	510	640	**560**	510	690	**560**	460	670	**590**	540	560	**490**	445
	2	–	–	–	–	–	–	–	–	–	–	–	–	605	**525**	425	605	**525**	460	575	**490**	410	590	**475**	395	605	**520**	425	510	**425**	360
	3	–	–	–	–	–	–	–	–	–	–	–	–	460	**395**	310	475	**425**	375	425	**375**	295	475	**360**	280	455	**390**	310	375	**330**	260
K	1	1380	**1265**	1115	885	**805**	705	–	–	–	–	–	–	755	**675**	605	970	**870**	785	–	–	–	–	–	–	820	**720**	605	–	–	–
	2	1100	**970**	900	690	**625**	575	–	–	–	–	–	–	590	**525**	490	770	**690**	625	–	–	–	–	–	–	655	**590**	490	–	–	–
	3	920	**820**	755	575	**525**	475	–	–	–	–	–	–	490	**445**	395	640	**575**	525	–	–	–	–	–	–	590	**490**	390	–	–	–
N	1	–	–	–	–	–	–	2605	**2275**	1965	3525	**3100**	2870	–	–	–	–	–	–	–	–	–	–	–	–	1800	**1540**	1310	–	–	–
	2	–	–	–	–	–	–	2605	**2275**	1965	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	1800	**1540**	1310	–	–	–
	3	–	–	–	–	–	–	1835	**1590**	1375	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	1310	**1145**	980	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	80	–	–	–	–	–	–	130	**115**	80	130	**110**	80	115	**100**	80
	2	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	80	–	–	–	–	–	–	130	**115**	80	130	**110**	80	115	**100**	80
	3	–	–	–	–	–	–	–	–	–	–	–	–	165	**130**	80	–	–	–	–	–	–	165	**130**	80	160	**130**	80	150	**115**	80
	4	–	–	–	–	–	–	–	–	–	–	–	–	230	**165**	115	–	–	–	–	–	–	195	**165**	100	225	**160**	110	195	**150**	100
H	1	–	–	–	–	–	–	–	–	–	–	–	–	395	**295**	230	–	–	–	–	–	–	–	–	–	360	**260**	225	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

VSM17 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%				
.F..ALP	.005	**.009**	.016	.003	**.007**	.012	.003	**.005**	.009	.002	**.004**	.008	.002	**.004**	.007		.F..ALP
.E..ML	.007	**.014**	.019	.005	**.010**	.013	.004	**.008**	.010	.003	**.007**	.009	.003	**.006**	.008		.E..ML
.S..MM/.S..MU	.007	**.016**	.026	.005	**.012**	.018	.004	**.009**	.014	.003	**.008**	.012	.003	**.007**	.011		.S..MM/.S..MU
.S..MH	.009	**.019**	.030	.007	**.013**	.021	.005	**.010**	.016	.004	**.009**	.014	.004	**.008**	.013		.S..MH

NOTE: Use "Light Machining" value as starting feed rate.

VSM Single-Sided Series

VSM22 Shoulder Mill

The VSM22 shoulder mill will continuously face large-walled, big components in stainless steel, cast iron, and steel using high depth of cuts while providing free chip flow for a clean workpiece.

.787" (20mm) long insert cutting edge length, .25" (6,35mm) thick.

Precision ground insert with a positive rake and helical cutting edge to enable smooth cutting action, even in unstable conditions.

.084" (2,14mm) wiper facet for accurate indexing.

Through-coolant cutter body.

Cutters with a chip gash for free chip flow and clean workpiece.



The VSM22 shoulder mill is built for heavy-duty machining equipped with precision ground inserts featuring .787" (20mm) long cutting edges to face big components with high DOCs.

Two insert geometries are available for heavy roughing or general-purpose applications.

TWO INSERTS, EACH AVAILABLE IN THREE GRADES

-MH



-MM



WK15CM

K

WK15CM is a wear-resistant grade with balanced toughness for general milling of cast irons. Best results in dry machining, but can also be used wet.

WP35CM

P M K S

WP35CM has a wide range of applications in general and rough milling of steels and cast iron. Performs best in dry, but can also be used under wet conditions.

WU20PM

P M K N S H

WU20PM is a universal grade for machining of steel, stainless steel, and high-temperature alloys. Also suitable for machining of gray and nodular irons. Resists breakage and offers improved wear resistance and increased strength. Can be used for both dry and wet machining.

RELIABILITY, WHEN IT MATTERS MOST

PRODUCT

SERIES

VSM22

DIAMETER RANGE

3–6" (50–125mm)

SHANK TYPES

Shell Mills

INDUSTRY

GENERAL ENGINEERING

TRANSPORTATION

ENERGY

APPLICATIONS


FACE MILLING


PLUNGE MILLING


POCKETING


RAMPING


SIDE MILLING/ SHOULDER MILLING: SQUARE END


SLOTTING: SQUARE END


POCKET MILLING


SLOTTING SIDE



HEAVY DUTY

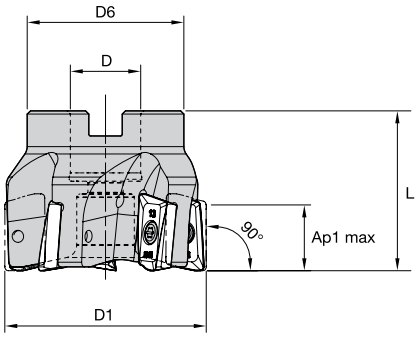
.25" (6,35mm) thick -MH insert for heavy roughing.

HIGH DEPTH OF CUT

Insert with .787" (20mm) long cutting edge coupled with large chip gash to achieve high DOC.

VSM22 • 0° • Shell Mills • Inch





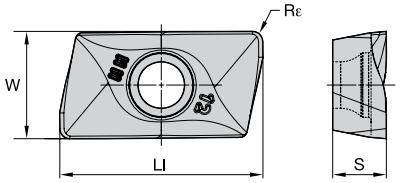
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
6921226	**VSM22U300Z06S100XP22**	3.000	1.000	2.750	1.750	.787	6	—	Yes	1.77
6921227	**VSM22U400Z08S150XP22**	4.000	1.250	2.875	2.000	.787	8	—	Yes	3.09
6921228	**VSM22U600Z10S200XP22**	6.000	2.000	4.875	2.380	.787	10	6800	Yes	9.17

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM22 • XPHT-MM





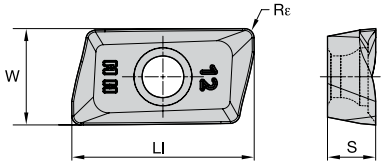
● first choice
○ alternate choice

P		●	●
M		●	●
K	●	○	○
N			○
S		○	○
H			○

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WK15CM	WP35CM	WU20PM
XPHT220612PDSRMM	XPHT220612PDSRMM	2	22,55	.888	6,35	.250	12,70	.500	1,20	.047	0,23	.009	6870184	6852415	-
XPHT220612PDSRMM	XPHT220612PDSRMM	2	22,55	.888	6,35	.250	12,70	.500	1,20	.047	0,05	.002	-	-	2567049

VSM22 • XPHT-MH





● first choice
○ alternate choice

P		●	●
M		●	●
K	●	○	○
N			○
S		○	○
H			○

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WK15CM	WP35CM	WU20PM
XPHT220612PDSRMH	XPHT220612PDSRMH	2	22,55	.888	6,35	.250	12,70	.500	1,20	.047	0,23	.009	6094886	6852416	3789524

VSM22 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	.S..MM	WP35CM	**.S..MH**	**WU20PM**	.S..MH	WP35CM
P3–P4	.S..MM	WP35CM	**.S..MH**	**WP35CM**	.S..MH	WP35CM
P5–P6	.S..MM	WP35CM	**.S..MH**	**WP35CM**	.S..MH	WP35CM
M1–M2	.S..MH	WU20PM	**.S..MH**	**WU20PM**	.S..MH	WU20PM
M3	.S..MM	WP35CM	**.S..MH**	**WP35CM**	.S..MH	WP35CM
K1–K2	.S..MM	WK15CM	**.S..MM**	**WK15CM**	.S..MH	WK15CM
K3	.S..MM	WK15CM	**.S..MM**	**WK15CM**	.S..MH	WU20PM
N1–N2	.S..MH	WU20PM	**.S..MH**	**WU20PM**	.S..MH	WU20PM
N3	.S..MH	WU20PM	**.S..MH**	**WU20PM**	.S..MH	WU20PM
S1–S2	.S..MH	WU20PM	**.S..MH**	**WU20PM**	.S..MH	WU20PM
S3	.S..MH	WU20PM	**.S..MH**	**WU20PM**	.S..MH	WU20PM
S4	.S..MM	WP35CM	**.S..MM**	**WP35CM**	.S..MH	WP35CM
H1	.S..MH	WU20PM	**.S..MH**	**WU20PM**	–	–

VSM22 • Recommended Starting Speeds [SFM]

Material Group		WK15CM			WU20PM			WP35CM		
P	1	—	—	—	1080	**950**	885	1490	**1295**	1215
	2	—	—	—	900	**820**	655	920	**835**	755
	3	—	—	—	835	**720**	570	835	**755**	670
	4	—	—	—	735	**620**	490	625	**575**	525
	5	—	—	—	605	**570**	490	855	**755**	690
	6	—	—	—	540	**425**	325	525	**445**	—
M	1	—	—	—	670	**590**	540	670	**605**	510
	2	—	—	—	605	**520**	425	605	**525**	460
	3	—	—	—	455	**390**	310	475	**425**	375
K	1	1380	**1265**	1115	820	**720**	605	970	**870**	785
	2	1100	**970**	900	655	**590**	490	770	**690**	625
	3	920	**820**	755	590	**490**	390	640	**575**	525
N	1	—	—	—	1800	**1540**	1310	—	—	—
	2	—	—	—	1800	**1540**	1310	—	—	—
	3	—	—	—	1310	**1145**	980	—	—	—
S	1	—	—	—	130	**110**	80	—	—	—
	2	—	—	—	130	**110**	80	—	—	—
	3	—	—	—	160	**130**	80	—	—	—
	4	—	—	—	225	**160**	110	215	**165**	110
H	1	—	—	—	360	**260**	225	—	—	—
	2	—	—	—	—	—	—	—	—	—
	3	—	—	—	—	—	—	—	—	—

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

VSM22 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.S..MM	.009	**.022**	.036	.007	**.016**	.026	.005	**.012**	.019	.004	**.010**	.017	.004	**.009**	.015	.S..MM
.S..MH	.009	**.023**	.037	.007	**.017**	.027	.005	**.013**	.020	.004	**.011**	.017	.004	**.010**	.016	.S..MH

NOTE: Use "Light Machining" value as starting feed rate.
For new applications, starting at a lighter feed rate is recommended.
% = ae/Dc X 100 (ae = radial depth of cut, Dc = cutting diameter)

*Find the offering of slotting mills at **widia.com***

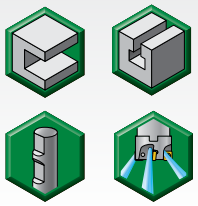




M16 T-SLOTTING

Designed for maximum chip evacuation and optimum security, the M16 slot mill series is an excellent choice for T-slot milling of steel and cast-iron materials.

APPLICATIONS

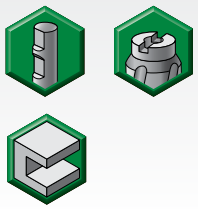




M94 PRECISE SLOTTING AND GROOVING

Designed for the most demanding small width slotting and grooving operations, the M94 slot mill series is an excellent choice for thin slotting and grooving of steel, stainless steel and cast-iron materials.

APPLICATIONS

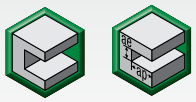




M95 SQUARE STYLE INSERT SLOTTING

The M95 slotting cutter is designed for deeper applications that require the cutting load to be shared from one insert to the other. Use in steel, stainless steel and cast-iron materials.

APPLICATIONS

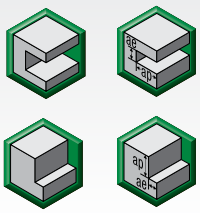




M900 ADJUSTABLE SLOTTING

The M900 slotting cutter is a multipurpose slotting cutter with high-precision capabilities in numerous operations. Use on steel, stainless steel, cast iron and superalloys.

APPLICATIONS



VSM Series

VSM490-10™, VSM490-15™ Shoulder Mills

The VSM Series is a four-edged, double-sided roughing shoulder mill with embedded finishing capabilities known for producing a smooth wall finish in axial step-down jobs.



VSM490-10
Ap1 max = .394", 10mm
Taper 40 spindles



VSM490-15
Ap1 max = .591", 15mm
Taper 50 spindles

FOUR INSERT GEOMETRIES FOR ALL MATERIAL GROUPS IN SHOULDER MILLING APPLICATIONS

★ -ALP



N

For non-ferrous materials.

★ -ML



P M K S H

First choice for stainless steel, light machining, and finishing jobs.

★ -MM



P M K S H

First choice for general purpose in all material groups.

★ -MH



P K

First choice for HPC roughing cast iron. Strongest edge protection with additional margins.

Finishing Capabilities/Lower Cutting Forces

Geometry Strengthening

FOUR-EDGED SHOULDER MILL

PRODUCT

SERIES	DIAMETER RANGE
VSM490-10™	Screw-On End Mills: — (16–32mm) Cylindrical End Mills: .62–1" (16–25mm) Shell Mills: 1.50–5" (40–125mm) Weldon® End Mills: .62–1" (16–25mm)
VSM490-15™	Weldon End Mills: .625–1.5" (16–32mm) Cylindrical End Mills: .625–1.5" (16–32mm) Shell Mills: 1.5–5" (40–125mm)

INSERTS

INSERT TYPE	GRADE	MATERIALS
ALP, ML, MM, MH	WP40PM, WS40PM, WP25PM, WU10PM	P M K S H
ALP, ML, MM, MH	WS40PM, WP25PM, WP40PM	P M S

APPLICATIONS



FACE MILLING | EASED CHAMFER | SIDE MILLING/ SHOULDER MILLING: SQUARE END | SLOTTING: SQUARE END | POCKETING | SIDE MILLING/ SHOULDER MILLING: BOTTOM SHOULDERING

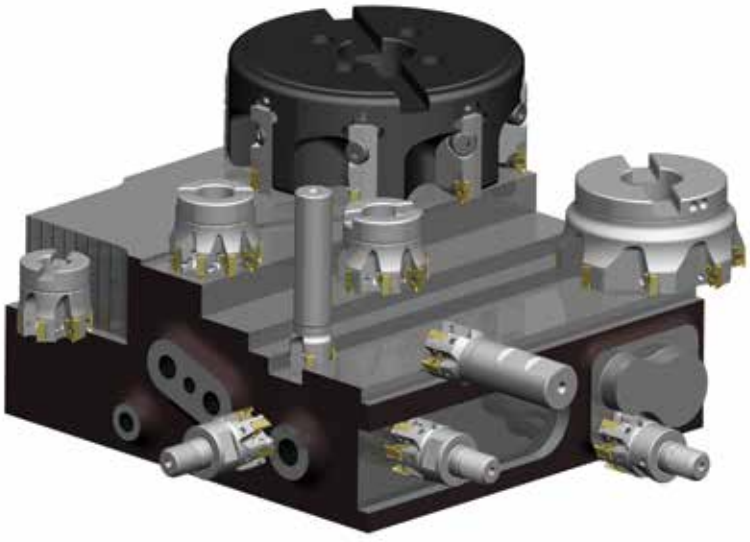
INDUSTRY

TRANSPORTATION

AEROSPACE

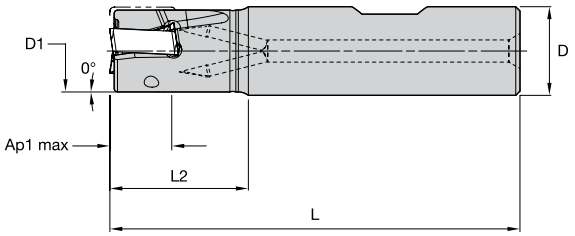
ENERGY

GENERAL ENGINEERING



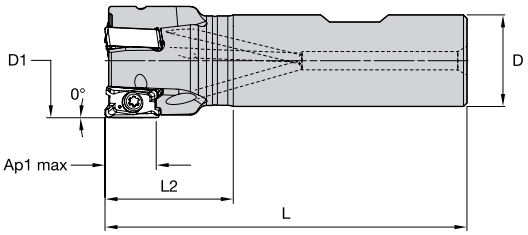
VSM490-10 • Weldon® End Mills • Inch





Regular Shank



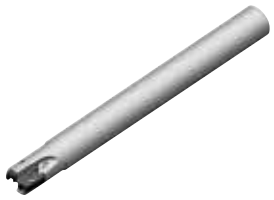


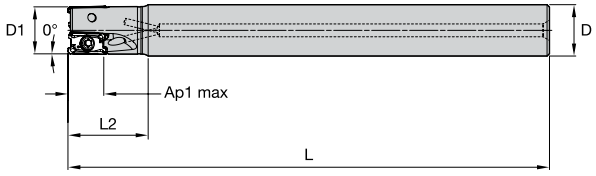
Reduced Shank

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
6425459	VSM490D062Z02W062XN10	.625	.625	2.750	.844	.394	2	48000	Yes	.20
6425460	VSM490D075Z02W075XN10	.750	.750	3.250	1.220	.394	2	41700	Yes	.34
6425471	VSM490D075Z03W075XN10	.750	.750	3.250	1.220	.394	3	41700	Yes	.33
6425472	VSM490D100Z03W075XN10	1.000	.750	3.250	1.220	.394	3	33900	Yes	.39
6425473	VSM490D100Z03W100XN10	1.000	1.000	3.750	1.470	.394	3	33900	Yes	.71
6425474	VSM490D100Z04W100XN10	1.000	1.000	3.750	1.470	.394	4	33900	Yes	.71
6425475	VSM490D125Z04W075XN10	1.250	.750	3.250	1.220	.394	4	29200	Yes	.46
6425476	VSM490D125Z04W100XN10	1.250	1.000	3.750	1.470	.394	4	29200	Yes	.79
6425477	VSM490D125Z04W125XN10	1.250	1.250	4.000	1.720	.394	4	29200	Yes	1.20
6425478	VSM490D125Z05W125XN10	1.250	1.250	4.000	1.720	.394	5	29200	Yes	1.20
6425479	VSM490D150Z05W125XN10	1.500	1.250	4.500	2.220	.394	5	26200	Yes	1.48

NOTE: Weldon type not recommended for finishing operations.

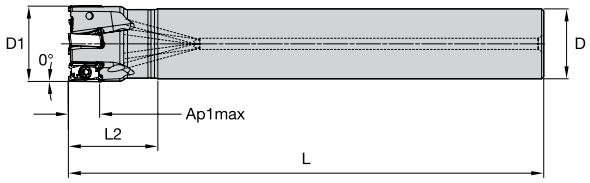
VSM490-10 • Cylindrical End Mills (regular and long version) • Inch





Regular Shank





Reduced Shank

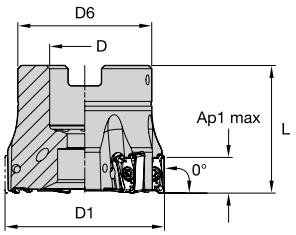
order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
6425419	**VSM490D062Z02C062XN10L360**	.625	.625	3.600	.850	.394	2	48000	Yes	.27
6425420	**VSM490D062Z02C062XN10L600**	.625	.625	6.000	1.000	.394	2	48000	Yes	.47
6425442	**VSM490D075Z02C075XN10L600**	.750	.750	6.000	1.250	.394	2	41700	Yes	.67
6425441	**VSM490D075Z03C075XN10L360**	.750	.750	3.600	.900	.394	3	41700	Yes	.38
6425443	**VSM490D075Z03C075XN10L600**	.750	.750	6.000	1.250	.394	3	41700	Yes	.66
6425444	**VSM490D100Z03C075XN10L400**	1.000	.750	4.000	1.250	.394	3	33900	Yes	.49
6425446	**VSM490D100Z03C100XN10L670**	1.000	1.000	6.700	1.600	.394	3	33900	Yes	1.36
6425445	**VSM490D100Z04C100XN10L400**	1.000	1.000	4.000	1.250	.394	4	33900	Yes	.78
6425448	**VSM490D100Z04C100XN10L670**	1.000	1.000	6.700	1.600	.394	4	33900	Yes	1.35
6425450	**VSM490D125Z04C075XN10L430**	1.250	.750	4.300	1.600	.394	4	29200	Yes	.62
6425452	**VSM490D125Z04C100XN10L430**	1.250	1.000	4.300	1.600	.394	4	29200	Yes	.92
6425454	**VSM490D125Z05C100XN10L430**	1.250	1.000	4.300	1.600	.394	5	29200	Yes	.92
6425455	**VSM490D125Z04C125XN10L800**	1.250	1.250	8.000	1.900	.394	4	29200	Yes	2.58
6425456	**VSM490D125Z05C125XN10L800**	1.250	1.250	8.000	1.900	.394	5	29200	Yes	2.58
6425457	**VSM490D150Z05C125XN10L800**	1.500	1.250	8.000	2.000	.394	5	26200	Yes	2.69

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM490-10 • Shell Mills • Inch





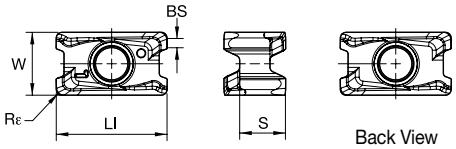
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
6425383	**VSM490D150Z04S075XN10**	1.500	.750	1.421	1.577	.394	4	26200	Yes	.44
6425384	**VSM490D150Z06S075XN10**	1.500	.750	1.421	1.577	.394	6	26200	Yes	.44
6425385	**VSM490D150Z07S075XN10**	1.500	.750	1.421	1.577	.394	7	26200	Yes	.42
6425386	**VSM490D200Z05S075XN10**	2.000	.750	1.750	1.577	.394	5	22100	Yes	.81
6425387	**VSM490D200Z07S075XN10**	2.000	.750	1.750	1.577	.394	7	22100	Yes	.81
6425388	**VSM490D200Z09S075XN10**	2.000	.750	1.750	1.577	.394	9	22100	Yes	.83
6425389	**VSM490D250Z05S075XN10**	2.500	.750	1.928	1.577	.394	5	22100	Yes	1.25
6425390	**VSM490D250Z07S075XN10**	2.500	.750	1.928	1.577	.394	7	22100	Yes	1.22
6425401	**VSM490D250Z09S075XN10**	2.500	.750	1.928	1.577	.394	9	22100	Yes	1.24
6425402	**VSM490D300Z06S100XN10**	3.000	1.000	2.190	1.750	.394	6	17600	Yes	2.06
6425403	**VSM490D300Z08S100XN10**	3.000	1.000	2.190	1.750	.394	8	17600	Yes	2.03
6425404	**VSM490D300Z10S100XN10**	3.000	1.000	2.190	1.750	.394	10	17600	Yes	2.05
6425405	**VSM490D400Z08S150XN10**	4.000	1.500	3.380	2.000	.394	8	15000	Yes	3.40
6425406	**VSM490D400Z12S150XN10**	4.000	1.500	3.380	2.000	.394	12	15000	Yes	3.37
6425407	**VSM490D500Z10S150XN10**	5.000	1.500	3.907	2.380	.394	10	13400	Yes	7.21
6425408	**VSM490D500Z14S150XN10**	5.000	1.500	3.907	2.380	.394	14	13400	Yes	7.19

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM490-10 • XNGU-ML • Precision Finishing and Light Machining



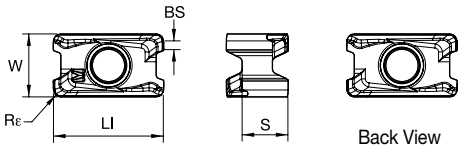


● first choice
○ alternate choice

| | | |

VSM490-10 • XNGU-MM • Universal Geometry for Medium Machining



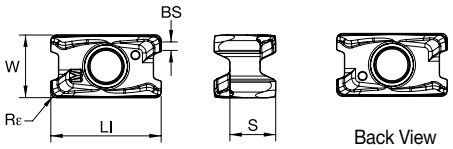


● first choice
○ alternate choice

| | | |

VSM490-10 • XNGU-MH • Heavy Roughing





● first choice
○ alternate choice

| | | |

VSM490™-10 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	XNGU-ML	WP40PM	**XNPU-MM**	**WP40PM**	XNPU-MM	WP40PM
P3–P4	XNGU-ML	WP40PM	**XNPU-MM**	**WP40PM**	XNPU-MM	WP40PM
P5–P6	XNGU-MM	WP25PM	**XNPU-MM**	**WP35CM**	XNPU-MM	WP40PM
M1–M2	XNGU-ML	WS40PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
M3	XNGU-ML	WS40PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
K1–K2	XNPU-ML	WK15PM	**XNGU-MH**	**WK15CM**	XNGU-MH	WK15CM
K3	XNPU-MM	WK15PM	**XNGU-MH**	**WP35CM**	XNGU-MH	WP35CM
N1–N2	XNGU-ALP	WN25PM	**XNGU-ALP**	**WN25PM**	XNGU-ALP	WN25PM
N3	XNGU-ALP	WN25PM	**XNGU-ALP**	**WN25PM**	XNGU-ALP	WN25PM
S1–S2	XNGU-ML	WP25PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
S3	XNGU-ML	WS40PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
S4	XNGU-ML	WS40PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
H1	XNGU-ML	WU10PM	**XNGU-MM**	**WU10PM**	–	–

VSM490-10 • Recommended Starting Speeds [SFM]

Material Group		WK15CM			WK15PM			WN25PM			WP25PM			WP35CM			WP40PM			WS40PM			WU10PM		
P	1	–	–	–	–	–	–	–	–	–	1085	**935**	885	1495	**1295**	1215	970	**855**	805	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	900	**785**	655	920	**835**	755	820	**705**	590	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	835	**705**	575	835	**755**	675	755	**640**	525	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	740	**605**	490	625	**575**	525	675	**560**	445	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–	605	**560**	490	855	**755**	690	560	**510**	445	560	**475**	395	–	–	–
	6	–	–	–	–	–	–	–	–	–	540	**410**	330	525	**445**	360	490	**375**	295	490	**360**	260	–	–	–
M	1	–	–	–	–	–	–	–	–	–	675	**590**	540	675	**605**	510	640	**560**	510	690	**560**	460	–	–	–
	2	–	–	–	–	–	–	–	–	–	605	**525**	425	605	**525**	460	575	**490**	410	590	**475**	395	–	–	–
	3	–	–	–	–	–	–	–	–	–	460	**395**	310	475	**425**	375	425	**375**	295	475	**360**	280	–	–	–
K	1	1380	**1265**	1115	885	**805**	705	–	–	–	755	**675**	605	970	**870**	785	–	–	–	–	–	–	970	**870**	785
	2	1100	**970**	900	690	**625**	575	–	–	–	590	**525**	490	770	**690**	625	–	–	–	–	–	–	755	**675**	625
	3	920	**820**	755	575	**525**	475	–	–	–	490	**445**	395	640	**575**	525	–	–	–	–	–	–	640	**575**	525
N	1	–	–	–	–	–	–	3525	**3100**	2870	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	130	**115**	80	–	–	–	130	**115**	100	130	**115**	80	–	–	–
	2	–	–	–	–	–	–	–	–	–	130	**115**	80	–	–	–	130	**115**	100	130	**115**	80	–	–	–
	3	–	–	–	–	–	–	–	–	–	165	**130**	80	–	–	–	165	**130**	100	165	**130**	80	–	–	–
	4	–	–	–	–	–	–	–	–	–	230	**165**	115	–	–	–	215	**165**	115	195	**165**	100	–	–	–
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	525	**425**	295

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

VSM490-10 • Recommended Starting Feeds [IPT]

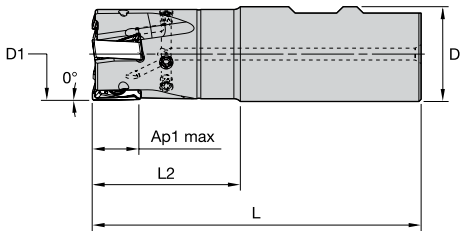
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..ALP	.005	**.009**	.013	.003	**.007**	.009	.003	**.005**	.007	.002	**.004**	.006	.002	**.004**	.006	.E..ALP
.E..ML	.007	**.011**	.015	.005	**.008**	.011	.004	**.006**	.008	.003	**.005**	.007	.003	**.005**	.006	.E..ML
.S..MM	.009	**.014**	.018	.007	**.010**	.013	.005	**.007**	.010	.004	**.006**	.008	.004	**.006**	.008	.S..MM
.S..MH	.009	**.016**	.022	.007	**.012**	.016	.005	**.009**	.012	.004	**.008**	.010	.004	**.007**	.010	.S..MH

NOTE: Use "Light Machining" value as starting feed rate.

VSM490-15 • Weldon® End Mills • Inch



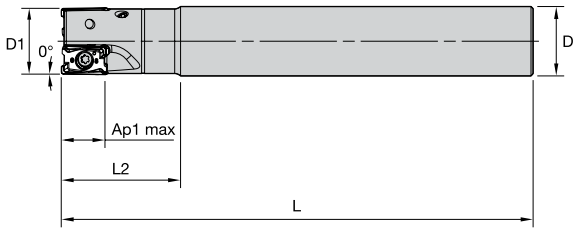


order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
5873069	VSM490D100Z02W075XN15	1.000	.750	3.780	1.750	.591	2	26300	Yes	.40
5710590	VSM490D100Z02W100XN15	1.000	1.000	4.030	1.750	.591	2	26300	Yes	.70
5710591	VSM490D125Z03W100XN15	1.250	1.000	4.530	2.250	.591	3	22100	Yes	.88
5873070	VSM490D150Z03W125XN15	1.500	1.250	4.530	2.250	.591	3	19500	Yes	1.41
5710592	VSM490D150Z04W125XN15	1.500	1.250	4.530	2.250	.591	4	19500	Yes	1.42

NOTE: Weldon type not recommended for finishing operations.

VSM490-15 • Cylindrical End Mills • Inch

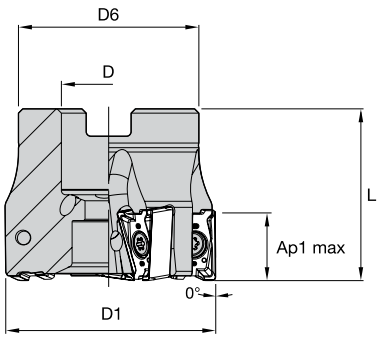




order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
5873101	VSM490D100Z02C100XN15L800	1.000	1.000	8.000	1.750	.610	2	26300	Yes	1.55
5873102	VSM490D125Z03C125XN15L800	1.250	1.250	8.000	2.250	.591	3	22100	Yes	2.50
5873103	VSM490D150Z04C125XN15L800	1.500	1.250	8.000	2.250	.591	4	19500	Yes	2.56

VSM490-15 • Shell Mills • Inch





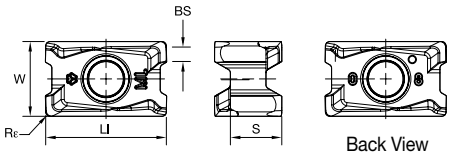
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5710593	**VSM490D150Z05S050XN15**	1.500	.500	1.420	1.575	.591	5	19500	Yes	.43
5710594	**VSM490D200Z05S075XN15**	2.000	.750	1.750	1.575	.591	5	16100	Yes	.78
5710595	**VSM490D200Z06S075XN15**	2.000	.750	1.750	1.575	.591	6	16100	Yes	.77
5873104	**VSM490D250Z05S075XN15**	2.500	.750	1.750	1.575	.591	5	14100	Yes	1.11
5710596	**VSM490D250Z06S075XN15**	2.500	.750	1.750	1.575	.591	6	14100	Yes	1.06
5710597	**VSM490D250Z07S100XN15**	2.500	1.000	2.190	1.750	.591	7	14100	Yes	1.31
5710598	**VSM490D300Z07S100XN15**	3.000	1.000	2.190	1.750	.591	7	12700	Yes	1.83
5873105	**VSM490D300Z09S100XN15**	3.000	1.000	2.190	1.750	.610	9	12700	Yes	1.94
5873106	**VSM490D400Z08S150XN15**	4.000	1.500	3.380	2.000	.591	8	10800	Yes	3.26
5710599	**VSM490D400Z11S150XN15**	4.000	1.500	3.380	2.000	.591	11	10800	Yes	3.26
5873107	**VSM490D500Z09S150XN15**	5.000	1.500	3.907	2.380	.591	9	9600	Yes	7.67
5873108	**VSM490D500Z12S150XN15**	5.000	1.500	3.907	2.380	.591	12	9600	Yes	6.83
5873109	**VSM490D600Z10S200XN15**	6.000	2.000	4.880	2.380	.591	10	8600	Yes	10.42

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM490-15 • XNGU-ML • Precision Finishing and Light Machining



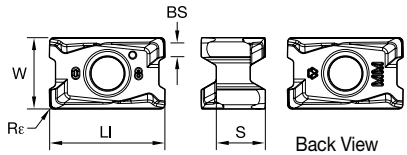


● first choice
○ alternate choice

| | | |

VSM490-15 • XNGU-MM • Universal Geometry for Medium Machining



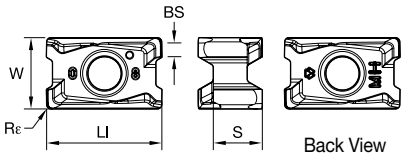


● first choice
○ alternate choice

| | | |

VSM490-15 • XNGU-MH • Heavy Roughing





● first choice
○ alternate choice

| | | |

VSM490-15 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	XNGU-ML	WP40PM	**XNPU-MM**	**WP40PM**	XNPU-MM	WP40PM
P3–P4	XNGU-ML	WP40PM	**XNPU-MM**	**WP40PM**	XNPU-MM	WP40PM
P5–P6	XNGU-MM	WP25PM	**XNPU-MM**	**WP35CM**	XNPU-MM	WP40PM
M1–M2	XNGU-ML	WS40PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
M3	XNGU-ML	WS40PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
K1–K2	XNPU-MM	WK15PM	**XNGU-MH**	**WK15CM**	XNGU-MH	WK15CM
K3	XNPU-MM	WK15PM	**XNGU-MH**	**WP35CM**	XNGU-MH	WP35CM
N1–N2	XNGU-ALP	WN25PM	**XNGU-ALP**	**WN25PM**	XNGU-ALP	WN25PM
N3	XNGU-ALP	WN25PM	**XNGU-ALP**	**WN25PM**	XNGU-ALP	WN25PM
S1–S2	XNGU-ML	WP25PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
S3	XNGU-ML	WS40PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
S4	XNGU-ML	WS40PM	**XNGU-ML**	**WS40PM**	XNPU-MM	WS40PM
H1	–	–	**–**	**–**	–	–

VSM490-15 • Recommended Starting Speeds [SFM]

Material Group		WK15CM			WK15PM			WN25PM			WP25PM			WP35CM			WP40PM			WS40PM			WU35PM		
P	1	–	–	–	–	–	–	–	–	–	1085	**935**	885	1495	**1295**	1215	970	**855**	805	–	–	–	855	**755**	705
	2	–	–	–	–	–	–	–	–	–	900	**785**	655	920	**835**	755	820	**705**	590	–	–	–	720	**625**	525
	3	–	–	–	–	–	–	–	–	–	835	**705**	575	835	**755**	675	755	**640**	525	–	–	–	655	**560**	460
	4	–	–	–	–	–	–	–	–	–	740	**605**	490	625	**575**	525	675	**560**	445	–	–	–	590	**490**	395
	5	–	–	–	–	–	–	–	–	–	605	**560**	490	855	**755**	690	560	**510**	445	560	**475**	395	490	**445**	395
	6	–	–	–	–	–	–	–	–	–	540	**410**	330	525	**445**	360	490	**375**	295	490	**360**	260	425	**330**	260
M	1	–	–	–	–	–	–	–	–	–	675	**590**	540	675	**605**	510	640	**560**	510	690	**560**	460	560	**490**	445
	2	–	–	–	–	–	–	–	–	–	605	**525**	425	605	**525**	460	575	**490**	410	590	**475**	395	510	**425**	360
	3	–	–	–	–	–	–	–	–	–	460	**395**	310	475	**425**	375	425	**375**	295	475	**360**	280	375	**330**	260
K	1	1380	**1265**	1115	885	**805**	705	–	–	–	755	**675**	605	970	**870**	785	–	–	–	–	–	–	–	–	–
	2	1100	**970**	900	690	**625**	575	–	–	–	590	**525**	490	770	**690**	625	–	–	–	–	–	–	–	–	–
	3	920	**820**	755	575	**525**	475	–	–	–	490	**445**	395	640	**575**	525	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	3525	**3100**	2870	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	130	**115**	80	–	–	–	130	**115**	100	130	**115**	80	115	**100**	80
	2	–	–	–	–	–	–	–	–	–	130	**115**	80	–	–	–	130	**115**	100	130	**115**	80	115	**100**	80
	3	–	–	–	–	–	–	–	–	–	165	**130**	80	–	–	–	165	**130**	100	165	**130**	80	150	**115**	80
	4	–	–	–	–	–	–	–	–	–	230	**165**	115	–	–	–	215	**165**	115	195	**165**	100	195	**150**	100
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

VSM490-15 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%				
.E..ALP	.005	**.008**	.012	.003	**.006**	.009	.002	**.004**	.007	.002	**.004**	.006	.002	**.004**	.005		.E..ALP
.E..ML	.007	**.012**	.018	.005	**.009**	.013	.004	**.006**	.010	.003	**.006**	.008	.003	**.005**	.008		.E..ML
.S..MM	.008	**.015**	.024	.006	**.011**	.017	.005	**.008**	.013	.004	**.007**	.011	.004	**.007**	.010		.S..MM
.S..MH	.009	**.017**	.028	.006	**.012**	.020	.005	**.009**	.015	.004	**.008**	.013	.004	**.007**	.012		.S..MH

NOTE: Use "Light Machining" value as starting feed rate.



widia.com

WIDIA™

VSM890™

VSM890 Shoulder Mill

Use VSM890 shoulder mills to perform a true 90-degree wall and axial step down in light machining to heavy roughing jobs while maintaining a smooth surface finish in all material groups.

Course, medium, and fine-pitched cutter densities.

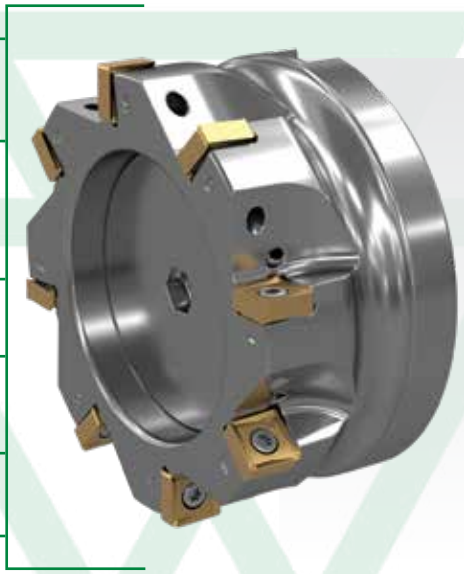
Pocket seat designed for tight insert seating, enabling stability in roughing applications.

Ap1 Max up to .3872" (9,8mm).

User-friendly pocket numbering system.

Integrated wiper facet.

Super-positive rake design for low machine power consumption.



VSM890 shoulder mills feature an internal coolant supply and an enhanced user-friendly design with a pocket numbering system. Each insert is double-sided with eight cutting edges and an insert nose radius of R.032" (R0,8 mm), creating no lap lines in step down contour milling jobs.

UNIQUE INSERT RAKE DESIGN TO REDUCE AND PERFECTLY BALANCE AXIAL AND RADIAL CUTTING FORCES. ENGINEERED FOR LIGHT MACHINING TO HEAVY ROUGHING IN ALL MATERIAL GROUPS.

-ALP



N

First choice for Non-Ferrous materials.

-ML



P M S

First choice for Stainless Steel, light machining, and finishing jobs.

-MM



P M K S H

First choice for general purpose in all workpiece materials. Engineered for high-feed rates.

Finishing Capabilities/Lower Cutting Forces

Geometry Strengthening

TRUE 90-DEGREE WALL AND AXIAL STEP DOWN WITH VSM890™

PRODUCT

SERIES

VSM890

DIAMETER RANGE

Weldon End Mills:
1.25–1.5" (32mm)
Shell Mills: 2–10" (40–250mm)

SHANK TYPES

Weldon® End Mills
Shell Mills

INDUSTRY

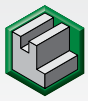
GENERAL ENGINEERING

TRANSPORTATION

ENERGY

APPLICATIONS


FACE MILLING


SIDE/ SHOULDER MILLING: SLOTTING: SHOULDER


SLOTTING: TROCHOIDAL MILLING

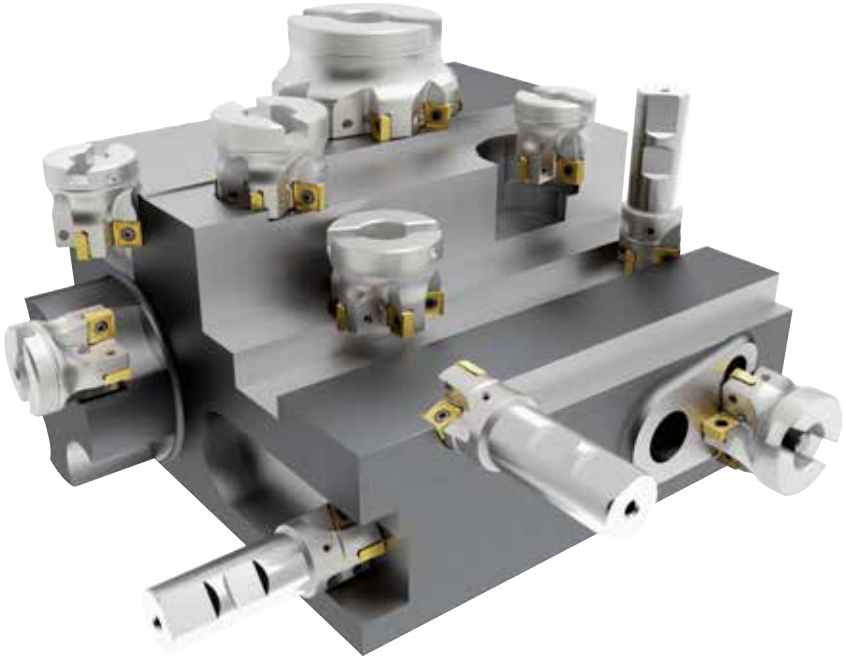

PLUNGE MILLING


SLOTTING: SQUARE END


POCKET MILLING

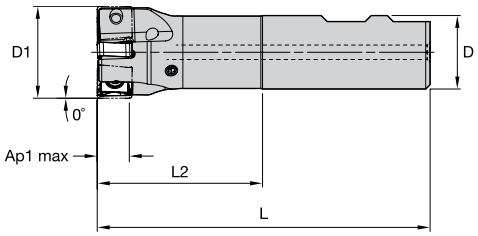
VERSATILITY

Apply VSM890 in a variety of applications.



VSM890-12 • Weldon® End Mills • Inch

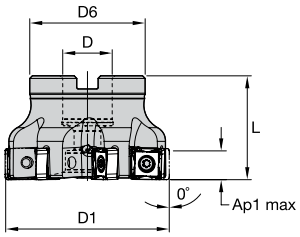




order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
6596129	VSM890D125Z03W100SN12	1.250	1.000	4.530	2.250	.387	3	33400	Yes	.89
6596130	VSM890D150Z04W100SN12	1.500	1.000	4.530	2.250	.387	4	29100	Yes	1.18

VSM890-12 • Shell Mills • Inch





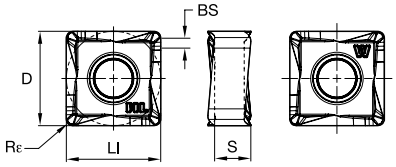
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
6596131	VSM890D200Z04S075SN12	2.000	.750	1.750	1.575	.387	4	23800	Yes	.73
6596132	VSM890D200Z05S075SN12	2.000	.750	1.750	1.575	.387	5	23800	Yes	.70
6596133	VSM890D250Z05S075SN12	2.500	.750	1.750	1.575	.387	5	20700	Yes	1.06
6596134	VSM890D250Z07S075SN12	2.500	.750	1.750	1.575	.387	7	20700	Yes	.99
6596135	VSM890D300Z05S100SN12	3.000	1.000	2.190	1.750	.387	5	18500	Yes	1.63
6596136	VSM890D300Z07S100SN12	3.000	1.000	2.190	1.750	.387	7	18500	Yes	1.73
6596137	VSM890D300Z09S100SN12	3.000	1.000	2.190	1.750	.387	9	18500	Yes	1.69
6596138	VSM890D400Z06S150SN12	4.000	1.500	3.810	2.000	.387	6	15700	Yes	3.51
6596139	VSM890D400Z08S150SN12	4.000	1.500	3.810	2.000	.387	8	15700	Yes	3.76
6596151	VSM890D400Z11S150SN12	4.000	1.500	3.810	2.000	.387	11	15700	Yes	3.67
6596152	VSM890D500Z07S150SN12	5.000	1.500	3.810	2.380	.387	7	13800	Yes	6.02
6596153	VSM890D500Z10S150SN12	5.000	1.500	3.810	2.380	.387	10	13800	Yes	6.40
6596154	VSM890D500Z14S150SN12	5.000	1.500	3.810	2.380	.387	14	13800	Yes	6.14
6596155	VSM890D600Z08S200SN12	6.000	2.000	4.875	2.380	.387	8	12500	Yes	9.44
6596156	VSM890D600Z12S200SN12	6.000	2.000	4.875	2.380	.387	12	12500	Yes	9.43
6596157	VSM890D600Z16S200SN12	6.000	2.000	4.875	2.380	.387	16	12500	Yes	9.64
6596158	VSM890D800Z10S250SN12	8.000	2.500	5.118	2.380	.387	10	10700	Yes	12.08
6596159	VSM890D800Z14S250SN12	8.000	2.500	5.118	2.380	.387	14	10700	Yes	12.60
6596160	VSM890D800Z22S250SN12	8.000	2.500	5.118	2.380	.387	22	10700	Yes	12.45
6613696	VSM890D1000Z16S250SN12	10.000	2.500	5.118	2.380	.387	16	9500	Yes	18.01

FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM890-12 • SNHX-ML • Precision Finishing and Light Machining





● first choice
○ alternate choice

| | | |

VSM890-12 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	SNHX-ML	WS40PM	**SNHX-MM**	**WP40PM**	SNHX-MM	WP40PM
P3–P4	SNHX-ML	WS40PM	**SNHX-MM**	**WP40PM**	SNHX-MM	WP40PM
P5–P6	SNHX-ML	WP25PM	**SNHX-MM**	**WP40PM**	SNHX-MM	WP40PM
M1–M2	SNHX-ML	WS40PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
M3	SNHX-ML	WS40PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
K1–K2	SNHX-MM	WK15CM	**SNHX-MM**	**WK15CM**	SNHX-MM	WK15CM
K3	SNHX-MM	WK15CM	**SNHX-MM**	**WK15CM**	SNHX-MM	WK15CM
N1–N2	SNHX-ALP	WN25PM	**SNHX-ALP**	**WN25PM**	SNHX-ALP	WN25PM
N3	SNHX-ALP	WN25PM	**SNHX-ALP**	**WN25PM**	SNHX-ALP	WN25PM
S1–S2	SNHX-ML	WP25PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
S3	SNHX-ML	WS40PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
S4	SNHX-ML	WS40PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
H1	SNHX-MM	WU10PM	**SNHX-MM**	**WU10PM**	–	–

VSM890-12 • Recommended Starting Speeds [SFM]

Material Group		WK15CM			WN25PM			WP25PM			WP35CM			WP40PM			WS40PM			WU10PM		
P	1	–	–	–	–	–	–	1085	**935**	885	1490	**1295**	1210	970	**855**	805	–	–	–	–	–	–
	2	–	–	–	–	–	–	900	**785**	655	915	**835**	750	820	**705**	590	–	–	–	–	–	–
	3	–	–	–	–	–	–	835	**705**	575	835	**750**	670	755	**640**	525	–	–	–	–	–	–
	4	–	–	–	–	–	–	740	**605**	490	620	**570**	520	675	**560**	445	–	–	–	–	–	–
	5	–	–	–	–	–	–	605	**560**	490	850	**750**	685	560	**510**	445	560	**475**	395	–	–	–
	6	–	–	–	–	–	–	540	**410**	330	520	**440**	360	490	**375**	295	490	**360**	260	–	–	–
M	1	–	–	–	–	–	–	675	**590**	540	670	**605**	505	640	**560**	510	690	**560**	460	–	–	–
	2	–	–	–	–	–	–	605	**525**	425	605	**520**	455	575	**490**	410	590	**475**	395	–	–	–
	3	–	–	–	–	–	–	460	**395**	310	475	**425**	375	425	**375**	295	475	**360**	280	–	–	–
K	1	1380	**1265**	1115	–	–	–	755	**675**	605	965	**865**	785	–	–	–	–	–	–	970	**870**	785
	2	1100	**970**	900	–	–	–	590	**525**	490	770	**685**	620	–	–	–	–	–	–	755	**675**	625
	3	920	**820**	755	–	–	–	490	**445**	395	635	**570**	520	–	–	–	–	–	–	640	**575**	525
N	1	–	–	–	3525	**3100**	2870	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	130	**115**	80	–	–	–	130	**115**	100	130	**115**	80	–	–	–
	2	–	–	–	–	–	–	130	**115**	80	–	–	–	130	**115**	100	130	**115**	80	–	–	–
	3	–	–	–	–	–	–	165	**130**	80	–	–	–	165	**130**	100	165	**130**	80	–	–	–
	4	–	–	–	–	–	–	230	**165**	115	215	**160**	105	215	**165**	115	195	**165**	100	–	–	–
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	525	**425**	295

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

VSM890-12 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

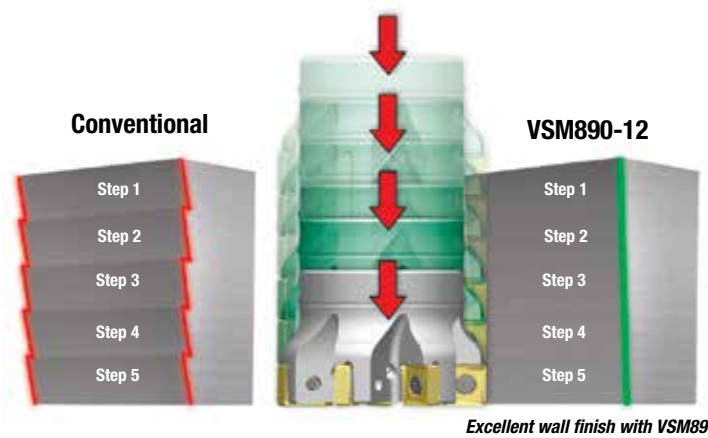
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..ALP	.005	**.010**	.015	.003	**.007**	.011	.003	**.005**	.008	.002	**.005**	.007	.002	**.004**	.006	.E..ALP
.E..ML	.007	**.012**	.023	.005	**.009**	.017	.004	**.007**	.012	.003	**.006**	.011	.003	**.005**	.010	.E..ML
.S..MM	.009	**.014**	.032	.007	**.010**	.023	.005	**.008**	.017	.004	**.007**	.015	.004	**.006**	.014	.S..MM

NOTE: Use "Light Machining" value as starting feed rate.

Best Practices

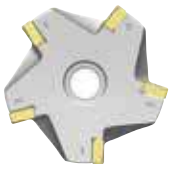
True 0° roughing tool with embedded finishing capabilities all in one tool.

Best-in-class wall finish with VSM890-12 in axial stepping-down jobs. For many shop floor setups, no additional finishing is required resulting in shorter machining time and lower tooling cost.



Excellent wall finish with VSM890-12

Coarse Pitch



- Unstable setup.
- Low spindle power.
- High axial depth of cut Ap1.
- Low feed rate.
- Machining aluminum.
- Driven tools.

Medium Pitch



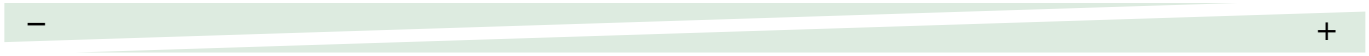
- Regular setup.
- Regular spindle power.
- Medium feed rate.

Fine Pitch



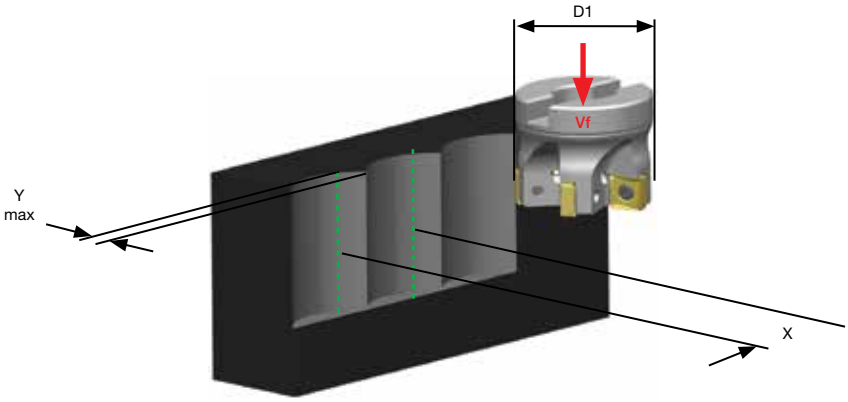
- Rigid setup.
- High spindle power.
- Low axial depth of cut Ap1.
- High feed rate.
- Boost productivity and cut into cycle time.

Machining Stability



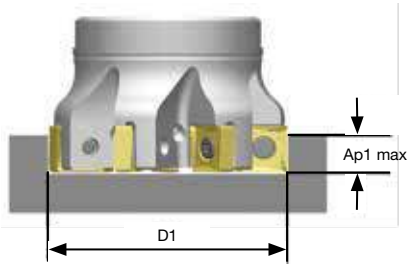
VSM890-12 Z-Axis Plunge Milling

cutting diameter (D1)	Y max	X
1.25	0.3504	1.1228
1.5	0.3504	1.2693
2	0.3504	1.5205
2.5	0.3504	1.7358
3	0.3504	1.9272
4	0.3504	2.2618
5	0.3504	2.5528
6	0.3504	2.8138
8	0.3504	3.2744
10	0.3504	3.6776



VSM890-12 Ap1 max at Full Slotting, 100% Radial Cutter Engagement

	Recommended Cutter Density	Ap1 max		
D1 diameter	Z	Gray Cast Iron EN-GJL-250 EN-JL1040 GG25	Steel AISI 4140 1.7225 42CrMo4	Stainless Steel AISI 316L, 1.4404, X2CrNiMo1810
1.5"	4	.300"	.250"	.195"
2.0"	4	.300"	.250"	.195"
2.5"	5	.300"	.250"	.195"
3.0"	5	.300"	.250"	.195"
4.0"	6	.300"	.250"	.195"



M680 Series

M680-09, M680-16, and M680+ Shoulder Mills



M680-09

The M680-09 shoulder mill provides the length needed to machine deep cavities or wall machines. The axially positive geometry makes the this tool suitable for machining in unstable conditions.



M680-16

The M680-16 is a versatile 90° shoulder mill with optimized strong tool design for challenging milling operations. A wide selection of inserts are available to machine all material types.



M680+

The M680+ is a general purpose shoulder mill that features strong inserts for high reliability in roughing applications and interrupted cuts.

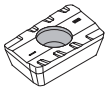
M680 TO M680-16



AL
Additional choice for aluminum and non-ferrous alloy machining.



XP..16..
First choice for general machining operations in steel and cast iron.



MR
First choice for heavy machining and unstable conditions (e.g., long reach).

M680-09



-XDHT
Versatile choice for general machining operations in steel, stainless steel, cast iron, non-ferrous, high-temp alloys, and hardened materials.



-MM
First choice for general machining in steel and cast iron.

WIDE RANGE OF INSERTS FOR OPTIMAL PERFORMANCE

PRODUCT		INSERTS		
SERIES	DIAMETER RANGE	INSERT TYPE	GRADE	MATERIALS
M680-09	.625–1.25" (16–32mm)	XDHT, MM	WK15PM, WU20PM	P M K N S H
M680-16	1–2" (16–160mm)	ALP, AL, GE, XP..16, MR	THR, THM-U, TN6501, TN6502, TN6510, TN6520, TN6525, TN6540, TTM08, WK15PM, WP35CM, WU20PM, TTI25, THM, WK15CM, WP40PM, WS30PM	P M K N S H
M680+	25–40mm (only available in metric sizes)	ML, MM, MH	THM, TN6510, TN6520, TN6540, WK15CM, WP35CM	P M K N S

APPLICATIONS



SIDE MILLING/ SHOULDER MILLING: SQUARE END | SLOTTING: SQUARE END | FACE MILLING | THROUGH COOLANT: RADIAL: INDEXABLE MILLING | SLOTTING: SIDE MILLING | PLUNGE MILLING | POCKETING | RAMPING: BLANK

INDUSTRY



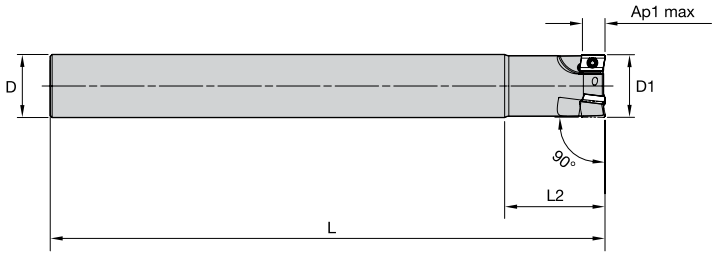






M680-09 • Cylindrical End Mills • XD09 • Inch





order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
6921188	**M680U062Z02C062XD09L600**	.625	.625	6.000	1.250	.354	2	22000	No	.48
6921189	**M680U075Z02C075XD09L800**	.750	.750	8.000	1.610	.354	2	—	No	.95
6921191	**M680U100Z03C100XD09L800**	1.000	1.000	8.000	2.100	.354	3	—	No	1.67
6921192	**M680U125Z04C125XD09L980**	1.250	1.250	9.800	2.510	.354	4	—	No	3.26

NOTE: Please order wrench separately.

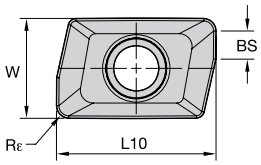
FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M680-09 • XDHT



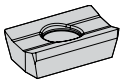


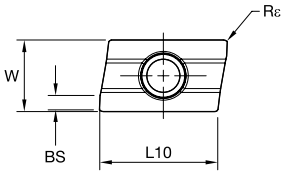


● first choice
○ alternate choice

| | | |

M680-09 • XDHT-AL





● first choice
○ alternate choice

| | | |

M680 XD09 • Recommended Starting Speeds [SFM]

Material Group		THM			THM-U			THR			TN6501			TN6502			TN6510			TN6520			TN6525		
P	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1345	**1050**	920
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1050	**820**	705
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	920	**705**	605
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	770	**560**	475
	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1015	**770**	640
	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	670	**525**	425
M	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	625	**395**	260
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	395	**260**	165
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	410	**260**	180
K	1	390	**295**	245	620	**555**	490	490	**440**	390	–	–	–	–	–	–	1575	**1150**	835	1475	**1050**	755	–	–	–
	2	410	**325**	225	–	–	–	605	**455**	390	–	–	–	–	–	–	1380	**920**	670	1280	**820**	625	–	–	–
	3	425	**310**	195	–	–	–	340	**245**	160	–	–	–	–	–	–	1100	**855**	655	985	**740**	525	–	–	–
N	1	2950	**1965**	1640	6560	**3935**	3280	2950	**1965**	1640	6560	**3935**	3280	5245	**3115**	2620	–	–	–	–	–	–	–	–	–
	2	2245	**1525**	1260	4475	**2670**	2180	2245	**1525**	1260	4475	**2670**	2180	3605	**2180**	1800	–	–	–	–	–	–	–	–	–
	3	1475	**915**	655	2620	**1640**	1310	1475	**915**	655	2620	**1640**	1310	2130	**1310**	980	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	110	**80**	65	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	80	**65**	45	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	160	**130**	95	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	110	**80**	55	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		TN6540			TTI25			TTM08			WK15CM			WK15PM			WP35CM			WP40PM			WS30PM			WU20PM		
P	1	1180	**920**	785	1180	**985**	820	750	**655**	620	–	–	–	–	–	–	1490	**1295**	1210	970	**855**	805	1215	**1050**	985	1080	**950**	885
	2	820	**625**	540	855	**690**	590	635	**555**	455	–	–	–	–	–	–	915	**835**	750	820	**705**	590	1000	**885**	720	900	**820**	655
	3	705	**540**	460	855	**690**	590	590	**490**	410	–	–	–	–	–	–	835	**750**	670	755	**640**	525	935	**785**	640	835	**720**	570
	4	590	**425**	360	720	**590**	490	520	**425**	340	–	–	–	–	–	–	620	**570**	520	670	**560**	445	820	**670**	540	735	**620**	490
	5	785	**590**	490	870	**640**	540	–	–	–	–	–	–	–	–	–	850	**750**	685	560	**510**	445	670	**625**	540	605	**570**	490
	6	525	**395**	330	395	**295**	245	–	–	–	–	–	–	–	–	–	520	**440**	360	490	**375**	295	605	**460**	360	540	**425**	325
M	1	425	**260**	195	1310	**855**	590	–	–	–	–	–	–	–	–	–	670	**605**	505	640	**560**	510	740	**655**	605	670	**590**	540
	2	260	**165**	130	885	**560**	395	–	–	–	–	–	–	–	–	–	605	**520**	455	575	**490**	410	670	**590**	475	605	**520**	425
	3	280	**165**	130	870	**575**	395	–	–	–	–	–	–	–	–	–	475	**425**	375	425	**375**	295	510	**445**	345	455	**390**	310
K	1	–	–	–	605	**510**	425	–	–	–	1380	**1265**	1115	1310	**950**	705	965	**865**	785	–	–	–	835	**740**	640	820	**720**	605
	2	–	–	–	490	**395**	345	–	–	–	1100	**970**	900	1145	**770**	555	770	**685**	620	–	–	–	655	**590**	540	655	**590**	490
	3	–	–	–	395	**345**	280	–	–	–	920	**820**	755	915	**800**	540	635	**570**	520	–	–	–	540	**490**	445	590	**490**	390
N	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1800	**1540**	1310
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1800	**1540**	1310
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1310	**1145**	980
S	1	150	**115**	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	100	150	**130**	100	130	**110**	80
	2	80	**65**	35	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	100	150	**130**	100	130	**110**	80
	3	230	**130**	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	165	**130**	100	180	**150**	100	160	**130**	80
	4	195	**100**	80	–	–	–	–	–	–	–	–	–	–	–	–	215	**160**	105	215	**165**	115	280	**195**	130	225	**160**	110
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	445	**330**	245	360	**260**	225
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

NOTE: FIRST choice starting speeds are in bold type.
As the average chip thickness increases, the speed should be decreased.

M680-09 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%				
.XDHT..	.006	**.017**	.026	.004	**.012**	.018	.003	**.009**	.014	.003	**.008**	.012	.003	**.007**	.011		.XDHT..
..SRMM	.007	**.019**	.029	.005	**.014**	.020	.004	**.010**	.015	.003	**.009**	.013	.003	**.008**	.012		..SRMM

NOTE: Use "Light Machining" value as starting feed rate.

M690 Series

M690 IC12, M690 IC15

The M690 is an economical, four-edged shoulder mill designed to deliver optimal chip evacuation, excellent shoulder finish, and free cutting action.



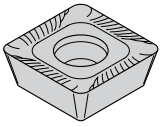
IC12 AND IC15 INSERTS OFFERED IN 4 GEOMETRIES



-ALP

N

Recommended as a first choice for machining non-ferrous and aluminum materials.



-ML

P M K

Steel, cast iron with secondary uses on stainless and titanium.



-MH

P K

This geometry is reserved for heavy or interrupted cut machining operations that require additional edge protection.



-MM

P K

Steel, cast iron with secondary uses on stainless and titanium.

Recommended as a first choice for general machining of all materials.

ECONOMICAL SHOULDER MILLING

PRODUCT

SERIES

M690

DIAMETER RANGE

1.5–6" (125–315mm)

SHANK TYPES

Shell Mills
Weldon® End Mills

INDUSTRY

GENERAL ENGINEERING

ENERGY

TRANSPORTATION

APPLICATIONS



SIDE MILLING/ SHOULDER MILLING: SQUARE END



FACE MILLING

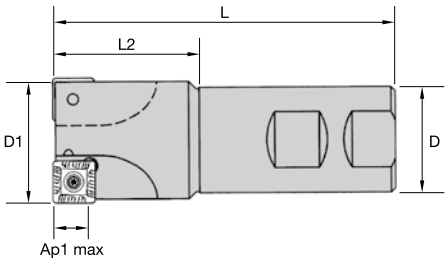


SLOTTING: SQUARE END



M690 • Weldon® End Mills • SD1204 • Inch

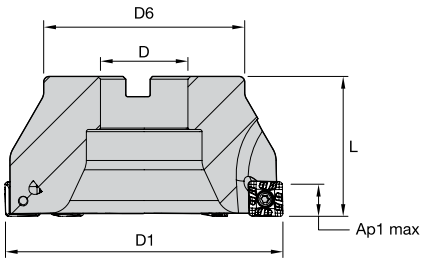




order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
2646782	**M690D150Z03W125SD12**	1.500	1.250	4.000	1.720	.400	3	22400	Yes	1.40

M690 • Shell Mills • SD1204 • Inch





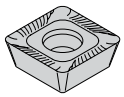
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2646785	**M690D200Z05S075SD12**	2.000	.750	1.700	1.500	.400	5	22400	Yes	.50
2646788	**M690D250Z06S100SD12**	2.500	1.000	2.200	1.750	.400	6	20000	Yes	1.35
2646790	**M690D300Z06SD12**	3.000	1.000	2.305	2.000	.400	6	17200	No	1.84

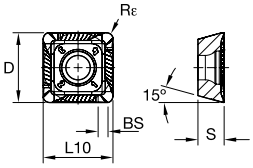
NOTE: Standard milling cutters will accept insert nose radius up to 0.79" without modification.
For larger radii, clearance must be added.

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M690 • SDMT-ML • SD1204..



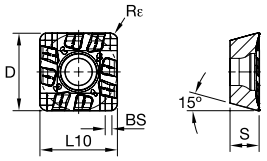


● first choice
○ alternate choice

| | | |

M690 • SDMT-MH • SD1204..



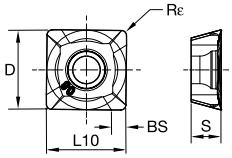


● first choice
○ alternate choice

| | | |

M690 • SDEX-ALP • SD1204..





● first choice
○ alternate choice

								THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	WS30PM	WS40PM
P				●	●		●	○	●						
M				○	●		●	●	●						
K	●	●	○	○	●	○									
N	○														○
S				●		○	●	●	●						
H							○								

catalog number	cutting edges	D	L10	S	BS	Rε	hm	5281790							
SDEX120408FRALP	4	.500	.504	.187	.060	.031	.001	-	-	-	-	-	-	-	-

M690 SD1204 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MH	TN6540
P3–P4	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MH	TN6540
P5–P6	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MH	TN6540
M1–M2	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MH	TN6540
M3	.E..ML	WS40PM	**.S..MM**	**WS40PM**	.S..MH	WP35CM
K1–K2	.E..ML	WK15CM	**.E..ML**	**WK15CM**	.S..MH	WK15CM
K3	.E..ML	WK15CM	**.S..MM**	**TN6525**	.S..MH	TN6525
N1–N2	.ALP	THM-U	**.E..ML**	**THM-U**	.S..ML	THM-U
N3	.ALP	THM-U	**.E..ML**	**THM-U**	.S..ML	THM-U
S1–S2	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MM	TN6540
S3	.E..ML	TN6540	**.S..MM**	**WS30PM**	.S..MM	TN6540
S4	.E..ML	TN6540	**.S..MM**	**WS30PM**	.S..MM	TN6540
H1	.S..MM	WS30PM	**.S..MM**	**WS30PM**	.S..MM	WS30PM

M690 SD1204 • Recommended Starting Speeds [SFM]

Material Group		TN6520			TN6525			TN6540			WK15CM		
P	1	–	–	–	1115	**870**	770	985	**770**	655	–	–	–
	2	–	–	–	870	**690**	590	690	**525**	460	–	–	–
	3	–	–	–	770	**590**	510	590	**460**	375	–	–	–
	4	–	–	–	640	**460**	395	490	**360**	295	–	–	–
	5	–	–	–	855	**640**	540	655	**490**	410	–	–	–
	6	–	–	–	560	**445**	360	445	**330**	280	–	–	–
M	1	–	–	–	525	**330**	215	360	**215**	165	–	–	–
	2	–	–	–	330	**215**	130	215	**130**	115	–	–	–
	3	–	–	–	345	**215**	150	230	**130**	115	–	–	–
K	1	1230	**870**	625	755	**670**	605	605	**560**	490	1380	**1265**	1115
	2	1065	**690**	525	590	**525**	490	475	**425**	375	1100	**970**	900
	3	820	**625**	445	490	**445**	395	425	**395**	345	920	**820**	755
N	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	130	**100**	80	–	–	–
	2	–	–	–	–	–	–	65	**50**	35	–	–	–
	3	–	–	–	–	–	–	195	**115**	80	–	–	–
	4	–	–	–	–	–	–	165	**80**	65	–	–	–
H	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		WP35CM			WS30PM			WS40PM			THM-U		
P	1	1490	**1295**	1210	–	–	–	–	–	–	–	–	–
	2	915	**835**	750	–	–	–	–	–	–	–	–	–
	3	835	**750**	670	–	–	–	–	–	–	–	–	–
	4	620	**570**	520	–	–	–	–	–	–	–	–	–
	5	850	**750**	685	–	–	–	560	**475**	395	–	–	–
	6	520	**440**	360	–	–	–	490	**360**	260	–	–	–
M	1	670	**605**	505	740	**655**	605	690	**560**	460	–	–	–
	2	605	**520**	455	670	**590**	475	590	**475**	395	–	–	–
	3	475	**425**	375	510	**445**	345	475	**360**	280	–	–	–
K	1	965	**865**	785	–	–	–	–	–	–	625	**560**	490
	2	770	**685**	620	–	–	–	–	–	–	–	–	–
	3	635	**570**	520	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	6560	**3935**	3280
	2	–	–	–	–	–	–	–	–	–	4475	**2675**	2180
	3	–	–	–	–	–	–	–	–	–	2625	**1640**	1310
S	1	–	–	–	150	**130**	100	130	**115**	80	–	–	–
	2	–	–	–	150	**130**	100	130	**115**	80	–	–	–
	3	–	–	–	180	**150**	100	165	**130**	80	–	–	–
	4	215	**160**	105	280	**195**	130	195	**165**	100	–	–	–
H	1	–	–	–	445	**330**	245	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M690 SD1204 • Recommended Starting Feeds [IPT]

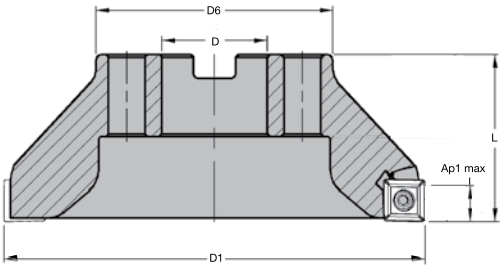
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.F..ALP	.005	**.009**	.019	.003	**.007**	.013	.003	**.005**	.010	.002	**.004**	.009	.002	**.004**	.008	.F..ALP
.E..ML	.005	**.014**	.022	.003	**.010**	.016	.003	**.007**	.012	.002	**.006**	.010	.002	**.006**	.010	.E..ML
.S..MM	.005	**.016**	.027	.003	**.012**	.020	.003	**.009**	.015	.002	**.008**	.013	.002	**.007**	.012	.S..MM
.S..MH	.009	**.021**	.033	.007	**.015**	.024	.005	**.011**	.018	.004	**.010**	.016	.004	**.009**	.014	.S..MH

NOTE: Use "Light Machining" value as starting feed rate.

M690 • Shell Mills • SD1506 • Inch



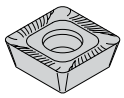


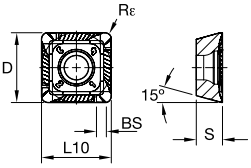
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2646791	**M690D300Z06S100SD15**	3.000	1.000	2.300	2.000	.500	6	17700	Yes	2.00
2646793	**M690D400Z08S150SD15**	4.000	1.500	3.100	2.000	.500	8	15800	No	2.70

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M690 • SDMT-ML • SD1506..





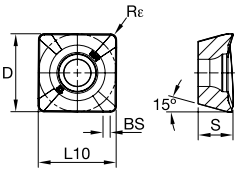
● first choice
○ alternate choice

P					●	●		●	○	●						
M					○	●		●	●	●						
K		●	●		○	○	●	○								
N		○								○						
S						●		○	●	●						
H									○							

catalog number	cutting edges	D	L10	S	BS	Rε	hm	THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	WS30PM	WS40PM
SDMT1506PDRML	4	.625	.625	.249	.043	.047	.003	-	-	-	3378677	5427425	-	-	-

M690 • SDMX-MM • SD1506..





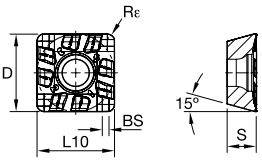
● first choice
○ alternate choice

P					●	●		●	○	●						
M					○	●		●	●	●						
K		●	●		○	○	●	○								
N		○								○						
S						●		○	●	●						
H									○							

catalog number	cutting edges	D	L10	S	BS	Rε	hm	THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	WS30PM	WS40PM
SDMX150612RMM	4	.625	.625	.250	.057	.047	.006	-	-	-	3949807	-	-	-	-

M690 • SDMT-MH • SD1506..





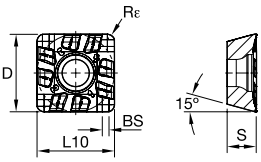
● first choice
○ alternate choice

P					●	●		●	○	●						
M					○	●		●	●	●						
K		●	●		○	○	●	○								
N		○								○						
S						●		○	●	●						
H									○							

catalog number	cutting edges	D	L10	S	BS	Rε	hm	THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	WS30PM	WS40PM
SDMT1506PDRMH	4	.625	.625	.250	.043	.047	.003	-	-	-	3378676	5427424	6907181	-	-

M690 • SDMX-MM • SD1506..





● first choice
○ alternate choice

								THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	WS30PM	WS40PM
P										●	●		●	○	●
M										○	●		●	●	●
K								●	●	○	○	●	○		
N								○							○
S											●		○	●	●
H														○	
catalog number	cutting edges	D	L10	S	BS	Rε	hm								
SDMX150612RMH	4	.625	.625	.250	.057	.047	.008	-	-	-	3949811	5427426	6901182	-	-
SDMX150616RMH	4	.625	.625	.250	.059	.063	.008	-	-	-	-	6052028	-	-	-

M690 SD1506 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MH	TN6540
P3–P4	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MH	TN6540
P5–P6	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MH	TN6540
M1–M2	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MH	TN6540
M3	.E..ML	TN6540	**.S..MM**	**WP35CM**	.S..MH	WP35CM
K1–K2	.E..ML	WK15CM	**.E..ML**	**WK15CM**	.S..MH	WK15CM
K3	.E..ML	WK15CM	**.S..MM**	**WK15CM**	.S..MH	WK15CM
N1–N2	–	–	**–**	**–**	–	–
N3	–	–	**–**	**–**	–	–
S1–S2	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MM	TN6540
S3	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MM	TN6540
S4	.E..ML	TN6540	**.S..MM**	**TN6540**	.S..MM	TN6540
H1	.S..MM	TN6540	**.S..MM**	**TN6540**	.S..MM	TN6540

M690 SD1506 • Recommended Starting Speeds [SFM]

Material Group		TN6520			TN6525			TN6540			WK15CM		
P	1	–	–	–	1115	**870**	770	985	**770**	655	–	–	–
	2	–	–	–	870	**690**	590	690	**525**	460	–	–	–
	3	–	–	–	770	**590**	510	590	**460**	375	–	–	–
	4	–	–	–	640	**460**	395	490	**360**	295	–	–	–
	5	–	–	–	855	**640**	540	655	**490**	410	–	–	–
	6	–	–	–	560	**445**	360	445	**330**	280	–	–	–
M	1	–	–	–	525	**330**	215	360	**215**	165	–	–	–
	2	–	–	–	330	**215**	130	215	**130**	115	–	–	–
	3	–	–	–	345	**215**	150	230	**130**	115	–	–	–
K	1	1230	**870**	625	755	**670**	605	605	**560**	490	1380	**1265**	1115
	2	1065	**690**	525	590	**525**	490	475	**425**	375	1100	**970**	900
	3	820	**625**	445	490	**445**	395	425	**395**	345	920	**820**	755
N	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	130	**100**	80	–	–	–
	2	–	–	–	–	–	–	65	**50**	35	–	–	–
	3	–	–	–	–	–	–	195	**115**	80	–	–	–
	4	–	–	–	–	–	–	165	**80**	65	–	–	–
H	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		WP35CM			WS30PM			WS40PM			THM-U		
P	1	1490	**1295**	1210	–	–	–	–	–	–	–	–	–
	2	915	**835**	750	–	–	–	–	–	–	–	–	–
	3	835	**750**	670	–	–	–	–	–	–	–	–	–
	4	620	**570**	520	–	–	–	–	–	–	–	–	–
	5	850	**750**	685	–	–	–	560	**475**	395	–	–	–
	6	520	**440**	360	–	–	–	490	**360**	260	–	–	–
M	1	670	**605**	505	740	**655**	605	690	**560**	460	–	–	–
	2	605	**520**	455	670	**590**	475	590	**475**	395	–	–	–
	3	475	**425**	375	510	**445**	345	475	**360**	280	–	–	–
K	1	965	**865**	785	–	–	–	–	–	–	625	**560**	490
	2	770	**685**	620	–	–	–	–	–	–	–	–	–
	3	635	**570**	520	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	6560	**3935**	3280
	2	–	–	–	–	–	–	–	–	–	4475	**2675**	2180
	3	–	–	–	–	–	–	–	–	–	2625	**1640**	1310
S	1	–	–	–	150	**130**	100	130	**115**	80	–	–	–
	2	–	–	–	150	**130**	100	130	**115**	80	–	–	–
	3	–	–	–	180	**150**	100	165	**130**	80	–	–	–
	4	215	**160**	105	280	**195**	130	195	**165**	100	–	–	–
H	1	–	–	–	445	**330**	245	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M690 SD1506 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

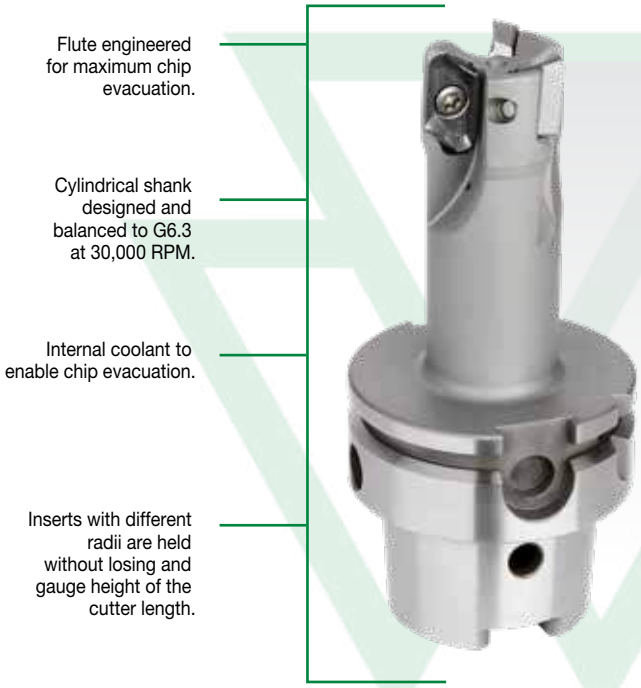
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%				
.E..ML	.007	**.019**	.032	.005	**.014**	.023	.004	**.010**	.017	.003	**.009**	.015	.003	**.008**	.014		.E..ML
.S..MM	.008	**.021**	.035	.006	**.015**	.025	.004	**.011**	.019	.004	**.010**	.016	.003	**.009**	.015		.S..MM
.S..MH	.009	**.023**	.037	.007	**.017**	.027	.005	**.013**	.020	.004	**.011**	.017	.004	**.010**	.016		.S..MH

NOTE: Use "Light Machining" value as starting feed rate.

VHSC

VHSC Victory™ High-Speed Cutting

The VHSC high-speed cutter is designed to perform true high-speed profiling and pocket milling operations on thin-walled aluminum alloy components using heavy feeds and high ramping angles.



The VHSC high-speed cutter's proprietary pocket design allows multiple insert radii (R0.4–R6.0) for one body definition while also maintaining axial positioning regardless of the size of the insert corner nose radius. This feature saves time for CNC programmers and operators by removing the step to re-balance and modify the body during the insert change process.

Seven different corner nose radii are available, each with .630" (16mm) axial cutting depth.

HIGH-SPEED CUTTING INSERTS XDET-ALP FOR NON-FERROUS MATERIALS

FR-ALP



N

Sharp cutting edge "F" preparation for roughing and finishing jobs.

ER-ALP



N

Honed cutting edge "E" preparation for heavy roughing jobs and demanding castings.

Finishing Capabilities/Lower Cutting Forces

Geometry Strengthening

TRUE HSC

Developed to achieve true HSC cutting of aluminum components up to 9843 SFM or 3,000m/min.



THIN-WALLED ALUMINUM HIGH SPEED CUTTING

PRODUCT

SERIES

VHSC

DIAMETER RANGE

Cylindrical: 1–1.5" (25–32mm)
Monoblocks: .9843–1.9685" (25–50mm)
Shell Mills: 1.5–3" (40–80mm)

SHANK TYPES

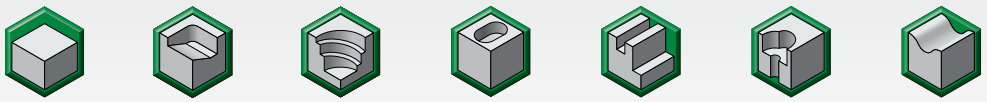
Cylindrical End Mills
Monoblocks
Shell Mills

INDUSTRY

AEROSPACE

GENERAL ENGINEERING

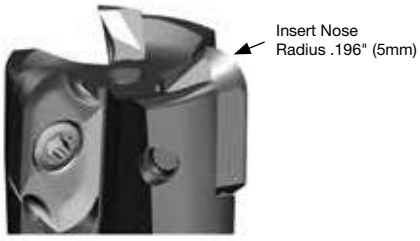
APPLICATIONS



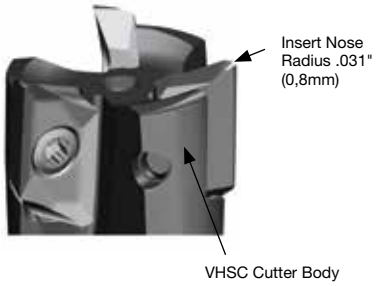
FACE MILLING | RAMPING BLANK | HELICAL MILLING | POCKETING | SIDE/ SHOULDER MILLING: SLOTTING: SHOULDER | SPIRAL/ CIRCULAR | 3D PROFILING

USER-FRIENDLY SETUP MAKES A BIG DIFFERENCE

LARGE CORNER RADIUS

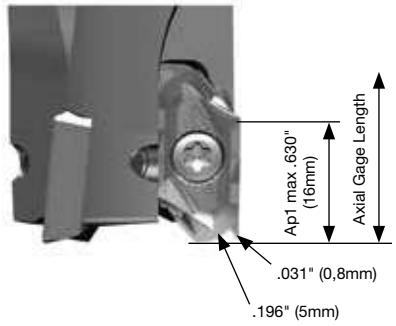


SMALL CORNER RADIUS



- Unique feature has a great impact on significant cost savings.
- Only one cutter body needed to load inserts with corner nose radii from R.020" to R.236" (R0,4–R0,6mm) max.
- All other suppliers require modification and rebalance of the cutter body.

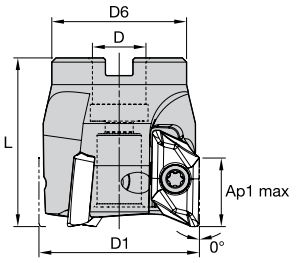
INSERT OVERLAY



- Axial gage length on the cutter body will always be the same, no matter which insert nose radius is applied.
- Preferred by CNC programmers and operators.
- Ap1 max will always remain .630" (16mm), no matter which insert nose radius is applied.

VHSC • Shell Mills • Inch



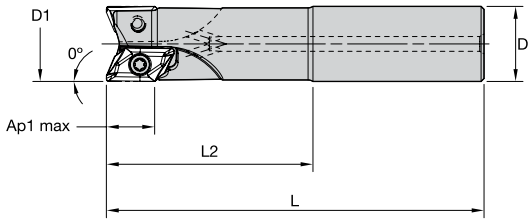


order number	catalog number	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6425429	**VHSC150Z03S050XD16**	1.500	.500	1.260	1.575	.630	3	8.1°	36500	Yes	.34
6630200	**VHSC200Z03S075XD16**	2.000	.750	1.772	1.575	.630	3	7.8°	30000	Yes	.70
6425430	**VHSC200Z04S075XD16**	2.000	.750	1.772	1.575	.630	4	7.7°	30000	Yes	.62
6425431	**VHSC250Z04S100XD16**	2.500	1.000	1.969	1.969	.630	4	5.8°	26000	Yes	1.38
6425432	**VHSC300Z05S100XD16**	3.000	1.000	1.969	1.969	.630	5	4.6°	23000	Yes	1.78
6425433	**VHSC400Z05S125XD16**	4.000	1.250	2.441	1.969	.630	5	3.7°	23000	Yes	3.51

NOTE: It is important to change the screw each time the insert is changed to ensure the highest security. A dynamometric key and the correct insert screw torque value are key for VHSC applications. Adjustable torque wrench (order number 6197561) and Torx Plus 20 bit (order number 6205891) may be purchased separately.

VHSC • Cylindrical End Mills • Inch





order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6425425	**VHSC100Z02C100XD16**	1.000	1.000	5.030	2.750	.630	2	14.7°	50000	Yes	.87
6425426	**VHSC125Z02C125XD16**	1.250	1.250	5.280	2.997	.630	2	11.5°	41500	Yes	1.49
6425427	**VHSC125Z03C125XD16**	1.250	1.250	5.280	3.000	.630	3	11.5°	41500	Yes	1.39
6425428	**VHSC150Z03C150XD16**	1.500	1.500	6.030	3.750	.630	3	7.6°	36500	Yes	1.39

NOTE: Pre-balanced to G6.3/30,000 RPM.

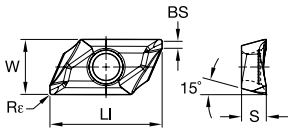
NOTE: It is important to change the screw each time the insert is changed to ensure the highest security. A dynamometric key and the correct insert screw torque value are key for HSC applications. Adjustable torque wrench (order number 6197561) and Torx Plus 20 bit (order number 6205891) may be purchased seperately.

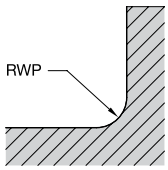
FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VHSC • XDET-ALP







● first choice
○ alternate choice

P	
M	
K	
N	●
S	
H	

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	W mm	W in	BS mm	BS in	Rε mm	Rε in	RWP* mm	RWP* in	hm mm	hm in	WN10HM
XDET16M5PDFRALP	XDET16M5PDFRALP	2	22,92	.902	5,00	.197	11,25	.443	1,42	.056	0,30	.010	0,30	.010	0,02	.001	6425772
XDET16M504FRALP	XDET16M504FRALP	2	23,02	.906	5,00	.197	11,25	.443	1,27	.050	0,40	.020	0,40	.020	0,02	.001	6425773
XDET16M508FRALP	XDET16M508FRALP	2	23,02	.906	5,00	.197	11,25	.443	0,87	.034	0,80	.032	0,80	.032	0,02	.001	6425774
XDET16M512FRALP	XDET16M512FRALP	2	23,02	.906	5,00	.197	11,25	.443	0,87	.034	1,24	.049	1,20	.047	–	–	6797599
XDET16M516FRALP	XDET16M516FRALP	2	23,02	.906	5,00	.197	11,25	.443	0,87	.034	1,68	.066	1,60	.063	–	–	6797600
XDET16M520FRALP	XDET16M520FRALP	2	23,02	.906	5,00	.197	11,25	.443	0,58	.023	2,10	.083	2,00	.079	0,02	.001	6425775
XDET16M530ERALP	XDET16M530ERALP	2	23,02	.906	5,00	.197	11,25	.443	0,48	.019	3,10	.123	3,00	.118	0,03	.001	6425776
XDET16M530FRALP	XDET16M530FRALP	2	23,02	.906	5,00	.197	11,25	.443	0,48	.019	3,10	.123	3,00	.118	0,02	.001	6425777
XDET16M540ERALP	XDET16M540ERALP	2	23,02	.906	5,00	.197	11,25	.443	0,60	.023	4,10	.161	4,00	.157	0,03	.001	6425778
XDET16M540FRALP	XDET16M540FRALP	2	23,02	.906	5,00	.197	11,25	.443	0,60	.023	4,10	.161	4,00	.157	0,02	.001	6425779
XDET16M550FRALP	XDET16M550FRALP	2	23,02	.906	5,00	.197	11,25	.443	0,24	.009	5,20	.205	5,00	.197	0,02	.001	6425780

NOTE: RWP = Resultant workpiece radius.*

VHSC • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
N1–N2	.F..ALP	WN10HM	**.F..ALP**	**WN10HM**	.E..ALP	WN10HM
N3	.F..ALP	WN10HM	**.F..ALP**	**WN10HM**	.E..ALP	WN10HM

VHSC • Recommended Starting Speeds [SFM]

Material Group		WN10HM		
N	1	9640	**5880**	2860
	2	9640	**5880**	2860
	3	5230	**2775**	1565

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

VHSC • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.F..ALP	.005	**.018**	.032	.003	**.013**	.023	.003	**.010**	.017	.002	**.009**	.015	.002	**.008**	.014	.F..ALP
.E..ALP	.006	**.020**	.037	.004	**.014**	.027	.003	**.011**	.020	.003	**.009**	.017	.003	**.009**	.016	.E..ALP

NOTE: Use "Light Machining" values as starting feed rate.

Recommendations for High Speed Machining at 8,000 RPM or above

- Check spindle condition:
  - Runout
  - Clamping of the attachment in traction
  - Marking and cleanliness
- Check that the tool is suitable for the required use.
- Inserts must be locked positively in the pocket and secured using the torx screw provided. The screw must be torqued to the correct value as indicated in the charts on the product pages.
- Because of heavy force to the screw, it is important to change the screw when changing the insert.
- Check the balancing of the assembled tool: cutter body, inserts, and attachment.
- Before start up, note the maximum RPM engraved on the tool. The maximum RPM is linked to a precise balancing value.
- Ensure that the field of application of the tool shown in our technical documents and technological parameters is observed:

A_e (inch)	Width of cut, lateral engagement (radial)
a_p (inch)	Axial depth of cut
f_z (IPT/tooth)	Inch per tooth
n (RPM)	Revolutions per minute



WIDIA™ cannot accept responsibility for misuse of this product due to:

- Non-observance of the above instructions
- Machine without casing
- Incorrect clamping of workpieces
- No safety device on the machine
- Any misuse or incorrect clamping

The optimum rotation must be determined by condition of the spindle. The spindle must be rigid to run at these higher RPMs.

Under no circumstances must any attempt be made to repair this tool. The only permitted maintenance is the indexing or replacement of the inserts.

When assembling the cutter to a Shrink Fit holder, the maximum protrusion cannot exceed 10% of the reach of tool.

Balancing:

- Cylindrical shank and HSK63A integral shanks are designed and balanced to G6.3 at 30,000 RPM for diameters up to 2".
- Cylindrical shank tools mounted in a Shrink Fit holder or any other chuck mill holder + inserts + screws must be re-inspected for balance as an assembly by the end-user when at or exceeding 8,000 RPM. End-user must balance the assembly at a G6.3 at 30,000 RPM maximum.
- Shell mills are not balanced. These tools must be re-inspected for balance as an assembly, cutter + inserts + screws by the end-user for high speed machining at 8,000 RPM or above. End-user must balance the assembly at a G6.3 value minimum.
- Balancing requires removing some material by drilling or milling operations.
- For each new shell mill installed on the same toolholder, re-balance the assembly.

Tighten the bolt between the shell mill and toolholder; with lubricant, apply the torque value of:

Thread sizes (inch)	Cutter Bore Size (inch)	Torque Values ft. lbs.
.250	.500	7.37
.375	.750	22.12
.500	1.000	36.87
.625	1.250	59.00
.750	1.500	81.13

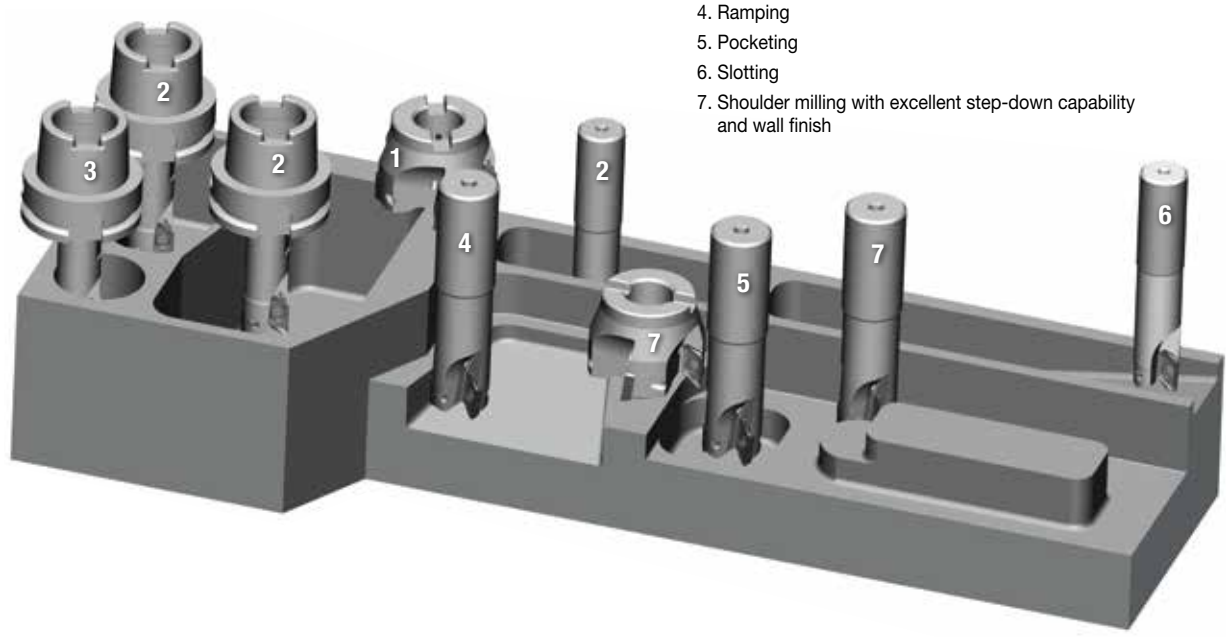
Technical Information

▼ Machinability by Materials • Aluminum

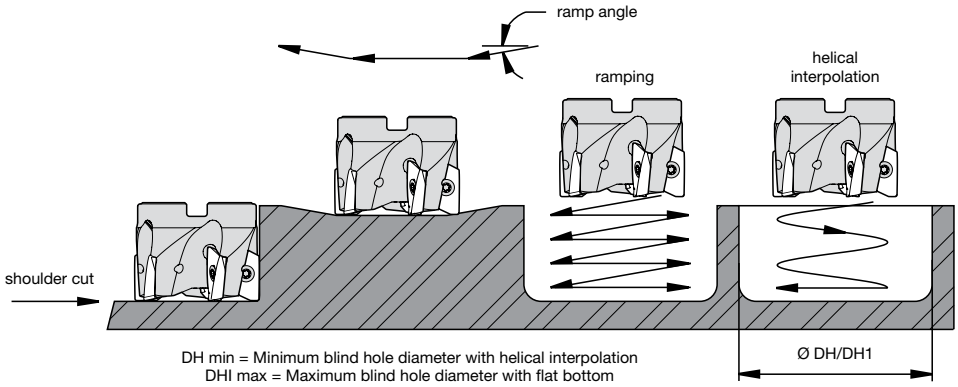
Alloy Group	Alloy Designation	Chemical Composition Limits (WT%)												Typical Temper	Rm (Mpa)	Machinability Chip Formation	Machinability
		Cu	Si	Fe	Mn	Mg	Zn	Cr	Ti	Pb	Bi	Al	Others				
Al	1050	0.05	0.25	0.40	0.50	0.05	0.05	–	–	–	–	99.50min	–	H14	105	D	A
	1100	0.05–0.20	Si+Fe 1.00 max	–	0.05	–	0.10	–	–	–	–	99.00min	–	H14	90	D	A
AlCu	2011	5.00–6.00	0.40	0.70	–	–	0.30	–	–	0.20	0.60	remaining	–	T3	310	A	A
	2014	3.90–5.00	0.50–1.20	0.70	0.40–1.20	0.20–0.80	0.25	0.10	0.15	–	–	remaining	–	T6	430	B	A
	2017	3.50–4.50	0.20–0.80	0.70	0.40–1.00	0.40–0.80	0.25	0.10	0.15	–	–	remaining	–	T4	390	B	A
	2024	3.80–4.90	0.50	0.50	0.30–0.90	1.20–1.80	0.25	0.10	0.15	–	–	remaining	–	T4	465	B	A
	2218	3.50–4.50	0.90	1	0.20	1.20–1.80	0.25	0.10	–	–	–	remaining	Ni1.7–2.3	T72	331	B	B
	2224	3.80–4.40	0.12	0.15	0.30–0.90	1.20–1.80	0.25	0.10	0.15	–	–	remaining	–	–	–	A	A
AlMn	3003	0.05–0.20	0.60	0.70	1.00–1.50	–	0.10	–	–	–	–	remaining	–	H14	140	D	B
AlSi	4032	0.50–1.30	11.00–13.50	1	–	0.80–1.30	0.25	0.10	–	–	–	remaining	Ni0.5–1.3	T6	379	B	D
AlMg	5083	0.10	0.40	0.40	0.40–1.00	4.00–4.90	0.25	0.05–0.25	0.15	–	–	remaining	–	H112	335	C	A
AlMgSi	6061	0.15–0.40	0.40–0.80	0.70	0.15	0.80–1.20	0.25	0.04–0.35	0.15	–	–	remaining	–	T6	300	C	B
	6063	0.10	0.20–0.60	0.35	0.10	0.45–0.90	0.10	0.10	0.10	–	–	remaining	–	T5	200	C	B
	6070	0.15–0.40	1.00–1.70	0.50	0.40–1.00	0.50–1.20	0.25	0.10	0.15	–	–	remaining	–	T6	379	C	C
	6151	0.35	0.60–1.20	1	0.20	0.45–0.80	0.25	0.15–0.35	0.15	–	–	remaining	–	T6	–	C	C
	6262	0.15–0.40	0.40–0.80	0.70	0.15	0.80–1.20	0.25	0.04–0.14	0.15	0.40	0.70	remaining	–	T9	400	B	B
	6351	0.10	0.70–1.30	0.50	0.40–0.80	0.40–0.80	0.20	–	0.20	–	–	remaining	–	T6	310	D	C
	6463	0.20	0.20–0.60	0.15	0.05	0.45–0.90	0.05	–	–	–	–	remaining	–	T6	241	C	B
AlZn	7001	1.60–2.60	0.35	0.40	0.20	2.60–3.40	6.80–8.00	0.18–0.35	0.20	–	–	remaining	–	O	–	B	A
	7003	0.20	0.30	0.35	0.30	0.50–1.00	5.00–6.50	0.20	0.20	–	–	remaining	Zr0.05–0.25	T5	400	B	A
	7050	2.00–2.60	0.12	0.15	0.10	1.90–2.60	5.70–6.70	0.04	0.06	–	–	remaining	Zr0.08–0.15	T73	530	B	A
	7075	1.20–2.00	0.40	0.50	0.30	2.10–2.90	5.10–6.10	0.18–0.28	0.20	–	–	remaining	–	T6	570	B	A
	7178	1.60–2.40	0.40	0.50	0.30	2.40–3.10	6.30–7.30	0.18–0.35	0.20	–	–	remaining	–	T6	600	B	A
	7475	1.20–1.90	0.10	0.12	0.06	1.90–2.60	5.20–6.20	0.18–0.25	0.06	–	–	remaining	–	T61	565	B	A

Machinability: A (Excellent), B (Good to Excellent), C (Good), D (Not Good)

1. Face milling
2. First choice for deep pocketing and thin wall machining
3. Boring by circular interpolation into full material
4. Ramping
5. Pocketing
6. Slotting
7. Shoulder milling with excellent step-down capability and wall finish



Best Practices



▼ Ramp Angle

cutter diameter	Max. Ramping Angle Related to Insert Corner Nose Radius and Cutter D1						
	Facet	R .020	R .032	R .079	R .118	R .157	R. 197
1.000	14.8°	14.8°	14.8°	9.2°	18.5°	8.8°	10.9°
1.250	11.5°	11.5°	11.5°	12.1°	12.7°	13.4°	14.0°
1.500	8.1°	8.1°	8.1°	8.5°	8.8°	9.1°	9.5°
2.000	7.7°	7.3°	7.7°	7.5°	7.7°	8.2°	8.8°
2.500	5.8°	5.5°	5.8°	5.6°	5.7°	6.1°	6.3°
3.000	4.6°	4.3°	4.6°	4.5°	4.6°	4.8°	5.0°
4.000	3.3°	3.3°	3.3°	3.2°	3.3°	3.4°	3.5°

▼ Helical Min. Hole and Helical Max. Hole

cutter diameter	DH min	DH1 max
1.000	1.193	1.921
1.250	1.693	2.421
1.500	2.193	2.921
2.000	3.193	3.921
2.500	4.193	4.921
3.000	5.193	5.921
4.000	7.193	7.921

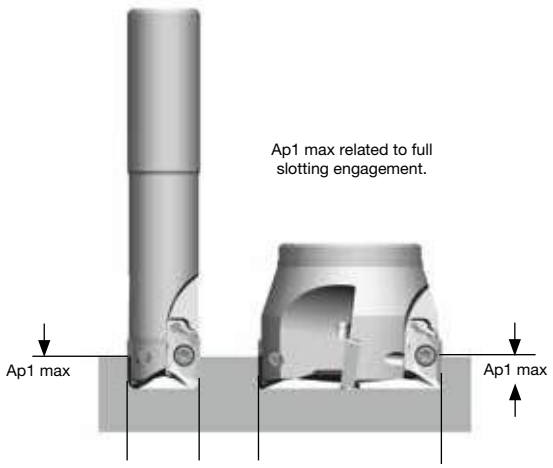
▼ Ap1 max at Helical Interpolation for 360° Tool Path

cutter diameter	Helical interpolation depth Ap1 max for 360° tool path
1.000	.160
1.250	.160
1.500	.160
2.000	.160
2.500	.160
3.000	.160
4.000	.160

NOTE: Ap max depends on connection with cutter diameter, rigidity of the cutter, rigidity of the machine, and size of the flute.

▼ Ap1 max at Full Slotting

cutting diameter (D1)	Number of inserts Z	Ap1 max
1.000	2	.300
1.250	2	.435
1.250	3	.240
1.500	3	.350
2.000	4	.350
2.500	4	.435
3.000	5	.435
4.000	5	.435



VXF™ Series

VXF-07, VXF-09, VXF-12, and VXF-16

The VXF Series high-feed mills have a nickel-plated body and four durable cutting edges to run at high feeds in deep cavities on primarily steel, stainless steel, titanium, and high-temp alloys.



VXF-07
Ap1 Max:
0.0354" (0,9mm)
Fz Max:
0.047"/z (1,2mm/z)



VXF-12
Ap1 Max:
0.1057" (2,5mm)
Fz Max:
0.118"/z (3,0mm/z)



VXF-09
Ap1 Max:
0.0591" (1,5mm)
Fz Max:
0.079"/z (2,0mm/z)

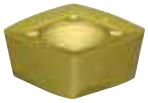


VXF-16
Ap1 Max:
0.1378" (3,5mm)
Fz Max:
0.079" (2,0 mm/z)

ALL-IN-ONE INSERT STYLE COMBINED FROM SQUARE AND ROUND DESIGNS TO ACHIEVE POWERFUL HIGH FEEDS

VXF-07

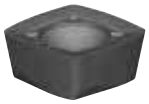
-MM



P M S

First choice for soft steel, stainless steel, and high-temp alloys. Best fit for pocketing and profiling operations.

-MH



P K H

First choice for P3 and P4 materials. Stronger edge protection for heavy roughing jobs and hardened steel up to 48 HRC.

VXF-09

-MM



P M S

First choice for soft steel, stainless steel, and high-temp alloys. Best fit for pocketing and profiling operations.

-MH

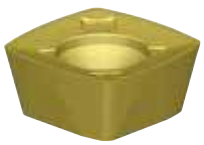


P K H

First choice for P3 and P4 materials. Stronger edge protection for heavy roughing jobs.

VXF-12

-MM



P M S

First choice for soft steel, stainless steel, and high-temp alloys. Best fit for pocketing and profiling operations.

-MH



P K H

First choice for P3 and P4 materials. Stronger edge protection for heavy roughing jobs.

VXF-16

-MM



P M S

First choice for soft steel, stainless steel, and high-temp alloys. Best fit for pocketing and profiling operations.

HIGH-FEEDS, DEEP CAVITIES

PRODUCT		INSERTS		
SERIES	DIAMETER RANGE	INSERT TYPE	GRADE	MATERIALS
VXF-07	.625–2" (16–50mm)	MM, MH	WP40PM, WS40PM, WP25PM, WU10PM	P M K S H
VXF-09	1–2" (25–63mm)	MM, MH	WS40PM, WP25PM, WP40PM	P M S
VXF-12	1.25–5" (32–100mm)	MM, MH	WS40PM, WP25PM, WP40PM	P M K S H
VXF-16	2–5" (50–125mm)	MM	WS40PM, WP25PM	P M S

APPLICATIONS



FACE MILLING | 3D PROFILING | POCKETING | HELICAL MILLING | RAMPING BLANK | SLOTTING: TROCHOIDAL MILLING | PLUNGE MILLING

INDUSTRY

TRANSPORTATION

AEROSPACE

ENERGY

GENERAL ENGINEERING

73.5°

LEAD ANGLE

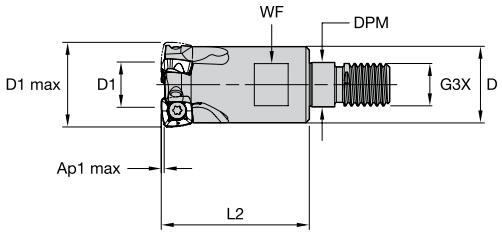
redistributes cutting forces in the spindle z-axis direction.





VXF-07 • Screw-On End Mills • Inch

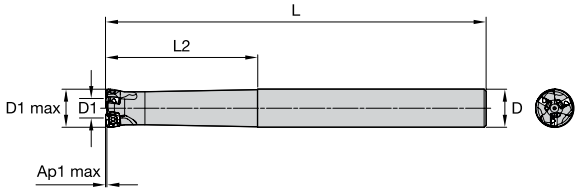




order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6712878	VXF075Z03M10XP07	.750	.384	.709	.413	M10	1.378	.589	.035	3	6.7°	57000	Yes	.13
6712879	VXF100Z04M12XP07	1.000	.631	.827	.492	M12	1.378	.667	.035	4	4.3°	49000	Yes	.21
6712880	VXF125Z05M16XP07	1.250	.879	1.142	.669	M16	1.693	.943	.035	5	2.7°	41500	Yes	.48

VXF-07 • Cylindrical End Mills • Inch

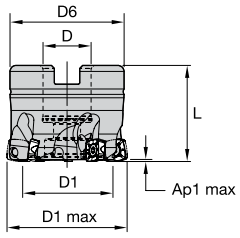




order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6712971	VXF062Z02C062XP07L700	.625	.271	.625	7.000	2.500	.035	2	8.2°	65000	Yes	.51
6712972	VXF075Z03C075XP07L750	.750	.384	.750	7.500	3.000	.035	3	6.7°	57000	Yes	.51
6712973	VXF100Z04C100XP07L800	1.000	.631	1.000	8.000	3.500	.035	4	2.2°	49000	Yes	1.56
6712974	VXF125Z05C125XP07L800	1.250	.879	1.250	8.000	3.500	.035	5	2.7°	41500	Yes	2.47

VXF-07 • Shell Mills • Inch



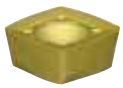


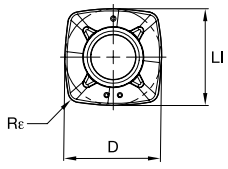
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6712975	VXF150Z05S075XP07	1.500	1.129	.750	1.417	1.260	.035	5	1.0°	35800	Yes	.33
6712976	VXF200Z07S075XP07	2.000	1.629	.750	1.654	1.575	.035	7	.7°	31000	Yes	.80

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VXF-07 • XPPT-MM





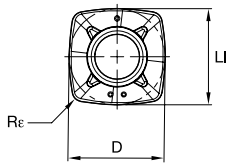
● first choice
○ alternate choice

P	●	●	●													
M	●	●	●													
K	○			●												
N			○													
S	●	○	●													
H	○			●												

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM	WU10PM
XPPT070308ERMM	**XPPT070308ERMM**	4	7,30	.288	3,17	.125	7,30	.288	0,80	.031	6595819	-	6595820	-

VXF-07 • XPPW-MH





● first choice
○ alternate choice

P	●	●	●													
M	●	●	●													
K	○			●												
N			○													
S	●	○	●													
H	○			●												

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM	WU10PM
XPPW070310SRMH	**XPPW070310SRMH**	4	7,30	.288	3,17	.125	7,30	.288	1,00	.039	-	6595770	-	6595769

VXF-07 • Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	XPPT-MM	WP25PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
P3–P4	XPPT-MM	WP25PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
P5–P6	XPPT-MM	WP25PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
M1–M2	XPPT-MM	WS40PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
M3	XPPT-MM	WS40PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
K1–K2	XPPW-MH	WU10PM	**XPPW-MH**	**WU10PM**	XPPW-MH	WU10PM
K3	XPPW-MH	WU10PM	**XPPW-MH**	**WU10PM**	XPPW-MH	WU10PM
S1–S2	XPPT-MM	WP25PM	**XPPT-MM**	**WS40PM**	–	–
S3	XPPT-MM	WS40PM	**XPPT-MM**	**WS40PM**	–	–
S4	XPPT-MM	WS40PM	**XPPT-MM**	**WS40PM**	–	–
H1	XPPW-MH	WU10PM	**XPPW-MH**	**WU10PM**	–	–

VXF-07 • Recommended Starting Speeds [SFM]

Material Group		WP25PM			WP40PM			WS40PM			WU10PM		
P	1	1295	**1115**	1065	1165	**1015**	970	1085	**920**	785	–	**–**	–
	2	1085	**950**	785	985	**855**	705	900	**805**	605	–	**–**	–
	3	1000	**855**	690	900	**770**	625	835	**705**	540	–	**–**	–
	4	885	**720**	590	805	**675**	525	755	**625**	490	–	**–**	–
	5	720	**675**	590	675	**605**	525	675	**575**	475	–	**–**	–
	6	655	**490**	395	590	**460**	360	590	**425**	310	–	**–**	–
M	1	805	**705**	655	770	**675**	605	820	**675**	560	–	**–**	–
	2	720	**625**	510	690	**590**	490	705	**575**	475	–	**–**	–
	3	560	**475**	375	510	**460**	360	575	**425**	330	–	**–**	–
K	1	900	**805**	720	–	**–**	–	–	**–**	–	1165	**1050**	950
	2	705	**625**	590	–	**–**	–	–	**–**	–	900	**805**	755
	3	590	**525**	475	–	**–**	–	–	**–**	–	770	**690**	625
S	1	165	**130**	100	165	**130**	115	165	**130**	100	–	**–**	–
	2	165	**130**	100	165	**130**	115	165	**130**	100	–	**–**	–
	3	195	**165**	100	195	**165**	115	195	**165**	100	–	**–**	–
	4	280	**195**	130	260	**195**	130	230	**195**	115	–	**–**	–
H	1	475	**360**	280	–	**–**	–	–	**–**	–	625	**510**	360

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

VXF-07 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .024 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.020	**.058**	.109	.014	**.039**	.067	.010	**.028**	.047	.009	**.025**	.041	.008	**.022**	.037	.E..MM
.S..MH	.036	**.080**	.141	.025	**.052**	.080	.019	**.037**	.056	.016	**.032**	.048	.015	**.029**	.043	.S..MH

At .028 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.018	**.051**	.094	.013	**.035**	.059	.009	**.025**	.042	.008	**.022**	.037	.007	**.020**	.033	.E..MM
.S..MH	.032	**.070**	.118	.023	**.046**	.071	.017	**.033**	.050	.014	**.029**	.043	.013	**.026**	.039	.S..MH

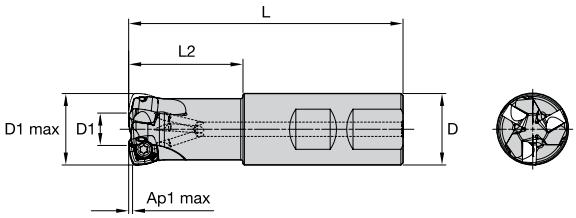
At .035 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.015	**.043**	.076	.011	**.029**	.050	.008	**.022**	.036	.007	**.019**	.031	.006	**.017**	.028	.E..MM
.S..MH	.027	**.058**	.093	.019	**.039**	.059	.014	**.028**	.042	.012	**.024**	.036	.011	**.022**	.033	.S..MH

NOTE: Use "Light Machining" values as starting feed rate.

VXF-09 • Weldon® End Mills • Inch



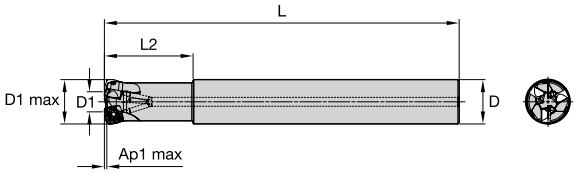


order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6597756	VXF100Z03W100XD09	1.000	.462	1.000	3.856	1.575	.059	3	2.7°	48000	Yes	.67
6597757	VXF125Z03W100XD09	1.250	.711	1.000	3.856	1.575	.059	3	1.5°	40500	Yes	.82
6597758	VXF125Z04W100XD09	1.250	.711	1.000	3.856	1.575	.059	4	1.5°	40500	Yes	.82

NOTE: Please order wrench separately.

VXF-09 • Cylindrical End Mills • Inch



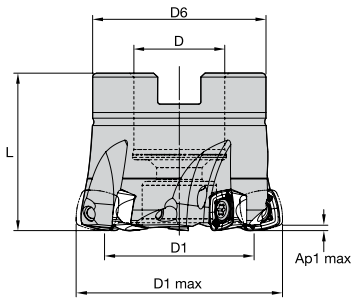


order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6597759	VXF100Z02C100XD09L780	1.000	.462	1.000	7.874	1.969	.059	2	2.7°	48000	Yes	1.52
6597760	VXF100Z03C100XD09L780	1.000	.462	1.000	8.000	2.000	.059	3	2.7°	48000	Yes	1.54
6597771	VXF125Z03C125XD09L980	1.250	.711	1.250	9.843	2.756	.059	3	1.5°	40500	Yes	3.03

NOTE: Please order wrench separately.

VXF-09 • Shell Mills • Inch



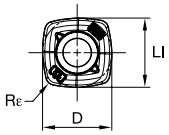


order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6597772	VXF150Z04S050XD09	1.500	.960	.500	1.339	1.260	.059	4	1.1°	36000	Yes	.32
6597773	VXF150Z05S050XD09	1.500	.960	.500	1.339	1.260	.059	5	1.1°	36000	Yes	.32
6597774	VXF200Z05S075XD09	2.000	1.458	.750	1.654	1.575	.059	5	.7°	30000	Yes	.76
6597775	VXF200Z06S075XD09	2.000	1.458	.750	1.654	1.575	.059	6	.7°	30000	Yes	.75

NOTE: Please order wrench separately.

VXF-09 • XDPT-MM





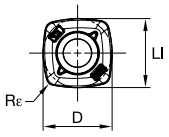
● first choice
○ alternate choice

P	●	●	●
M	●	●	●
K	○		
N			○
S	●	○	●
H	○		

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM
XDPT090412ERMM	XDPT090412ERMM	4	10,00	.394	4,76	.187	10,00	.394	1,20	.047	6596471	-	6596472

VXF-09 • XDPT-MH





● first choice
○ alternate choice

P	●	●	●
M	●	●	●
K	○		
N			○
S	●	○	●
H	○		

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM
XDPT090412SRMH	XDPT090412SRMH	4	10,00	.394	4,76	.187	10,00	.394	1,20	.047	-	6596822	-

VXF-09 • Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
P3–P4	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
P5–P6	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
M1–M2	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
M3	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S1–S2	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S3	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S4	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM

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VXF-09 • Recommended Starting Speeds [SFM]

Material Group		WP25PM			WP40PM			WS40PM		
P	1	1295	**1115**	1065	1165	**1015**	970	–	–	–
	2	1085	**950**	785	985	**855**	705	–	–	–
	3	1000	**855**	690	900	**770**	625	–	–	–
	4	885	**720**	590	805	**675**	525	–	–	–
	5	720	**675**	590	675	**605**	525	675	**575**	475
	6	655	**490**	395	590	**460**	360	590	**425**	310
M	1	805	**705**	655	770	**675**	605	820	**675**	560
	2	720	**625**	510	690	**590**	490	705	**575**	475
	3	560	**475**	375	510	**460**	360	575	**425**	330
S	1	165	**130**	100	165	**130**	115	165	**130**	100
	2	165	**130**	100	165	**130**	115	165	**130**	100
	3	195	**165**	100	195	**165**	115	195	**165**	100
	4	280	**195**	130	260	**195**	130	230	**195**	115

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

VXF-09 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .035 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.021	**.062**	.097	.015	**.043**	.066	.011	**.032**	.048	.010	**.028**	.042	.009	**.025**	.038	.E..MM
.S..MH	.030	**.068**	.114	.021	**.047**	.077	.016	**.035**	.056	.014	**.030**	.048	.013	**.028**	.044	.S..MH

At .040 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.018	**.053**	.083	.013	**.038**	.057	.010	**.028**	.042	.009	**.024**	.036	.008	**.022**	.033	.E..MM
.S..MH	.026	**.058**	.097	.019	**.041**	.067	.014	**.030**	.049	.012	**.026**	.042	.011	**.024**	.038	.S..MH

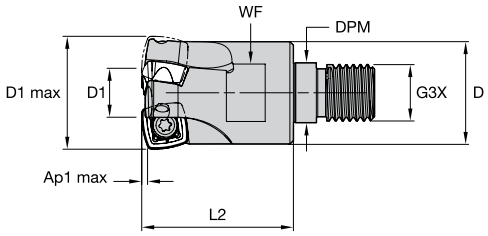
At .060 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.015	**.044**	.067	.011	**.031**	.047	.008	**.023**	.034	.007	**.020**	.030	.006	**.018**	.027	.E..MM
.S..MH	.021	**.048**	.079	.015	**.034**	.054	.011	**.025**	.040	.010	**.022**	.035	.009	**.020**	.032	.S..MH

NOTE: Use "Light Machining" values as starting feed rate.

VXF-12 • Screw-On End Mills • Inch



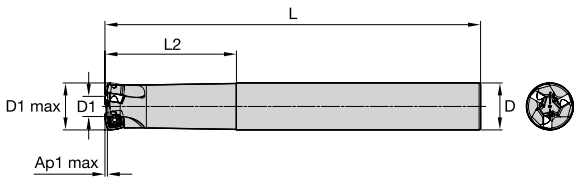


order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6733676	VXF125Z03M16XD12	1.250	.537	1.142	.669	M16	1.700	.394	.106	3	2.6°	31500	Yes	.42

NOTE: Please order wrench separately.

VXF-12 • Cylindrical End Mills • Inch



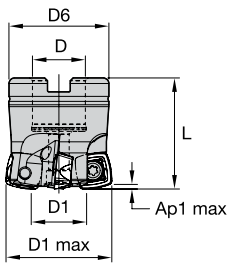


order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6733677	VXF125Z03C125XD12L1000	1.250	.537	1.250	10.000	3.500	.098	3	2.6°	31500	Yes	3.09

NOTE: Please order wrench separately.

VXF-12 • Shell Mills • Inch





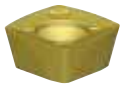
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6596763	VXF150Z04S075XD12	1.500	.785	.750	1.417	1.575	.098	4	1.0°	27500	Yes	.38
6596764	VXF200Z05S075XD12	2.000	1.284	.750	1.811	1.575	.098	5	.9°	22500	Yes	.69
6596765	VXF200Z06S075XD12	2.000	1.284	.750	1.811	1.575	.098	6	.9°	22500	Yes	.72
6596766	VXF250Z05S100XD12	2.500	1.784	1.000	1.969	1.575	.098	5	.6°	19500	Yes	.92
6596767	VXF250Z07S100XD12	2.500	1.784	1.000	1.969	1.575	.098	7	.6°	19500	Yes	.99
6596768	VXF300Z05S100XD12	3.000	2.283	1.000	2.087	1.969	.098	5	.5°	17500	Yes	1.56
6596769	VXF300Z08S100XD12	3.000	2.283	1.000	2.087	1.969	.098	8	.5°	17500	Yes	1.76
6596770	VXF400Z06S125XD12	4.000	3.283	1.250	2.559	1.969	.098	6	.3°	14500	Yes	3.10
6596780	VXF400Z09S125XD12	4.000	3.283	1.250	2.559	1.969	.098	9	.3°	14500	Yes	3.34
6596781	VXF500Z08S150XD12	5.000	4.283	1.500	3.150	2.480	.098	8	.2°	13000	Yes	6.50

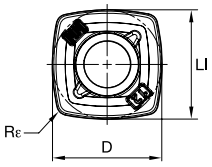
NOTE: Please order wrench separately.

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MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VXF-12 • XDPT-MM





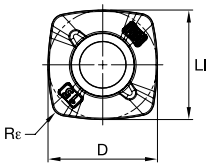
● first choice
○ alternate choice

P	●	●	●													
M	●	●	●													
K	○															
N			○													
S	●	○	●													
H	○															

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM
XDPT120512ERMM	XDPT120512ERMM	4	12,70	.500	5,56	.219	12,70	.500	1,20	.047	6596438	-	6596439

VXF-12 • XDPT-MH





● first choice
○ alternate choice

P	●	●	●													
M	●	●	●													
K	○															
N			○													
S	●	○	●													
H	○															

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM
XDPT120515SRMH	XDPT120515SRMH	4	12,70	.500	5,56	.219	12,70	.500	1,50	.059	-	6596440	-

VXF-12 • Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
P3–P4	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
P5–P6	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
M1–M2	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
M3	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S1–S2	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S3	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S4	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM

VXF-12 • Recommended Starting Speeds [SFM]

Material Group		WP25PM			WP40PM			WS40PM		
P	1	1295	**1115**	1065	1165	**1015**	970	–	–	–
	2	1085	**950**	785	985	**855**	705	–	–	–
	3	1000	**855**	690	900	**770**	625	–	–	–
	4	885	**720**	590	805	**675**	525	–	–	–
	5	720	**675**	590	675	**605**	525	675	**575**	475
	6	655	**490**	395	590	**460**	360	590	**425**	310
M	1	805	**705**	655	770	**675**	605	820	**675**	560
	2	720	**625**	510	690	**590**	490	705	**575**	475
	3	560	**475**	375	510	**460**	360	575	**425**	330
S	1	165	**130**	100	165	**130**	115	165	**130**	100
	2	165	**130**	100	165	**130**	115	165	**130**	100
	3	195	**165**	100	195	**165**	115	195	**165**	100
	4	280	**195**	130	260	**195**	130	230	**195**	115

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

VXF-12 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .055 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.020	**.058**	.109	.014	**.039**	.067	.010	**.028**	.047	.009	**.025**	.041	.008	**.022**	.037	.E..MM
.S..MH	.036	**.080**	.141	.025	**.052**	.080	.019	**.037**	.056	.016	**.032**	.048	.015	**.029**	.043	.S..MH

At .070 Axial Depth of Cut (AP1)

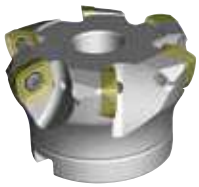
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.018	**.051**	.094	.013	**.035**	.059	.009	**.025**	.042	.008	**.022**	.037	.007	**.020**	.033	.E..MM
.S..MH	.032	**.070**	.118	.023	**.046**	.071	.017	**.033**	.050	.014	**.029**	.043	.013	**.026**	.039	.S..MH

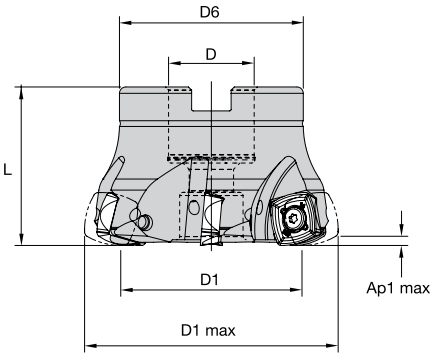
At .100 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.015	**.043**	.076	.011	**.029**	.050	.008	**.022**	.036	.007	**.019**	.031	.006	**.017**	.028	.E..MM
.S..MH	.027	**.058**	.093	.019	**.039**	.059	.014	**.028**	.042	.012	**.024**	.036	.011	**.022**	.033	.S..MH

NOTE: Use "Light Machining" values as starting feed rate.

VXF-16 • Shell Mills • Inch





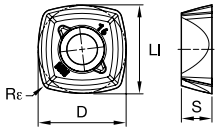
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6597783	**VXF200Z04S075XE16**	2.000	1.103	.750	1.772	1.772	.138	4	1.4°	24800	Yes	.72
6597784	**VXF250Z05S100XE16**	2.500	1.602	1.000	1.969	1.575	.138	5	1.0°	21200	Yes	.79
6597785	**VXF300Z06S100XE16**	3.000	2.102	1.000	2.087	1.969	.138	6	.7°	18900	Yes	1.61
6597788	**VXF400Z07S150XE16**	4.000	3.100	1.500	3.189	2.480	.138	7	.5°	15800	Yes	4.35
6597789	**VXF500Z10S150XE16**	5.000	4.099	1.500	3.307	2.480	.138	10	.4°	13900	Yes	6.39

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VXF-16 • XEPT-MM





● first choice
○ alternate choice

P	●	●
M	●	●
K	○	
N		○
S	●	●
H	○	

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WS40PM
XEPT160516ERMM	XEPT160516ERMM	4	16,00	.630	5,56	.219	16,00	.630	1,60	.064	6596823	6596824

VXF-16 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	XEPT-MM	WP25PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
P3–P4	XEPT-MM	WP25PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
P5–P6	XEPT-MM	WP25PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
M1–M2	XEPT-MM	WS40PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
M3	XEPT-MM	WS40PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
S1–S2	XEPT-MM	WP25PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
S3	XEPT-MM	WS40PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
S4	XEPT-MM	WS40PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM

VXF-16 • Recommended Starting Speeds [SFM]

Material Group		WP25PM			WS40PM		
P	1	1295	**1115**	1065	–	**–**	–
	2	1085	**950**	785	–	**–**	–
	3	1000	**855**	690	–	**–**	–
	4	885	**720**	590	–	**–**	–
	5	720	**675**	590	675	**575**	475
	6	655	**490**	395	590	**425**	310
M	1	805	**705**	655	820	**675**	560
	2	720	**625**	510	705	**575**	475
	3	560	**475**	375	575	**425**	330
S	1	165	**130**	100	165	**130**	100
	2	165	**130**	100	165	**130**	100
	3	195	**165**	100	195	**165**	100
	4	280	**195**	130	230	**195**	115

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

VXF-16 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .080 Axial Depth of Cut (Ap1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.016	**.051**	.086	.011	**.036**	.061	.009	**.027**	.045	.007	**.024**	.039	.007	**.022**	.036	.E..MM

At .100 Axial Depth of Cut (Ap1)

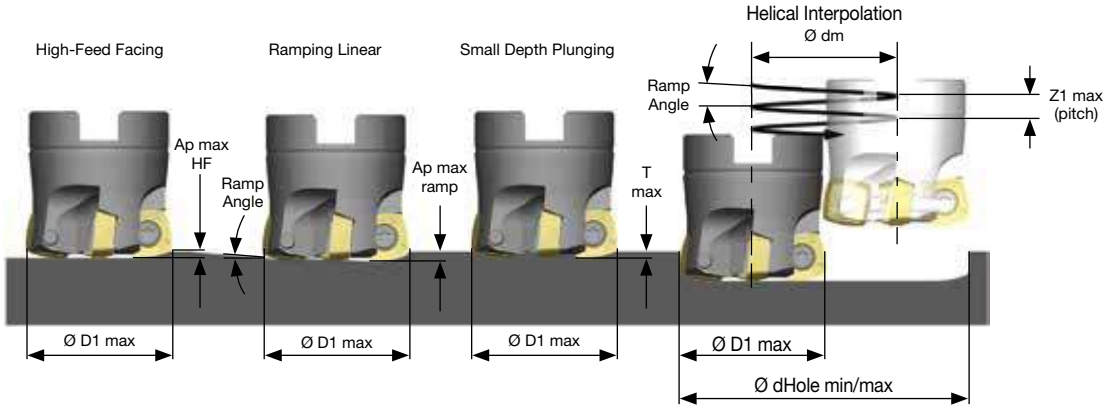
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.014	**.046**	.077	.010	**.033**	.055	.008	**.024**	.041	.007	**.021**	.036	.006	**.019**	.032	.E..MM

At .140 Axial Depth of Cut (Ap1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.012	**.039**	.066	.009	**.028**	.047	.007	**.021**	.035	.006	**.018**	.030	.005	**.017**	.028	.E..MM

NOTE: Use "Light Machining" values as starting feed rate.

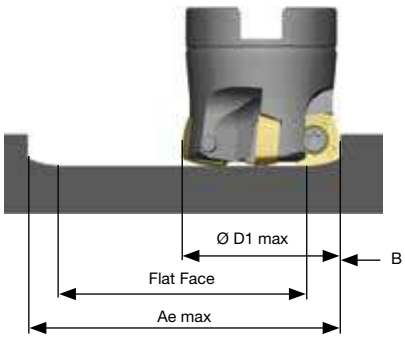
Best Practices



series	D1 max	High-feed Facing	Ramping Linear		Helical Interpolation				Small Depth Plunging
		Ap max HF	Ramp Angle max	Ap max Ramp	Ramp Angle max	d Hole min	d Hole max	Z1 max Helical	T max
VXF-07	.625	.024	8.2	.024	8.2	.850	1.170	.024	.018
	.750	.024	6.7	.024	6.7	1.100	1.420	.024	.018
	1.000	.024	4.3	.024	4.3	1.600	1.920	.024	.018
	1.250	.024	2.7	.024	2.7	2.100	2.420	.024	.018
	1.500	.024	1.0	.024	1.0	2.550	2.920	.024	.018
	2.000	.024	0.7	.024	0.7	3.400	3.920	.024	.018
VXF-09	1.000	.035	2.7	.039	2.7	1.370	1.920	.039	.025
	1.250	.035	1.5	.039	1.5	1.870	2.420	.039	.025
	1.500	.035	1.1	.039	1.1	2.370	2.920	.039	.025
	2.000	.035	0.7	.039	0.7	3.370	3.920	.039	.025
VXF-12	1.500	.051	1.0	.070	1.0	2.130	2.920	.070	.031
	2.000	.051	0.9	.070	0.9	3,130	3.920	.070	.031
	2.500	.051	0.6	.070	0.6	4.130	4.920	.070	.031
	3.000	.051	0.5	.070	0.5	5.130	5.920	.070	.031
	4.000	.051	0.3	.070	0.3	7.130	7.920	.070	.031
	5.000	.051	0.2	.070	0.2	9.130	9.920	.070	.031
VXF-16	2.000	.080	1.4	.100	1.4	3,000	4,000	.100	.027
	2.500	.080	1.0	.100	1.0	4,000	5,000	.100	.027
	3.000	.080	0.7	.100	0.7	5,000	6,000	.100	.027
	4.000	.080	0.5	.100	0.5	7,000	8,000	.100	.027
	5.000	.080	0.4	.100	0.4	8,820	9,920	.100	.027

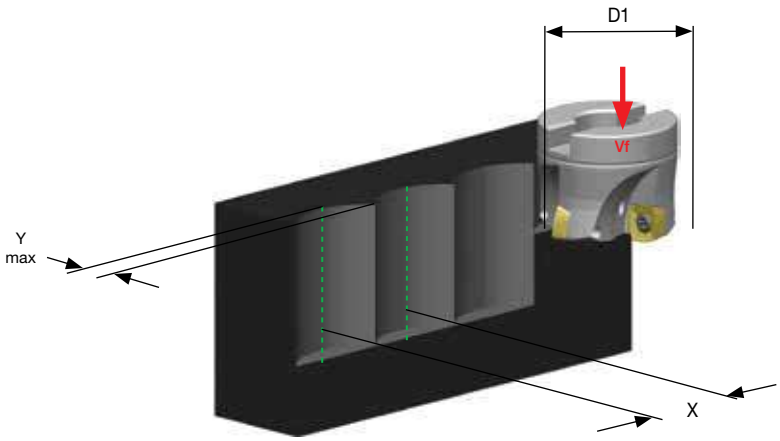
Ødm = ØHole–ØD1 max
Z1 = Ødm x 3,14 x tan ramp angle. Z1 ≤ Z1 max and ≤ ramp angle max
Ramp angle = arc tan x ((Z1)/Ødm x 3,14))

series	D1 max	X
VXF-07	.625–2.000	.165
VXF-09	1.000–2.000	.268
VXF-12	1.250–5.000	.358
VXF-16	2.000–5.000	.449



Ae max ≤ 2 x ØD1 max–2 x B
Flat Face = Ae max–2 x B

Z-Axis Plunge Milling



VXF-07

D1 max	Y max	X
.625	0.118	0.489
.750	0.118	0.546
1.000	0.118	0.645
1.250	0.118	0.731
1.500	0.118	0.808
2.000	0.118	0.942

VXF-09

D1 max	Y max	X
1,000	0.236	0.849
1.250	0.236	0.978
1.500	0.236	1.092
2.000	0.236	1.290

VXF-12

D1 max	Y max	X
1.250	.354	-
1.500	.354	1.274
2.000	.354	1.527
2.500	.354	1.743
3.000	.354	1.936
4.000	.354	2.272
5.000	.354	2.565

VXF-16

D1 max	Y max	X
2.000	0.512	1.746
2.500	0.512	2.018
3.000	0.512	2.257
4.000	0.512	2.673
5.000	0.512	3.032

Feed Rate Guide • Z-Axis Plunge Milling • fz (IPT)

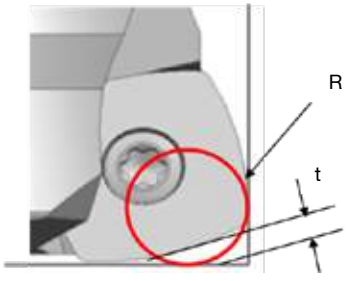
Light Machining	General Purpose	Heavy Machining

	Insert Geometry	Recommended Starting Feed per Tooth (Fz)			Insert Geometry	Y max
VXF-07	.E..MM	.002	**.006**	–	.E..MM	.118
	.S..MH	.004	**.008**	–	.S..MH	.118
VXF-09	.E..MM	.003	**.008**	.012	.E..MM	.236
	.S..MH	.004	**.009**	.014	.S..MH	.236
VXF-12	.E..MM	.003	**.008**	.012	.E..MM	.354
	.S..MH	.004	**.010**	.015	.S..MH	.354
VXF-16	.E..MM	.003	**.009**	.015	.E..MM	.512

CAM Programming

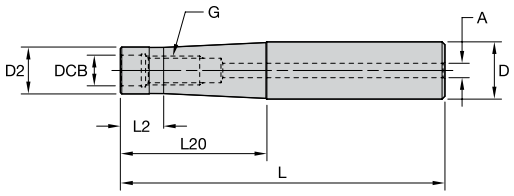
Programming Data

insert size	insert radius	R (to be programmed)	t
07	1/32	0.055	0.016
	1	0.059	0.017
09	1/32	0.078	0.028
	3/64	0.091	0.026
12	3/64	0.106	0.038
	1.5	0.110	0.037
16	3/64	0.165	0.057



Cylindrical Shank Extensions for Modular Heads • Inch





order number	catalog number	DCB	G	D	D2	A	L	L2	L20
5673704	M-13-M8-CA.625-3.543	.335	M8	.625	.512	.158	3.543	—	1.600
5673705	M-13-M8-CA.625-4.331	.335	M8	.625	.512	.158	4.331	—	2.500
5672833	M-13-M8-CA.625-6.693	.335	M8	.625	.512	.158	6.693	—	4.750
5672470	M-18-M10-CA.750-4.331	.413	M10	.750	.709	.158	4.331	—	2.500
5672834	M-18-M10-CA.750-5.118	.413	M10	.750	.709	.158	5.118	—	3.000
5672990	M-18-M10-CA.750-6.693	.413	M10	.750	.709	.158	6.693	—	4.750
5672835	M-21-M12-CA1-5.157	.492	M12	1.000	.827	.157	5.157	.476	3.000
5672991	M-21-M12-CA1-6.142	.492	M12	1.000	.827	.158	6.142	.476	4.000
5673353	M-21-M12-CA1-7.126	.492	M12	1.000	.827	.158	7.126	.476	5.000
5673588	M-21-M12-CA1-8.110	.492	M12	1.000	.827	.158	8.110	.476	6.000
5672471	M-21-M12-CA1-9.094	.492	M12	1.000	.827	.158	9.095	.476	6.992
5672992	M-29-M16-CA1.25-6.3	.669	M16	1.250	1.142	1.969	6.299	.476	4.000
5672836	M-29-M16-CA1.25-8.27	.669	M16	1.250	1.142	.197	8.268	.476	6.000
5672993	M-29-M16-CA1.25-10.2	.669	M16	1.250	1.142	1.969	10.236	.476	8.000
5673706	M-29-M16-CA1.25-12.2	.669	M16	1.250	1.142	.197	12.205	.476	10.000

NOTE: Cylindrical shank extensions can be used with all modular heads found in several product family series.

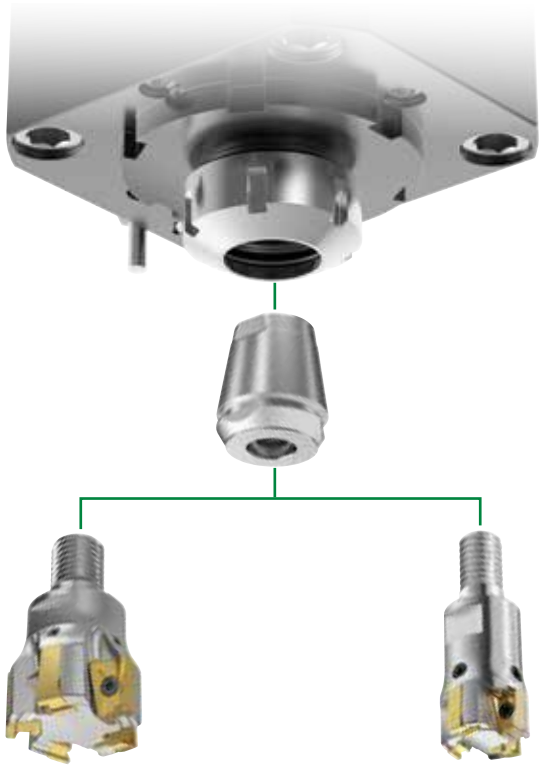


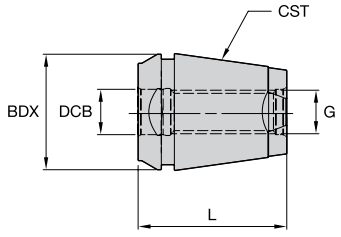
Solid ER Collets

Threaded solid ER collets turn CNC lathe machines into multitasking machines by providing access of any small diameter screw-on milling cutter to ER driven units.

These new solid ER collets increase machine utilization through modular flexibility.

The short projection from the face of the collet nut provides rigid toolholding and a smaller required machine envelope.





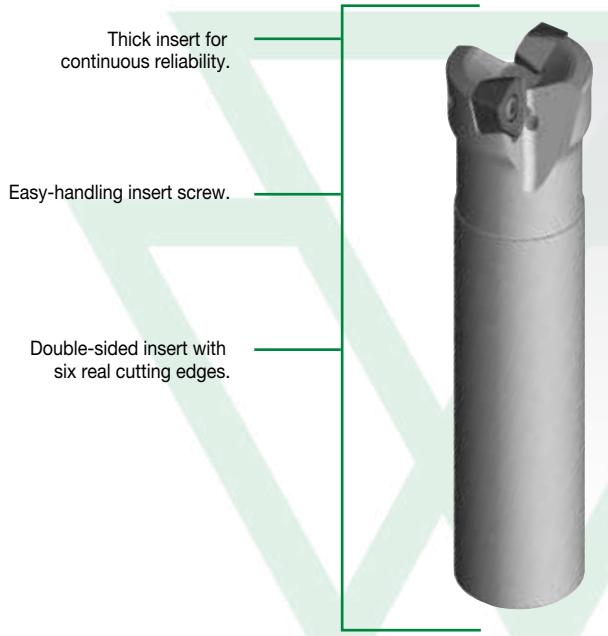
ERICKSON™

order number	catalog number	CST	collet capacity min mm	G	BDX	L
6587968	ER25STM08	ER25	9	M8	26	35
6587969	ER25STM10	ER25	11	M10	26	35
6587970	ER25STM12	ER25	13	M12	26	35
6588001	ER32STM08	ER32	9	M8	33	41
6588002	ER32STM10	ER32	11	M10	33	41
6588003	ER32STM12	ER32	13	M12	33	41
6588004	ER32STM16	ER32	17	M16	33	41
6588005	ER40STM08	ER40	9	M8	41	47
6588006	ER40STM10	ER40	11	M10	41	47
6588007	ER40STM12	ER40	13	M12	41	47
6588008	ER40STM16	ER40	17	M16	41	47

M370™

M370 IC08, M370 IC12 High-Feed Mill

The M370 Series is six-edged high-feed mill designed for high feed rate productivity in steel and cast iron materials.

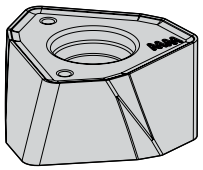


M370 high-feed mill's double-sided concept and six cutting edges provide security and optimal metal removal rates in steel and cast iron materials.

iC08 AND iC12 INSERTS OFFERED IN THREE GEOMETRIES



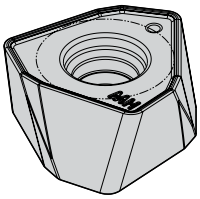




-MM

P M S

Designed for lower cutting forces. First choice for steel, stainless steel, and high-temp alloys.



-MH

P K

This insert has a strong cutting edge, making it a first choice for hard machining applications up to 48 HRC.



-MR

P K

Designed for heavy-duty steel and cast iron applications.

HIGH-FEED ROUGHING

PRODUCT

SERIES

M370™

DIAMETER RANGE

1–3" (25–125mm)

SHANK TYPES

Screw-On End Mills
Weldon® End Mills
Shell Mills

INDUSTRY

GENERAL ENGINEERING

APPLICATIONS



3D PROFILING | SLOTTING: SIDE MILLING | SLOTTING: SQUARE END | FACE MILLING | RAMPING BLANK

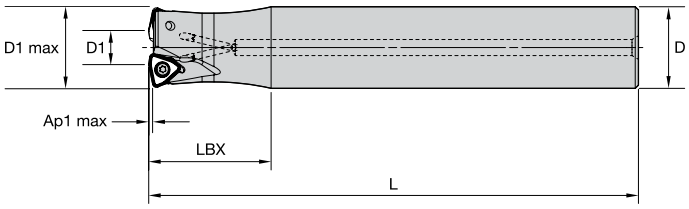


POCKETING | HELICAL MILLING | PLUNGE MILLING | THROUGH COOLANT: RADIAL: INDEXABLE MILLING



M370 • Cylindrical End Mills • iC08 • Medium • Inch

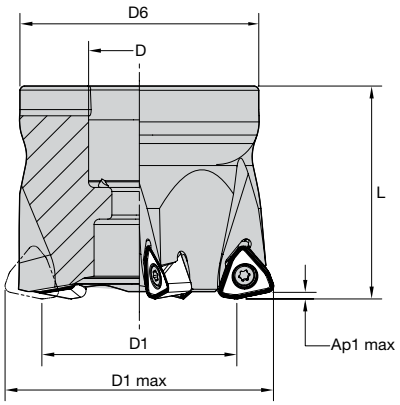




		D1 max		D1		D		L		LBX		Ap1 max							
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
4047654	M370D100Z02C100WO08L600	25,40	1.000	11,60	.460	25,40	1.000	152,40	6.000	38,10	1.500	1,25	.049	2	2.1	45500	Yes	0,53	1.17
4047655	M370D100Z02C100WO08L800	25,40	1.000	11,60	.460	25,40	1.000	203,20	8.000	38,10	1.500	1,25	.049	2	2.1	45500	Yes	0,73	1.60
4047656	M370D100Z03C100WO08L600	25,40	1.000	11,60	.460	25,40	1.000	152,40	6.000	38,10	1.500	1,25	.049	3	2.1	45500	Yes	0,52	1.16
4047657	M370D125Z03C125WO08L600	31,75	1.250	17,80	.700	31,75	1.250	152,40	6.000	38,10	1.500	1,25	.049	3	1.5	38900	Yes	0,85	1.87
4047658	M370D125Z03C125WO08L800	31,75	1.250	17,80	.700	31,75	1.250	203,20	8.000	38,10	1.500	1,25	.049	3	1.5	38900	Yes	1,16	2.55
4171167	M370D150Z03C125WO08L800	38,10	1.500	24,20	.950	31,70	1.250	195,21	7.686	38,10	1.500	1,25	.049	3	1.5	34500	Yes	2,32	5.11
4171168	M370D150Z04C150WO08L600	38,10	1.500	24,20	.950	38,10	1.500	152,41	6.000	38,10	1.500	1,25	.049	4	1.5	34500	Yes	1,23	2.70

M370 • Shell Mills • iC08 • Medium • Inch





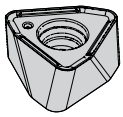
		D1 max		D1		D		D6		L		Ap1 max							
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
4047660	M370D150Z04S050WO08	38,10	1.500	24,10	.950	12,70	.500	36,00	1.417	40,00	1.575	1,25	.049	4	1.5	34500	Yes	0,19	.41
4047661	M370D200Z05S075WO08	50,80	2.000	36,80	1.450	19,05	.750	44,00	1.732	40,00	1.575	1,25	.049	5	.8	29000	Yes	0,37	.82
4047662	M370D200Z07S075WO08	50,80	2.000	36,80	1.450	19,05	.750	44,00	1.732	40,00	1.575	1,25	.049	7	.8	29000	Yes	0,38	.83
4171169	M370D250Z07S075WO08	63,50	2.500	49,50	1.950	19,05	.750	44,00	1.732	40,00	1.575	1,25	.049	7	.8	29000	Yes	0,64	1.42
4171170	M370D300Z08S100WO08	76,20	3.000	57,70	2.270	25,40	1.000	60,00	2.362	50,00	1.968	1,25	.049	8	.5	22900	Yes	2,19	4.82
6030309	M370D300Z06S100WO08	76,20	3.000	62,20	2.450	25,40	1.000	60,00	2.362	50,00	1.968	1,25	.049	6	.5	22900	Yes	2,23	4.91

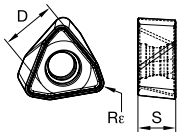
NOTE: Socket-head cap screw with coolant groove must be ordered separately.

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M370 • WOEJ-MM • W00804..

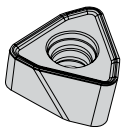


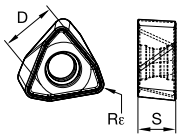


● first choice
○ alternate choice

								TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
P								●	●		●	●	●	○	●	●
M								○	●		●	●	●	●	●	●
K								○	○	●	○	○				
N															○	
S									●		●	○	○	●	●	●
H											○			○		
catalog number	cutting edges	D mm	D in	S mm	S in	Rε mm	Rε in									
WOEJ080412SRMM	6	7,79	.307	4,70	.185	1,22	.048	4113892	4113915	-	5564597	-	5544753	5520248	6333665	-

M370 • WOEJ-MH • W00804..





● first choice
○ alternate choice

								TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
P								●	●		●	●	●	○	●	●
M								○	●		●	●	●	●	●	●
K								○	○	●	○	○				
N															○	
S									●		●	○	○	●	●	●
H											○			○		
catalog number	cutting edges	D mm	D in	S mm	S in	Rε mm	Rε in									
WOEJ080412SRMH	6	7,79	.307	4,75	.187	1,22	.048	4052411	4052410	5427443	5564596	-	5544752	-	6333664	-

M370 • 08 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	...MM	WP40PM	**...MM**	**WP40PM**	...MM	WP40PM
P3–P4	...MM	WP25PM	**...MM**	**WP40PM**	...MH	WP40PM
P5–P6	...MM	WP25PM	**...MH**	**WP25PM**	...MH	WP40PM
M1–M2	...MM	WP25PM	**...MM**	**WS30PM**	...MM	WP40PM
M3	...MM	WP25PM	**...MM**	**WP25PM**	...MM	WP40PM
K1–K2	...MH	WK15CM	**...MH**	**WK15CM**	...MH	WK15CM
K3	...MH	TN6520	**...MH**	**TN6520**	...MH	WK15CM
N1–N2	–	–	**–**	**–**	–	–
N3	–	–	**–**	**–**	–	–
S1–S2	...MM	WP25PM	**...MM**	**WS30PM**	...MM	WP40PM
S3	...MM	WS30PM	**...MM**	**WS30PM**	...MM	WP40PM
S4	...MM	WS30PM	**...MM**	**WP40PM**	...MM	WP40PM
H1	...MH	WP25PM	**–**	**–**	–	–

M370 • 08 • Recommended Starting Speeds [SFM]

Material Group		TN6525			TN6540			WK15CM			WP25PM			WP35CM			WP40PM			WS30PM			WS40PM			WU35PM		
P	1	1340	**1045**	925	1180	**925**	785	–	–	–	1295	**1120**	1060	1790	**1555**	1460	1165	**1025**	965	–	–	–	–	–	–	850	**750**	705
	2	1045	**830**	710	830	**630**	550	–	–	–	1080	**940**	785	1105	**1000**	905	985	**845**	710	–	–	–	–	–	–	720	**620**	520
	3	925	**710**	610	710	**550**	450	–	–	–	1000	**845**	690	1000	**905**	805	905	**770**	630	–	–	–	–	–	–	655	**555**	455
	4	770	**550**	475	590	**430**	355	–	–	–	890	**725**	590	750	**690**	630	805	**670**	535	–	–	–	–	–	–	590	**490**	390
	5	1025	**770**	650	785	**590**	490	–	–	–	725	**670**	590	1025	**905**	830	670	**610**	535	–	–	–	560	**475**	395	490	**440**	390
	6	670	**535**	430	535	**395**	335	–	–	–	650	**490**	395	630	**535**	430	590	**450**	355	–	–	–	490	**360**	260	425	**325**	260
M	1	630	**395**	260	430	**260**	200	–	–	–	805	**710**	650	805	**725**	610	770	**670**	610	890	**785**	725	690	**560**	460	555	**490**	440
	2	395	**260**	155	260	**155**	140	–	–	–	725	**630**	510	725	**630**	550	690	**590**	490	805	**710**	570	590	**475**	395	505	**425**	360
	3	415	**260**	180	275	**155**	140	–	–	–	550	**475**	370	570	**510**	450	510	**450**	355	610	**535**	415	475	**360**	280	375	**325**	260
K	1	905	**805**	725	725	**670**	590	1655	**1520**	1340	905	**805**	725	1165	**1045**	940	–	–	–	–	–	–	–	–	–	–	–	–
	2	710	**630**	590	570	**510**	450	1320	**1165**	1080	710	**630**	590	925	**830**	750	–	–	–	–	–	–	–	–	–	–	–	–
	3	590	**535**	475	510	**475**	415	1105	**985**	905	590	**535**	475	770	**690**	630	–	–	–	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	155	**120**	95	–	–	–	155	**140**	95	–	–	–	155	**140**	120	180	**155**	120	130	**115**	80	110	**95**	80
	2	–	–	–	80	**60**	40	–	–	–	155	**140**	95	–	–	–	155	**140**	120	180	**155**	120	130	**115**	80	110	**95**	80
	3	–	–	–	235	**140**	95	–	–	–	200	**155**	95	–	–	–	200	**155**	120	215	**180**	120	165	**130**	80	145	**110**	80
	4	–	–	–	200	**95**	80	–	–	–	275	**200**	140	260	**200**	130	260	**200**	140	335	**235**	155	195	**165**	100	195	**145**	95
H	1	–	–	–	–	–	–	–	–	–	475	**355**	275	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M370 • 08 • Recommended Starting Feeds [IPT]

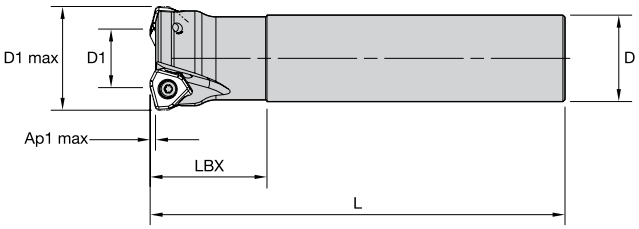
Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
...MM	.035	**.061**	.150	.025	**.044**	.104	.019	**.033**	.076	.017	**.028**	.066	.015	**.026**	.061	...MM
...MH	.035	**.092**	.197	.025	**.065**	.134	.019	**.048**	.098	.017	**.042**	.085	.015	**.038**	.078	...MH

NOTE: Use "Light Machining" value as starting feed rate.

M370 • Cylindrical End Mills iC12 • Large • Inch

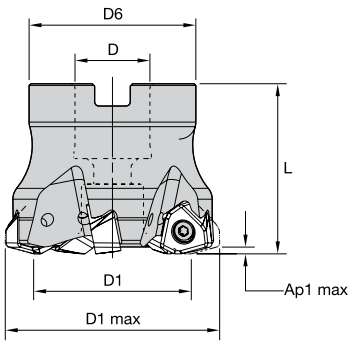




		D1 max		D1		D		L		LBX		Ap1 max							
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
5352394	M370D150Z02C125WO12L600	38,10	1.500	21,27	.837	31,70	1.250	152,40	6.000	42,93	1.690	2,00	.078	2	6.4	22380	Yes	0,87	1.92
5352395	M370D150Z02C150WO12L1000	38,10	1.500	21,27	.837	38,10	1.500	254,00	10.000	63,50	2.500	2,00	.078	2	6.4	22380	Yes	2,04	4.50

M370 • Shell Mills • iC12 • Large • Inch





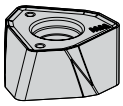
		D1 max		D1		D		D6		L		Ap1 max							
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
5352397	M370D200Z04S075WO12	50,80	2.000	33,91	1.335	19,10	.750	44,45	1.750	40,00	1.575	2,00	.078	4	3.6	19380	Yes	0,31	.69
5698432	M370D200Z04S075WO12L200	50,80	2.000	33,91	1.335	19,10	.750	44,45	1.750	50,79	2.000	2,00	.078	4	3.6	19380	Yes	0,42	.92
5352398	M370D250Z05S075WO12	63,50	2.500	46,59	1.834	19,10	.750	44,45	1.750	44,45	1.750	2,00	.078	5	2.5	17330	Yes	0,48	1.06
5352399	M370D250Z05S100WO12	63,50	2.500	46,59	1.834	25,40	1.000	55,63	2.190	44,45	1.750	2,00	.078	5	2.5	17330	Yes	0,58	1.27
5698433	M370D300Z06S100WO12L197	76,20	3.000	59,14	2.328	25,40	1.000	69,85	2.750	50,04	1.970	2,00	.078	6	1.9	15820	Yes	1,08	2.38
5352420	M370D300Z06S100WO12	76,20	3.000	59,27	2.333	25,40	1.000	69,85	2.750	44,45	1.750	2,00	.078	6	1.9	15820	Yes	0,94	2.08
5352421	M370D300Z05S125WO12	76,20	3.000	59,27	2.333	31,80	1.250	69,85	2.750	50,80	2.000	2,00	.078	5	1.9	15820	Yes	1,05	2.30
5352422	M370D300Z06S125WO12	76,20	3.000	59,27	2.333	31,80	1.250	69,85	2.750	50,80	2.000	2,00	.078	6	1.9	15820	Yes	1,05	2.32
5352423	M370D400Z06S150WO12	101,60	4.000	84,65	3.333	38,10	1.500	92,08	3.625	50,80	2.000	2,00	.078	6	1.3	13700	Yes	1,73	3.81
5352424	M370D400Z08S150WO12	101,60	4.000	84,65	3.333	38,10	1.500	92,08	3.625	50,80	2.000	2,00	.078	8	1.3	13700	Yes	1,75	3.85
5352425	M370D500Z07S150WO12	127,00	5.000	110,05	4.333	38,10	1.500	96,77	3.810	60,33	2.375	2,00	.078	7	1.0	12260	Yes	3,00	6.62
6030307	M370D600Z09S200WO12	152,40	6.000	135,44	5.332	50,80	2.000	127,00	5.000	60,33	2.375	2,00	.078	9	.8	11100	Yes	4,66	10.26

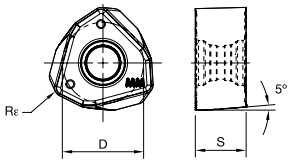
NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly must be ordered separately.

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M370 • WOEJ-MM • W0.J1207





● first choice
○ alternate choice

| | | |

M370 • 12 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	...MM	WU35PM	**...MM**	**WP40PM**	...MM	WP40PM
P3–P4	...MM	WP25PM	**...MM**	**WP25PM**	...MH	WP40PM
P5–P6	...MM	WP25PM	**...MM**	**WP35CM**	...MH	WP35CM
M1–M2	...MM	WS30PM	**...MM**	**WU35PM**	...MM	WP40PM
M3	...MM	WP25PM	**...MM**	**WP35CM**	...MM	WP40PM
K1–K2	...MH	WK15CM	**...MH**	**WK15CM**	...MH	WP20CM
K3	...MH	WK15CM	**...MH**	**WK15CM**	...MH	WP20CM
N1–N2	–	–	**–**	**–**	–	–
N3	–	–	**–**	**–**	–	–
S1–S2	...MM	WS30PM	**...MM**	**WU35PM**	...MM	WP40PM
S3	...MM	WS30PM	**...MM**	**WU35PM**	...MM	WP40PM
S4	...MM	WS30PM	**...MM**	**WU35PM**	...MM	WP40PM
H1	...MH	WP35CM	**...MR**	**WP25PM**	–	–

M370 • 12 • Recommended Starting Speeds [SFM]

Material Group		TN6525			TN6540			WK15CM			WP25PM			WP35CM			WP40PM			WS30PM			WS40PM			WU35PM		
P	1	1340	**1045**	925	1180	**925**	785	–	**–**	–	1295	**1120**	1060	1790	**1555**	1460	1165	**1025**	965	–	**–**	–	–	**–**	–	850	**750**	705
	2	1045	**830**	710	830	**630**	550	–	**–**	–	1080	**940**	785	1105	**1000**	905	985	**845**	710	–	**–**	–	–	**–**	–	720	**620**	520
	3	925	**710**	610	710	**550**	450	–	**–**	–	1000	**845**	690	1000	**905**	805	905	**770**	630	–	**–**	–	–	**–**	–	655	**555**	455
	4	770	**550**	475	590	**430**	355	–	**–**	–	890	**725**	590	750	**690**	630	805	**670**	535	–	**–**	–	–	**–**	–	590	**490**	390
	5	1025	**770**	650	785	**590**	490	–	**–**	–	725	**670**	590	1025	**905**	830	670	**610**	535	–	**–**	–	560	**475**	395	490	**440**	390
	6	670	**535**	430	535	**395**	335	–	**–**	–	650	**490**	395	630	**535**	430	590	**450**	355	–	**–**	–	490	**360**	260	425	**325**	260
M	1	630	**395**	260	430	**260**	200	–	**–**	–	805	**710**	650	805	**725**	610	770	**670**	610	890	**785**	725	690	**560**	460	555	**490**	440
	2	395	**260**	155	260	**155**	140	–	**–**	–	725	**630**	510	725	**630**	550	690	**590**	490	805	**710**	570	590	**475**	395	505	**425**	360
	3	415	**260**	180	275	**155**	140	–	**–**	–	550	**475**	370	570	**510**	450	510	**450**	355	610	**535**	415	475	**360**	280	375	**325**	260
K	1	905	**805**	725	725	**670**	590	1655	**1520**	1340	905	**805**	725	1165	**1045**	940	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	710	**630**	590	570	**510**	450	1320	**1165**	1080	710	**630**	590	925	**830**	750	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	590	**535**	475	510	**475**	415	1105	**985**	905	590	**535**	475	770	**690**	630	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
N	1	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
S	1	–	**–**	–	155	**120**	95	–	**–**	–	155	**140**	95	–	**–**	–	155	**140**	120	180	**155**	120	130	**115**	80	110	**95**	80
	2	–	**–**	–	80	**60**	40	–	**–**	–	155	**140**	95	–	**–**	–	155	**140**	120	180	**155**	120	130	**115**	80	110	**95**	80
	3	–	**–**	–	235	**140**	95	–	**–**	–	200	**155**	95	–	**–**	–	200	**155**	120	215	**180**	120	165	**130**	80	145	**110**	80
	4	–	**–**	–	200	**95**	80	–	**–**	–	275	**200**	140	260	**200**	130	260	**200**	140	335	**235**	155	195	**165**	100	195	**145**	95
H	1	–	**–**	–	–	**–**	–	–	**–**	–	475	**355**	275	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M370 • 12 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

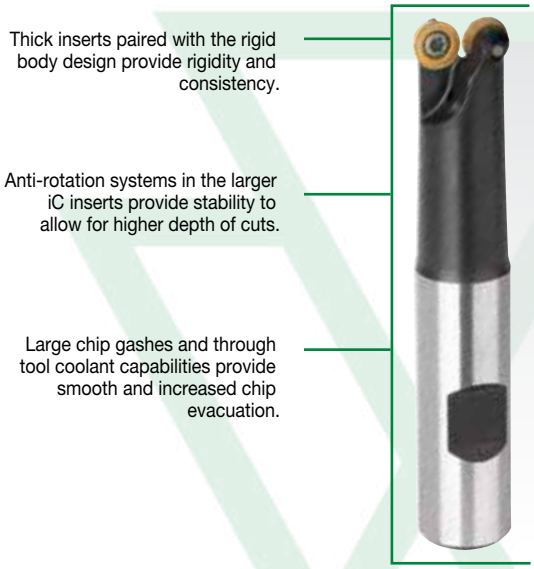
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%				
...MM	.035	**.073**	.143	.026	**.052**	.099	.019	**.039**	.073	.017	**.034**	.063	.015	**.031**	.058		...MM
...MH	.035	**.093**	.196	.026	**.066**	.134	.019	**.049**	.098	.017	**.042**	.085	.015	**.039**	.077		...MH
...MR	.035	**.111**	.214	.026	**.078**	.145	.019	**.057**	.106	.017	**.050**	.092	.015	**.046**	.084		...MR

NOTE: Use "Light Machining" value as starting feed rate.

M100™ Series

M100 IC06, M100 IC10, M100 IC12, M100 IC16, M100 IC18 Copy Mills

The M100 copy mill is a reliable multipurpose solution for copy milling, face milling, helical interpolation, and roughing. The strong and rigid body design paired with the thick inserts ensures consistent results in even the most demanding operations.



The M100 copy mill is equipped with thick inserts, rigid body design, and anti-rotation systems to stay engaged with the workpiece in high depth of cuts.

INSERT OFFERING



08mm iC
RD Insert Type
Ground and PSTS



10mm iC
RD Insert Type
Ground and PSTS



12mm iC
RD Insert Type
Anti-Rotation Feature
Ground and PSTS



16mm iC
RD Insert Type
Anti-Rotation Feature
Ground and PSTS



16mm iC
RC Insert Type
Anti-Rotation Feature
Ground and PSTS

CONSISTENCY AND STABILITY WITH M100

PRODUCT

SERIES

M100™

DIAMETER RANGE

.75–2" (24–125mm)

SHANK TYPES

Shell Mills
Weldon® End Mills
Screw-On End Mills

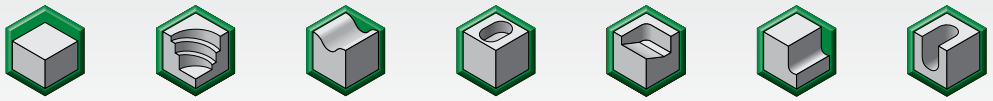
INDUSTRY

GENERAL ENGINEERING

ENERGY

TRANSPORTATION

APPLICATIONS



FACE MILLING | HELICAL MILLING/ POCKET MILLING | 3D PROFILING | POCKETING | RAMPING BLANK | SIDE MILLING/ SHOULDER MILLING: BALL NOSE | SLOTTING: BALL NOSE



CONSISTENCY

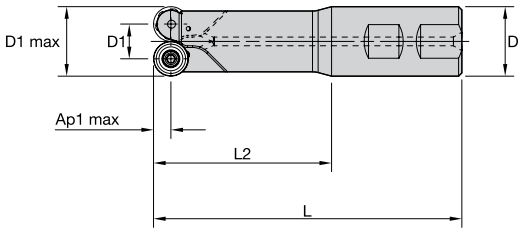
Thick inserts combined with the rigid body provide a strong foundation for consistent results.

STABILITY

Anti-rotation systems in the larger iC inserts provide a sure fit for stability in high depth of cuts.

M100 • Weldon® End Mills • iC08 • Inch





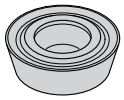
order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646596	**M100D075Z02W075RD08L453**	.750	.435	.750	4.530	2.500	.158	2	22.0	26000	Yes	.85

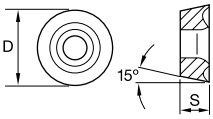
NOTE: All spare parts except the insert screws must be ordered separately.

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M100 • RDMT-M0T • RD0802..





● first choice
○ alternate choice

| | | |

M100 • RD08 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	RDMT-T	WP35CM	**RDMT-T**	**WP35CM**	RDMT-T	WP35CM
P3–P4	RDMT-T	WP35CM	**RDMW-T**	**TN6540**	RDMW-T	TN6540
P5–P6	RDMT-T	WP35CM	**RDMT-T**	**WP35CM**	RDMT-T	WP35CM
M1–M2	RDHT-T	WP35CM	**RDHT-T**	**WP35CM**	RDMT-T	WP35CM
M3	RDHT-T	WP35CM	**RDHT-T**	**WP35CM**	RDMT-T	WP35CM
K1–K2	–	–	**RDMT-T**	**WP35CM**	RDMT-T	WP35CM
K3	–	–	**RDMT-T**	**WP35CM**	RDMT-T	WP35CM
N1–N2	–	–	–	–	–	–
N3	–	–	–	–	–	–
S1–S2	–	–	–	–	–	–
S3	–	–	–	–	–	–
S4	–	–	–	–	–	–
H1	–	–	–	–	–	–

M100 • RD08 • Recommended Starting Speeds [SFM]

Material Group		THM			TN6525			TN6540			WP35CM		
P	1	–	–	–	1340	**1045**	925	1180	**925**	785	1790	**1555**	1460
	2	–	–	–	1045	**830**	710	830	**630**	550	1105	**1000**	905
	3	–	–	–	925	**710**	610	710	**550**	450	1000	**905**	805
	4	–	–	–	770	**550**	475	590	**430**	355	750	**690**	630
	5	–	–	–	1025	**770**	650	785	**590**	490	1025	**905**	830
	6	–	–	–	670	**535**	430	535	**395**	335	630	**535**	430
M	1	–	–	–	630	**395**	260	430	**260**	200	805	**725**	610
	2	–	–	–	395	**260**	155	260	**155**	140	725	**630**	550
	3	–	–	–	415	**260**	180	275	**155**	140	570	**510**	450
K	1	390	**295**	245	905	**805**	725	725	**670**	590	1165	**1045**	940
	2	410	**325**	225	710	**630**	590	570	**510**	450	925	**830**	750
	3	425	**310**	195	590	**535**	475	510	**475**	415	770	**690**	630
N	1	2950	**1965**	1640	–	–	–	–	–	–	–	–	–
	2	2245	**1525**	1260	–	–	–	–	–	–	–	–	–
	3	1475	**915**	655	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	155	**120**	95	–	–	–
	2	–	–	–	–	–	–	80	**60**	40	–	–	–
	3	–	–	–	–	–	–	235	**140**	95	–	–	–
	4	–	–	–	–	–	–	200	**95**	80	260	**200**	130
H	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		TTM08			WK15CM			WS30PM			WS40PM		
P	1	750	**655**	620	–	–	–	–	–	–	–	–	–
	2	635	**555**	455	–	–	–	–	–	–	–	–	–
	3	590	**490**	410	–	–	–	–	–	–	–	–	–
	4	520	**425**	340	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–	560	**475**	395
	6	–	–	–	–	–	–	–	–	–	490	**360**	260
M	1	–	–	–	–	–	–	890	**785**	725	690	**560**	460
	2	–	–	–	–	–	–	805	**710**	570	590	**475**	395
	3	–	–	–	–	–	–	610	**535**	415	475	**360**	280
K	1	–	–	–	1655	**1520**	1340	–	–	–	–	–	–
	2	–	–	–	1320	**1165**	1080	–	–	–	–	–	–
	3	–	–	–	1105	**985**	905	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	2	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	3	–	–	–	–	–	–	215	**180**	120	165	**130**	80
	4	–	–	–	–	–	–	335	**235**	155	195	**165**	100
H	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M100 • RD08 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .157 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDMW-	.007	**.011**	.016	.005	**.008**	.012	.004	**.006**	.009	.003	**.005**	.008	.003	**.005**	.007	RDMW-
RDHT-T	.009	**.012**	.024	.007	**.009**	.018	.005	**.007**	.013	.004	**.006**	.011	.004	**.005**	.011	RDHT-T
RDMT-T	.009	**.012**	.024	.007	**.009**	.018	.005	**.007**	.013	.004	**.006**	.011	.004	**.005**	.011	RDMT-T
RDMW-T	.009	**.016**	.028	.007	**.012**	.021	.005	**.009**	.015	.004	**.008**	.013	.004	**.007**	.012	RDMW-T

At .079 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDMW-	.008	**.013**	.019	.006	**.009**	.014	.005	**.007**	.010	.004	**.006**	.009	.004	**.006**	.008	RDMW-
RDHT-T	.010	**.014**	.028	.008	**.010**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.006**	.012	RDHT-T
RDMT-T	.010	**.014**	.028	.008	**.010**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.006**	.012	RDMT-T
RDMW-T	.010	**.019**	.033	.008	**.014**	.024	.006	**.010**	.018	.005	**.009**	.015	.005	**.008**	.014	RDMW-T

At .039 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDMW-	.011	**.017**	.025	.008	**.012**	.018	.006	**.009**	.013	.005	**.008**	.012	.005	**.007**	.011	RDMW-
RDHT-T	.014	**.018**	.037	.010	**.013**	.027	.007	**.010**	.020	.006	**.009**	.017	.006	**.008**	.016	RDHT-T
RDMT-T	.014	**.018**	.037	.010	**.013**	.027	.007	**.010**	.020	.006	**.009**	.017	.006	**.008**	.016	RDMT-T
RDMW-T	.014	**.025**	.043	.010	**.018**	.031	.007	**.013**	.023	.006	**.012**	.020	.006	**.011**	.019	RDMW-T

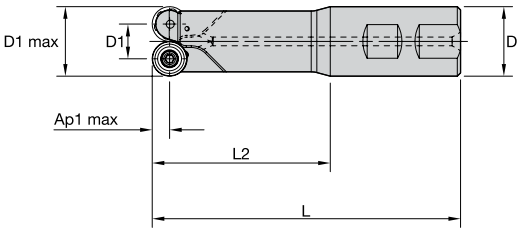
At .020 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDMW-	.015	**.023**	.034	.011	**.017**	.024	.008	**.013**	.018	.007	**.011**	.016	.007	**.010**	.014	RDMW-
RDHT-T	.019	**.025**	.051	.014	**.018**	.037	.010	**.014**	.027	.009	**.012**	.024	.008	**.011**	.022	RDHT-T
RDMT-T	.019	**.025**	.051	.014	**.018**	.037	.010	**.014**	.027	.009	**.012**	.024	.008	**.011**	.022	RDMT-T
RDMW-T	.019	**.034**	.060	.014	**.024**	.043	.010	**.018**	.032	.009	**.016**	.028	.008	**.014**	.025	RDMW-T

NOTE: Use "Light Machining" value as starting feed rate.

M100 • Weldon® End Mills • iC10 • Inch





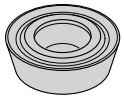
order number	catalog number	D1 max mm	D1 max in	D1 mm	D1 in	D mm	D in	L mm	L in	L2 mm	L2 in	Ap1 max mm	Ap1 max in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
2646602	M100D075Z02W100RD10L628	19,05	.750	9,04	.356	25,40	1.000	159,51	6.280	101,60	4.000	5,00	.197	2	40.0	26000	Yes	0,50	1.10

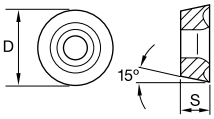
NOTE: All spare parts except the insert screws must be ordered separately.

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MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M100 • RDMT-M0T • RD1003..



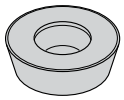


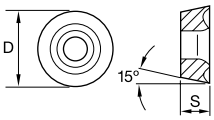
● first choice
○ alternate choice

P			●	●	●		●	○	●					
M			○	●			●	●	●					
K		○	○	○		●	○							
N		●							○					
S				●			○	●	●					
H								○						

catalog number	D mm	D in	S mm	S in	hm mm	hm in	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
RDMT1003M0	10,00	.394	3,18	.125	0,14	.006	2012538	-	-	-	-	-	-	-
RDMT1003M0T	10,00	.394	3,18	.125	0,14	.006	-	2957429	2957428	-	-	-	-	-

M100 • RDMW-M0 / -M0T • RD1003..





● first choice
○ alternate choice

P			●	●	●		●	○	●					
M			○	●			●	●	●					
K		○	○	○		●	○							
N		●							○					
S				●			○	●	●					
H								○						

catalog number	D mm	D in	S mm	S in	hm mm	hm in	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
RDMW1003M0	10,00	.394	3,18	.125	—	—	-	-	-	-	6724747	-	-	-
RDMW1003M0T	10,00	.394	3,18	.125	0,14	.006	-	-	3353279	-	-	-	-	-

M100 • RD10 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	RDMT-T	TN6525	**RDMT-T**	**TN6540**	RDMW-T	TN6540
P3–P4	RDMT-T	TN6525	**RDMW-T**	**TN6540**	RDMW-T	TN6540
P5–P6	RDMT-T	TN6525	**RDMW-T**	**TN6540**	RDMW-T	TN6540
M1–M2	RDHT-T	TN6540	**RDMT-T**	**TN6540**	RDMT-T	TN6540
M3	RDHT-T	TN6540	**RDMT-T**	**TN6540**	RDMT-T	TN6540
K1–K2	RDMW-MH	TN2510	**RDMW-MH**	**TN2510**	RDMW	WK15CM
K3	RDMW-MH	TN2510	**RDMW-MH**	**TN2510**	RDMW	WK15CM
N1–N2	–	–	**–**	**–**	–	–
N3	–	–	**–**	**–**	–	–
S1–S2	–	–	**RDMT-T**	**TN6540**	–	–
S3	–	–	**RDMT-T**	**TN6540**	–	–
S4	–	–	**RDMT-T**	**TN6540**	RDMT-T	TN6540
H1	RDMW-MH	TN2510	**RDMW-MH**	**TN2510**	–	–

M100 • RD10 • Recommended Starting Speeds [SFM]

Material Group		THM			TN6525			TN6540			WP35CM		
P	1	–	–	–	1340	**1045**	925	1180	**925**	785	1790	**1555**	1460
	2	–	–	–	1045	**830**	710	830	**630**	550	1105	**1000**	905
	3	–	–	–	925	**710**	610	710	**550**	450	1000	**905**	805
	4	–	–	–	770	**550**	475	590	**430**	355	750	**690**	630
	5	–	–	–	1025	**770**	650	785	**590**	490	1025	**905**	830
	6	–	–	–	670	**535**	430	535	**395**	335	630	**535**	430
M	1	–	–	–	630	**395**	260	430	**260**	200	805	**725**	610
	2	–	–	–	395	**260**	155	260	**155**	140	725	**630**	550
	3	–	–	–	415	**260**	180	275	**155**	140	570	**510**	450
K	1	390	**295**	245	905	**805**	725	725	**670**	590	1165	**1045**	940
	2	410	**325**	225	710	**630**	590	570	**510**	450	925	**830**	750
	3	425	**310**	195	590	**535**	475	510	**475**	415	770	**690**	630
N	1	2950	**1965**	1640	–	**–**	–	–	**–**	–	–	**–**	–
	2	2245	**1525**	1260	–	**–**	–	–	**–**	–	–	**–**	–
	3	1475	**915**	655	–	**–**	–	–	**–**	–	–	**–**	–
S	1	–	–	–	–	**–**	–	155	**120**	95	–	**–**	–
	2	–	–	–	–	**–**	–	80	**60**	40	–	**–**	–
	3	–	–	–	–	**–**	–	235	**140**	95	–	**–**	–
	4	–	–	–	–	**–**	–	200	**95**	80	260	**200**	130
H	1	–	–	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	–	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	–	–	–	**–**	–	–	**–**	–	–	**–**	–

Material Group		TTM08			WK15CM			WS30PM			WS40PM		
P	1	750	**655**	620	–	**–**	–	–	**–**	–	–	**–**	–
	2	635	**555**	455	–	**–**	–	–	**–**	–	–	**–**	–
	3	590	**490**	410	–	**–**	–	–	**–**	–	–	**–**	–
	4	520	**425**	340	–	**–**	–	–	**–**	–	–	**–**	–
	5	–	**–**	–	–	**–**	–	–	**–**	–	560	**475**	395
	6	–	–	–	–	**–**	–	–	**–**	–	490	**360**	260
M	1	–	–	–	–	**–**	–	890	**785**	725	690	**560**	460
	2	–	–	–	–	**–**	–	805	**710**	570	590	**475**	395
	3	–	–	–	–	**–**	–	610	**535**	415	475	**360**	280
K	1	–	**–**	–	1655	**1520**	1340	–	**–**	–	–	**–**	–
	2	–	–	–	1320	**1165**	1080	–	–	–	–	–	–
	3	–	**–**	–	1105	**985**	905	–	**–**	–	–	**–**	–
N	1	–	–	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	–	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	–	–	–	**–**	–	–	**–**	–	–	**–**	–
S	1	–	–	–	–	**–**	–	180	**155**	120	130	**115**	80
	2	–	–	–	–	**–**	–	180	**155**	120	130	**115**	80
	3	–	–	–	–	**–**	–	215	**180**	120	165	**130**	80
	4	–	–	–	–	**–**	–	335	**235**	155	195	**165**	100
H	1	–	–	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	–	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	–	–	–	**–**	–	–	**–**	–	–	**–**	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M100 • RD10 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .197 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-T	.009	**.015**	.026	.007	**.011**	.018	.005	**.008**	.014	.004	**.007**	.012	.004	**.007**	.011	RDHT-T
RDHW-MH	.009	**.017**	.035	.007	**.012**	.025	.005	**.009**	.019	.004	**.008**	.016	.004	**.007**	.015	RDHW-MH
RDMT-T	.009	**.015**	.026	.007	**.011**	.018	.005	**.008**	.014	.004	**.007**	.012	.004	**.007**	.011	RDMT-T
RDMW-	.009	**.008**	.024	.007	**.006**	.017	.005	**.004**	.013	.004	**.004**	.011	.004	**.004**	.010	RDMW-
RDMW-T	.009	**.022**	.035	.007	**.016**	.025	.005	**.012**	.019	.004	**.011**	.016	.004	**.010**	.015	RDMW-T

At .098 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-T	.010	**.018**	.030	.008	**.013**	.021	.006	**.010**	.016	.005	**.008**	.014	.005	**.008**	.013	RDHT-T
RDHW-MH	.010	**.019**	.040	.008	**.014**	.029	.006	**.010**	.021	.005	**.009**	.019	.005	**.008**	.017	RDHW-MH
RDMT-T	.010	**.018**	.030	.008	**.013**	.021	.006	**.010**	.016	.005	**.008**	.014	.005	**.008**	.013	RDMT-T
RDMW-	.010	**.009**	.027	.008	**.007**	.020	.006	**.005**	.015	.005	**.004**	.013	.005	**.004**	.012	RDMW-
RDMW-T	.010	**.026**	.040	.008	**.019**	.029	.006	**.014**	.021	.005	**.012**	.019	.005	**.011**	.017	RDMW-T

At .049 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-T	.014	**.023**	.039	.010	**.017**	.028	.007	**.012**	.021	.006	**.011**	.018	.006	**.010**	.017	RDHT-T
RDHW-MH	.014	**.025**	.053	.010	**.018**	.038	.007	**.014**	.028	.006	**.012**	.025	.006	**.011**	.022	RDHW-MH
RDMT-T	.014	**.023**	.039	.010	**.017**	.028	.007	**.012**	.021	.006	**.011**	.018	.006	**.010**	.017	RDMT-T
RDMW-	.014	**.012**	.036	.010	**.009**	.026	.007	**.007**	.019	.006	**.006**	.017	.006	**.005**	.015	RDMW-
RDMW-T	.014	**.034**	.053	.010	**.024**	.038	.007	**.018**	.028	.006	**.016**	.025	.006	**.015**	.022	RDMW-T

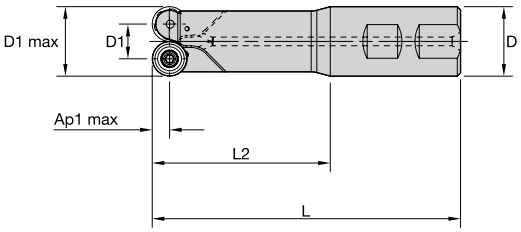
At .025 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-T	.019	**.032**	.053	.014	**.023**	.038	.010	**.017**	.028	.009	**.015**	.025	.008	**.014**	.023	RDHT-T
RDHW-MH	.019	**.034**	.073	.014	**.025**	.052	.010	**.019**	.039	.009	**.016**	.034	.008	**.015**	.031	RDHW-MH
RDMT-T	.019	**.032**	.053	.014	**.023**	.038	.010	**.017**	.028	.009	**.015**	.025	.008	**.014**	.023	RDMT-T
RDMW-	.019	**.017**	.049	.014	**.012**	.035	.010	**.009**	.026	.009	**.008**	.023	.008	**.007**	.021	RDMW-
RDMW-T	.019	**.047**	.073	.014	**.033**	.052	.010	**.025**	.039	.009	**.022**	.034	.008	**.020**	.031	RDMW-T

NOTE: Use "Light Machining" values as starting feed rate.

M100 • Weldon® End Mills • iC12 • Inch



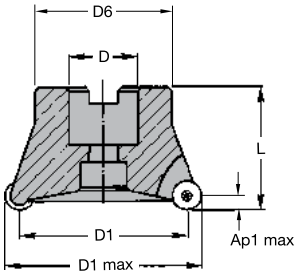


		D1 max		D1		D		L		L2		Ap1 max								
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
2646611	M100D100Z02W100RD12L553	25,40	1.000	14,78	.528	25,40	1.000	140,46	5.530	82,5500	3.250	6,00	.236	2	50.0	23000	Yes	0,57	1.25
2646617	M100D125Z02W125RD12L615	31,75	1.250	19,78	.778	31,75	1.250	156,21	6.150	98,30	3.870	6,00	.236	2	23.0	19000	Yes	0,73	1.60

NOTE: All spare parts except the insert screws must be ordered separately.

M100 • Shell Mills • iC12 • Inch





		D1 max		D1		D		D6		L		Ap1 max								
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
2646725	M100D200Z05S075RD12	50,80	2.000	38,86	1.530	19,05	.750	43,18	1.700	41,40	1.630	6,00	.236	5	10.0	15000	Yes	0,25	.55

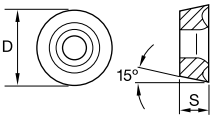
NOTE: All spare parts except the insert screws must be ordered separately.

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M100 • RDMT-TX • RD1204..



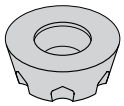


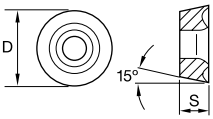
● first choice
○ alternate choice

P			●	●	●		●	○	●							
M			○	●			●	●	●							
K		○	○	○		●	○									
N		●							○							
S				●					○	●	●					
H											○					

catalog number	number of indexes	D mm	D in	S mm	S in	hm mm	hm in	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
RDMT1204M0TX	6	12,00	.472	4,76	.188	0,15	.006	-	2957430	2957432	2012546	-	-	5520247	-
RDMT1204M0TX	6	12,00	.472	4,76	.188	–	–	-	-	-	-	6724748	6901188	-	-

M100 • RDMW-TX • RD1204..





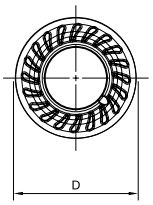
● first choice
○ alternate choice

P			●	●	●		●	○	●							
M			○	●			●	●	●							
K		○	○	○		●	○									
N		●							○							
S				●					○	●	●					
H											○					

catalog number	number of indexes	D mm	D in	S mm	S in	hm mm	hm in	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
RDMW1204M0TX	6	12,00	.472	4,76	.188	0,15	.006	-	-	3353281	2012600	5427441	-	-	-
RDMW1204M0TX	6	12,00	.472	4,76	.188	–	–	-	-	-	-	-	6901190	-	-

M100 • RDPT-MMX • RD1204..





● first choice
○ alternate choice

P			●	●	●		●	○	●
M			○	●			●	●	●
K		○	○	○		●	○		
N		●							○
S				●			○	●	●
H								○	

catalog number	number of indexes	D mm	D in	S mm	S in	hm mm	hm in	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
RDPT1204M0SMMX	6	12,00	.472	4,76	.187	0,177	.007	■	■	5176974	■	■	■	■	6412897
RDPT1204M0SMMX	6	12,00	.472	4,76	.187	–	–	■	■	■	■	■	6901783	■	■
RDPT1204M0SMMX4	4	12,00	.472	4,76	.187	–	–	■	■	■	■	■	■	■	6412898

M100 • RD12 • Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	RDMT-TX	WP35CM	**RDMT-TX**	**TN6540**	RDMT-TX	TN6540
P3–P4	RDMT-TX	WP35CM	**RDMW-TX**	**TN6540**	RDMW-TX	TN6540
P5–P6	RDMT-TX	WP35CM	**RDPT-MMX**	**WP35CM**	RDPT-MMX	WP35CM
M1–M2	RDHT-TX	WS30PM	**RDMT-TX**	**TN6540**	RDPT-MMX	TN6540
M3	RDHT-TX	WS30PM	**RDMT-TX**	**TN6540**	RDPT-MMX	TN6540
K1–K2	RDMW-TX	WK15CM	**RDMW-TX**	**WK15CM**	RDMW-TX	WK15CM
K3	RDHW-MH	TN2510	**RDMW-TX**	**WK15CM**	RDMW-TX	WK15CM
N1–N2	–	–	–	–	–	–
N3	–	–	–	–	–	–
S1–S2	–	–	**RDMT-TX**	**TN6540**	–	–
S3	–	–	**RDMT-TX**	**TN6540**	–	–
S4	–	–	**RDMT-TX**	**TN6540**	RDPT-MMX	TN6540
H1	RDHW-MH	TN2510	**RDHW-MH**	**TN2510**	–	–

M100 • RD12 • Recommended Starting Speeds [SFM]

Material Group		THM			TN6525			TN6540			WP35CM		
P	1	–	–	–	1340	**1045**	925	1180	**925**	785	1790	**1555**	1460
	2	–	–	–	1045	**830**	710	830	**630**	550	1105	**1000**	905
	3	–	–	–	925	**710**	610	710	**550**	450	1000	**905**	805
	4	–	–	–	770	**550**	475	590	**430**	355	750	**690**	630
	5	–	–	–	1025	**770**	650	785	**590**	490	1025	**905**	830
	6	–	–	–	670	**535**	430	535	**395**	335	630	**535**	430
M	1	–	–	–	630	**395**	260	430	**260**	200	805	**725**	610
	2	–	–	–	395	**260**	155	260	**155**	140	725	**630**	550
	3	–	–	–	415	**260**	180	275	**155**	140	570	**510**	450
K	1	390	**295**	245	905	**805**	725	725	**670**	590	1165	**1045**	940
	2	410	**325**	225	710	**630**	590	570	**510**	450	925	**830**	750
	3	425	**310**	195	590	**535**	475	510	**475**	415	770	**690**	630
N	1	2950	**1965**	1640	–	–	–	–	–	–	–	–	–
	2	2245	**1525**	1260	–	–	–	–	–	–	–	–	–
	3	1475	**915**	655	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	155	**120**	95	–	–	–
	2	–	–	–	–	–	–	80	**60**	40	–	–	–
	3	–	–	–	–	–	–	235	**140**	95	–	–	–
	4	–	–	–	–	–	–	200	**95**	80	260	**200**	130
H	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

M100 • RD12 • Recommended Starting Speeds [SFM]

Material Group		TTM08			WK15CM			WS30PM			WS40PM		
P	1	750	**655**	620	–	–	–	–	–	–	–	–	–
	2	635	**555**	455	–	–	–	–	–	–	–	–	–
	3	590	**490**	410	–	–	–	–	–	–	–	–	–
	4	520	**425**	340	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–	560	**475**	395
	6	–	–	–	–	–	–	–	–	–	490	**360**	260
M	1	–	–	–	–	–	–	890	**785**	725	690	**560**	460
	2	–	–	–	–	–	–	805	**710**	570	590	**475**	395
	3	–	–	–	–	–	–	610	**535**	415	475	**360**	280
K	1	–	–	–	1655	**1520**	1340	–	–	–	–	–	–
	2	–	–	–	1320	**1165**	1080	–	–	–	–	–	–
	3	–	–	–	1105	**985**	905	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	2	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	3	–	–	–	–	–	–	215	**180**	120	165	**130**	80
	4	–	–	–	–	–	–	335	**235**	155	195	**165**	100
H	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M100 • RD12 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .236 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-TX	.014	**.013**	.022	.010	**.009**	.016	.007	**.007**	.012	.006	**.006**	.010	.006	**.006**	.009	RDHT-TX
RDMT-TX	.014	**.016**	.027	.010	**.012**	.020	.007	**.009**	.015	.006	**.008**	.013	.006	**.007**	.012	RDMT-TX
RDPT-MMX	.014	**.023**	.037	.010	**.016**	.026	.007	**.012**	.020	.006	**.011**	.017	.006	**.010**	.016	RDPT-MMX
RDHW-MH	.014	**.027**	.042	.010	**.020**	.031	.007	**.015**	.023	.006	**.013**	.020	.006	**.012**	.018	RDHW-MH
RDMW-TX	.014	**.027**	.046	.010	**.020**	.033	.007	**.015**	.024	.006	**.013**	.021	.006	**.012**	.019	RDMW-TX

At .118 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-TX	.016	**.015**	.025	.011	**.011**	.018	.009	**.008**	.014	.007	**.007**	.012	.007	**.007**	.011	RDHT-TX
RDMT-TX	.016	**.019**	.032	.011	**.014**	.023	.009	**.010**	.017	.007	**.009**	.015	.007	**.008**	.014	RDMT-TX
RDPT-MMX	.016	**.026**	.043	.011	**.019**	.031	.009	**.014**	.023	.007	**.012**	.020	.007	**.011**	.018	RDPT-MMX
RDHW-MH	.016	**.032**	.049	.011	**.023**	.035	.009	**.017**	.026	.007	**.015**	.023	.007	**.014**	.021	RDHW-MH
RDMW-TX	.016	**.032**	.053	.011	**.023**	.038	.009	**.017**	.028	.007	**.015**	.025	.007	**.014**	.022	RDMW-TX

At .059 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-TX	.021	**.020**	.033	.015	**.014**	.024	.011	**.011**	.018	.010	**.009**	.016	.009	**.009**	.014	RDHT-TX
RDMT-TX	.021	**.025**	.042	.015	**.018**	.030	.011	**.013**	.022	.010	**.012**	.019	.009	**.011**	.018	RDMT-TX
RDPT-MMX	.021	**.035**	.056	.015	**.025**	.040	.011	**.019**	.030	.010	**.016**	.026	.009	**.015**	.024	RDPT-MMX
RDHW-MH	.021	**.042**	.065	.015	**.030**	.046	.011	**.022**	.034	.010	**.019**	.030	.009	**.018**	.027	RDHW-MH
RDMW-TX	.021	**.042**	.070	.015	**.030**	.050	.011	**.022**	.037	.010	**.019**	.032	.009	**.018**	.029	RDMW-TX

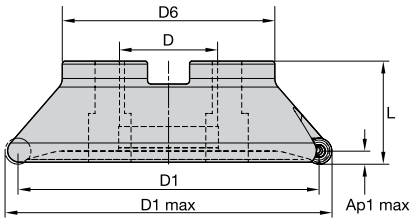
At .030 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-TX	.028	**.027**	.046	.020	**.020**	.033	.015	**.015**	.024	.013	**.013**	.021	.012	**.012**	.019	RDHT-TX
RDMT-TX	.028	**.034**	.057	.020	**.025**	.041	.015	**.018**	.031	.013	**.016**	.027	.012	**.015**	.024	RDMT-TX
RDPT-MMX	.028	**.047**	.077	.020	**.034**	.055	.015	**.025**	.041	.013	**.022**	.036	.012	**.020**	.033	RDPT-MMX
RDHW-MH	.028	**.058**	.090	.020	**.041**	.064	.015	**.031**	.047	.013	**.027**	.041	.012	**.024**	.037	RDHW-MH
RDMW-TX	.028	**.058**	.097	.020	**.041**	.068	.015	**.031**	.051	.013	**.027**	.044	.012	**.024**	.040	RDMW-TX

NOTE: Use "Light Machining" value as starting feed rate.

M100 • Shell Mills • iC16 • Inch





		D1 max		D1		D		D6		L		Ap1 max								
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
2646723	M100D200Z04S075RC16	50,80	2.000	34,79	1.370	19,05	.750	43,18	1.700	41,40	1.630	8,00	.315	4	12.0	15000	Yes	0,27	.60

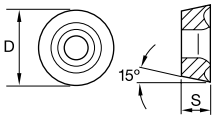
NOTE: All spare parts except the insert screws must be ordered separately.

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M100 • RDMT-M0TX • RD1605..



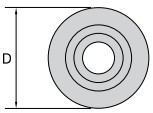


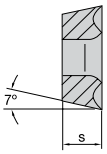
● first choice
○ alternate choice

| | | |

M100 • RCMT-M0TX • RC1606..







● first choice
○ alternate choice

P			●	●	●		●	○	●
M			○	●			●	●	●
K		○	○	○		●	○		
N		●							○
S				●			○	●	●
H								○	

catalog number	number of indexes	D mm	D in	S mm	S in	hm mm	hm in	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
RCMT1606M0TX	6	16,00	.630	6,35	.250	0,24	.009	-	2957535	2957427	-	5427442	-	-	-
RCMT1606M0TX	6	16,00	.630	6,35	.250	–	–	-	-	-	-	-	6924077	-	-

M100 • RD1605 • Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	RDMT-TX	TN6525	**RDMT-TX**	**TN6540**	RDMT-TX	TN6540
P3–P4	RDMT-TX	TN6525	**RDMW-TX**	**TN6540**	RDMW-TX	TN6540
P5–P6	RDMT-TX	WP35CM	**RDMT-TX**	**WP35CM**	RDMT-TX	WP35CM
M1–M2	RDMT-TX	TN6525	**RDMT-TX**	**TN6540**	RDMT-TX	TN6540
M3	RDMT-TX	TN6525	**RDMT-TX**	**TN6540**	RDMT-TX	TN6540
K1–K2	RDMW-TX	TN2510	**RDMW-TX**	**WP35CM**	RDMW-TX	WP35CM
K3	RDMW-TX	TN2510	**RDMW-TX**	**WP35CM**	RDMW-TX	WP35CM
N1–N2	–	–	**–**	**–**	–	–
N3	–	–	**–**	**–**	–	–
S1–S2	–	–	**RDMT-TX**	**TN6540**	–	–
S3	–	–	**RDMT-TX**	**TN6540**	–	–
S4	–	–	**RDMT-TX**	**TN6540**	RDMT-TX	TN6540
H1	RDMW-TX	TN2510	**RDMW-TX**	**TN2510**	–	–

M100 • RD1605 • Recommended Starting Speeds [SFM]

Material Group		THM			TN6525			TN6540			WP35CM		
P	1	–	**–**	–	1340	**1045**	925	1180	**925**	785	1790	**1555**	1460
	2	–	**–**	–	1045	**830**	710	830	**630**	550	1105	**1000**	905
	3	–	**–**	–	925	**710**	610	710	**550**	450	1000	**905**	805
	4	–	**–**	–	770	**550**	475	590	**430**	355	750	**690**	630
	5	–	**–**	–	1025	**770**	650	785	**590**	490	1025	**905**	830
	6	–	**–**	–	670	**535**	430	535	**395**	335	630	**535**	430
M	1	–	**–**	–	630	**395**	260	430	**260**	200	805	**725**	610
	2	–	**–**	–	395	**260**	155	260	**155**	140	725	**630**	550
	3	–	**–**	–	415	**260**	180	275	**155**	140	570	**510**	450
K	1	390	**295**	245	905	**805**	725	725	**670**	590	1165	**1045**	940
	2	410	**325**	225	710	**630**	590	570	**510**	450	925	**830**	750
	3	425	**310**	195	590	**535**	475	510	**475**	415	770	**690**	630
N	1	2950	**1965**	1640	–	**–**	–	–	**–**	–	–	**–**	–
	2	2245	**1525**	1260	–	**–**	–	–	**–**	–	–	**–**	–
	3	1475	**915**	655	–	**–**	–	–	**–**	–	–	**–**	–
S	1	–	**–**	–	–	**–**	–	155	**120**	95	–	**–**	–
	2	–	**–**	–	–	**–**	–	80	**60**	40	–	**–**	–
	3	–	**–**	–	–	**–**	–	235	**140**	95	–	**–**	–
	4	–	**–**	–	–	**–**	–	200	**95**	80	260	**200**	130
H	1	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–

M100 • RD1605 • Recommended Starting Speeds [SFM]

Material Group		TTM08			WK15CM			WS30PM			WS40PM		
P	1	750	**655**	620	–	–	–	–	–	–	–	–	–
	2	635	**555**	455	–	–	–	–	–	–	–	–	–
	3	590	**490**	410	–	–	–	–	–	–	–	–	–
	4	520	**425**	340	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–	560	**475**	395
	6	–	–	–	–	–	–	–	–	–	490	**360**	260
M	1	–	–	–	–	–	–	890	**785**	725	690	**560**	460
	2	–	–	–	–	–	–	805	**710**	570	590	**475**	395
	3	–	–	–	–	–	–	610	**535**	415	475	**360**	280
K	1	–	–	–	1655	**1520**	1340	–	–	–	–	–	–
	2	–	–	–	1320	**1165**	1080	–	–	–	–	–	–
	3	–	–	–	1105	**985**	905	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	2	–	–	–	–	–	–	180	**155**	120	130	**115**	80
	3	–	–	–	–	–	–	215	**180**	120	165	**130**	80
	4	–	–	–	–	–	–	335	**235**	155	195	**165**	100
H	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M100 • RD1605 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .315 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHX-TX	.005	**.014**	.027	.003	**.010**	.020	.002	**.007**	.015	.002	**.006**	.013	.002	**.006**	.012	RDHX-TX
RDMT-TX	.009	**.016**	.033	.007	**.012**	.024	.005	**.009**	.018	.004	**.008**	.016	.004	**.007**	.014	RDMT-TX
RDMW-TX	.009	**.020**	.041	.007	**.015**	.030	.005	**.011**	.022	.004	**.010**	.019	.004	**.009**	.018	RDMW-TX

At .157 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHX-TX	.005	**.016**	.032	.004	**.011**	.023	.003	**.008**	.017	.002	**.007**	.015	.002	**.007**	.014	RDHX-TX
RDMT-TX	.010	**.019**	.038	.008	**.014**	.028	.006	**.010**	.021	.005	**.009**	.018	.005	**.008**	.016	RDMT-TX
RDMW-TX	.010	**.024**	.048	.008	**.017**	.034	.006	**.013**	.026	.005	**.011**	.022	.005	**.010**	.020	RDMW-TX

At .079 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHX-TX	.007	**.021**	.042	.005	**.015**	.030	.004	**.011**	.022	.003	**.010**	.019	.003	**.009**	.018	RDHX-TX
RDMT-TX	.014	**.025**	.050	.010	**.018**	.036	.007	**.013**	.027	.006	**.012**	.023	.006	**.011**	.021	RDMT-TX
RDMW-TX	.014	**.031**	.063	.010	**.022**	.045	.007	**.017**	.034	.006	**.015**	.029	.006	**.013**	.027	RDMW-TX

At .039 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHX-TX	.009	**.028**	.057	.007	**.020**	.041	.005	**.015**	.030	.004	**.013**	.027	.004	**.012**	.024	RDHX-TX
RDMT-TX	.019	**.034**	.070	.014	**.025**	.050	.010	**.018**	.037	.009	**.016**	.032	.008	**.015**	.029	RDMT-TX
RDMW-TX	.019	**.043**	.088	.014	**.031**	.062	.010	**.023**	.046	.009	**.020**	.040	.008	**.018**	.037	RDMW-TX

NOTE: Use "Light Machining" value as starting feed rate.

M100 • RC1606 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	...TX	TN6525	**...43M**	**TN6540**	...43M	TN6540
P3–P4	...TX	TN6525	**...TX**	**TN6540**	...43M	TN6540
P5–P6	...TX	TN6525	**...TX**	**WP35CM**	...TX	WP35CM
M1–M2	...TX	TN6525	**...TX**	**TN6540**	...TX	TN6540
M3	...TX	TN6525	**...TX**	**TN6540**	...TX	TN6540
K1–K2	...43	TN2510	**...TX**	**WK15CM**	...TX	WK15CM
K3	...TX	TN6525	**...TX**	**WK15CM**	...TX	WK15CM
N1–N2	–	–	**–**	**–**	–	–
N3	–	–	**–**	**–**	–	–
S1–S2	–	–	**–**	**–**	–	–
S3	–	–	**–**	**–**	–	–
S4	...43M	TN6540	**...TX**	**TN6540**	...TX	TN6540
H1	–	–	**...TX**	**TN2510**	–	–

M100 • RC1606 • Recommended Starting Speeds [SFM]

Material Group		THM			TN6525			TN6540			WP35CM		
P	1	–	**–**	–	1340	**1045**	925	1180	**925**	785	1790	**1555**	1460
	2	–	**–**	–	1045	**830**	710	830	**630**	550	1105	**1000**	905
	3	–	**–**	–	925	**710**	610	710	**550**	450	1000	**905**	805
	4	–	**–**	–	770	**550**	475	590	**430**	355	750	**690**	630
	5	–	**–**	–	1025	**770**	650	785	**590**	490	1025	**905**	830
	6	–	**–**	–	670	**535**	430	535	**395**	335	630	**535**	430
M	1	–	**–**	–	630	**395**	260	430	**260**	200	805	**725**	610
	2	–	**–**	–	395	**260**	155	260	**155**	140	725	**630**	550
	3	–	**–**	–	415	**260**	180	275	**155**	140	570	**510**	450
K	1	390	**295**	245	905	**805**	725	725	**670**	590	1165	**1045**	940
	2	410	**325**	225	710	**630**	590	570	**510**	450	925	**830**	750
	3	425	**310**	195	590	**535**	475	510	**475**	415	770	**690**	630
N	1	2950	**1965**	1640	–	**–**	–	–	**–**	–	–	**–**	–
	2	2245	**1525**	1260	–	**–**	–	–	**–**	–	–	**–**	–
	3	1475	**915**	655	–	**–**	–	–	**–**	–	–	**–**	–
S	1	–	**–**	–	–	**–**	–	155	**120**	95	–	**–**	–
	2	–	**–**	–	–	**–**	–	80	**60**	40	–	**–**	–
	3	–	**–**	–	–	**–**	–	235	**140**	95	–	**–**	–
	4	–	**–**	–	–	**–**	–	200	**95**	80	260	**200**	130
H	1	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–

Material Group		TTM08			WK15CM			WS30PM			WS40PM		
P	1	750	**655**	620	–	**–**	–	–	**–**	–	–	**–**	–
	2	635	**555**	455	–	**–**	–	–	**–**	–	–	**–**	–
	3	590	**490**	410	–	**–**	–	–	**–**	–	–	**–**	–
	4	520	**425**	340	–	**–**	–	–	**–**	–	–	**–**	–
	5	–	**–**	–	–	**–**	–	–	**–**	–	560	**475**	395
	6	–	**–**	–	–	**–**	–	–	**–**	–	490	**360**	260
M	1	–	**–**	–	–	**–**	–	890	**785**	725	690	**560**	460
	2	–	**–**	–	–	**–**	–	805	**710**	570	590	**475**	395
	3	–	**–**	–	–	**–**	–	610	**535**	415	475	**360**	280
K	1	–	**–**	–	1655	**1520**	1340	–	**–**	–	–	**–**	–
	2	–	**–**	–	1320	**1165**	1080	–	**–**	–	–	**–**	–
	3	–	**–**	–	1105	**985**	905	–	**–**	–	–	**–**	–
N	1	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
S	1	–	**–**	–	–	**–**	–	180	**155**	120	130	**115**	80
	2	–	**–**	–	–	**–**	–	180	**155**	120	130	**115**	80
	3	–	**–**	–	–	**–**	–	215	**180**	120	165	**130**	80
	4	–	**–**	–	–	**–**	–	335	**235**	155	195	**165**	100
H	1	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

M100 • RC1606 • Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .315 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
...43	.018	**.024**	.037	.013	**.017**	.027	.010	**.013**	.020	.009	**.011**	.017	.008	**.010**	.016	...43
...TX	.018	**.027**	.044	.013	**.020**	.032	.010	**.015**	.024	.009	**.013**	.021	.008	**.012**	.019	...TX

At .157 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
...43	.021	**.028**	.043	.015	**.020**	.031	.011	**.015**	.023	.010	**.013**	.020	.009	**.012**	.018	...43
...TX	.021	**.032**	.051	.015	**.023**	.037	.011	**.017**	.027	.010	**.015**	.024	.009	**.014**	.022	...TX

At .079 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
...43	.028	**.036**	.056	.020	**.026**	.040	.015	**.019**	.030	.013	**.017**	.026	.012	**.016**	.024	...43
...TX	.028	**.042**	.067	.020	**.030**	.048	.015	**.022**	.036	.013	**.019**	.031	.012	**.018**	.028	...TX

At .039 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
...43	.038	**.050**	.078	.027	**.036**	.055	.020	**.027**	.041	.018	**.023**	.036	.016	**.021**	.033	...43
...TX	.038	**.058**	.093	.027	**.041**	.066	.020	**.031**	.049	.018	**.027**	.042	.016	**.024**	.039	...TX

NOTE: Use "Light Machining" value as starting feed rate.

General Milling and ISO Inserts

Additional Inserts

Use general milling and ISO inserts in the latest WIDIA™ grades as an economical solution for improved productivity in face milling, shoulder milling, and copy milling applications.

Inserts offered in pressed and sintered to size (PSTS) and ground versions for economical and precise solutions.

Available in the latest Victory™ grades: WK15CM, WP35CM, and WU20PM.

Inserts can be used in existing tool bodies for lower tooling costs.

Materials include all types of steel, stainless steel, cast iron, and nodular iron.



The general milling and ISO inserts provide higher performance for applications in automotive, heavy equipment, railroad components, and general engineering parts while being cost effective.

WK15CM

K

WK15CM is a wear-resistant grade with balanced toughness for general milling of cast irons. Best results in dry machining, but can also be used wet.

WP35CM

P K

WP35CM has a wide range of applications in general and rough milling of steels and cast iron. Performs best in dry, but can also be used under wet conditions.

WU20PM

P M K N S H

WU20PM is a universal grade for machining of steel, stainless steel, and high-temperature alloys. Also suitable for machining of gray and nodular irons. Resists breakage and offers improved wear resistance and increased strength. Can be used for both dry and wet machining.

HIGHER PERFORMANCE AT LOWER COST

PRODUCT

SERIES
General Milling/
ISO Inserts

INDUSTRY

TRANSPORTATION

GENERAL ENGINEERING

ENERGY

APPLICATIONS

FACE MILLING

SIDE MILLING/ SHOULDER MILLING

PERFORMANCE

Using proven WIDIA™ grades, improve productivity in all types of steel, stainless steel, cast iron, and nodular iron workpiece materials.

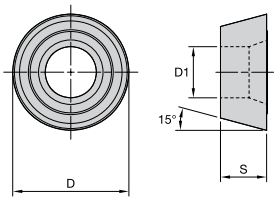
COST EFFECTIVE

Inserts can be used in existing cutter bodies reducing tooling costs.



Indexable Milling • Copy Milling ISO Inserts • RDMX





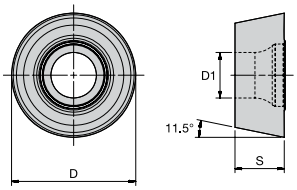
● first choice
○ alternate choice

P	●
M	●
K	○
N	○
S	○
H	○

ISO catalog number	ANSI catalog number	cutting edges	D1 mm	D1 in	D mm	D in	S mm	S in	hm mm	hm in	WU20PM
RDMX10T3M0	RDMX10T3M0	1	4,40	0	10	.394	3,97	.156	0,05	.002	2567081
RDMX1604M0T	RDMX1604M0T	1	5,50	0	16	.630	4,76	.188	0,06	.002	4147744

Indexable Milling • Copy Milling ISO Inserts • RPMT





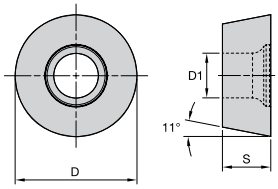
● first choice
○ alternate choice

P	●
M	●
K	○
N	○
S	○
H	○

ISO catalog number	ANSI catalog number	cutting edges	D1 mm	D1 in	D mm	D in	S mm	S in	hm mm	hm in	WU20PM
RPMT1204M0	RPMT1204M0	1	4,40	0	12	.472	4,76	.188	0,05	.002	4144073

Indexable Milling • Copy Milling ISO Inserts • RPMW





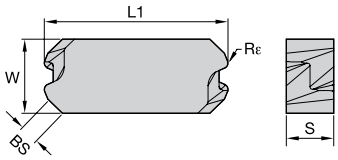
● first choice
○ alternate choice

P	●	
M	●	
K	○	
N	○	
S	○	
H	○	

ISO catalog number	ANSI catalog number	cutting edges	D1 mm	D1 in	D mm	D in	S mm	S in	hm mm	hm in	WU20PM
RPMW1003M0	RPMW1003M0	1	4,60	0	10	.394	3,18	.125	0,05	.002	3367756
RPMW1204M0	RPMW1204M0	1	4,40	0	12	.472	4,76	.188	0,05	.002	3350976

Indexable Milling • Face Milling ISO Inserts • LNCX





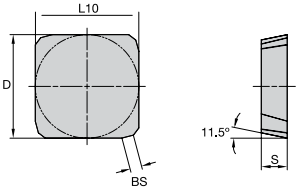
● first choice
○ alternate choice

P		●												
M		●												
K		○	●											
N														
S		○												
H														

ISO catalog number	ANSI catalog number	cutting edges	W mm	W in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	WP35CM	WK15CM
LNCX1806AZR11	LNCX1806AZR11	4	10,00	.394	6,40	.252	2,16	.085	0,75	.030	0,05	.002	-	5343199
LNCX1806AZR11	LNCX1806AZR11	4	10,00	.394	6,40	.252	2,16	.085	0,75	.030	0,06	.002	6852433	-

Indexable Milling • Face Milling ISO Inserts • SPAN





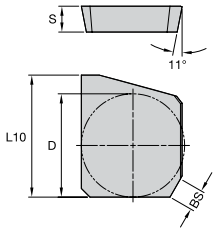
● first choice
○ alternate choice

P		●	●											
M		●	●											
K		○	○											
N			○											
S		○	○											
H			○											

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	hm mm	hm in	WP35CM	WU20PM
SPAN1203EDL	SPAN1203EDL	4	13	.500	12,70	.500	3,18	.125	1,03	.041	0,05	.002	-	3997503
SPAN1203EDR	SPAN1203EDR	4	13	.500	12,70	.500	3,18	.125	1,03	.041	0,05	.002	6877203	-
SPAN1203EDR	SPAN1203EDR	4	13	.500	12,70	.500	3,18	.125	1,03	.041	0,06	.002	-	2557457

Indexable Milling • Face Milling ISO Inserts • SPCX





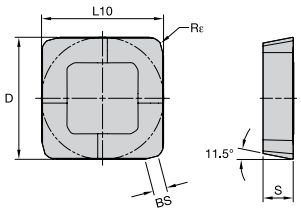
● first choice
○ alternate choice

P	●
M	
K	●
N	●
S	
H	

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	hm mm	hm in	THM-F
SPCX1203EDL	SPCX1203EDL	1	13	.500	15,00	.591	3,18	.125	0,02	.001	2557024
SPCX1203EDR	SPCX1203EDR	1	13	.500	15,00	.591	3,18	.125	0,02	.001	2557061

Indexable Milling • Face Milling ISO Inserts • SPKR





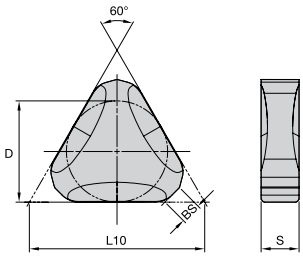
● first choice
○ alternate choice

P	●
M	●
K	○
N	○
S	○
H	○

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	WU20PM
SPKR1203EDLMS	SPKR1203EDLMS	4	13	.500	12,70	.500	3,18	.125	1,40	.055	1,60	.063	0,05	.002	2558319
SPKR1203EDRMS	SPKR1203EDRMS	4	13	.500	12,70	.500	3,18	.125	1,40	.055	1,60	.063	0,05	.002	2561005

Indexable Milling • Face Milling ISO Inserts • TNHF





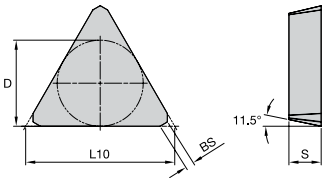
● first choice
○ alternate choice

P	M	K	N	S	H
		●			

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	hm mm	hm in	WK15CM
TNHF1204ANCA	TNHF1204ANCA	6	13	.500	22,00	.866	4,76	.188	2,58	.102	0,05	.002	6008686

Indexable Milling • Face Milling ISO Inserts • TPAN





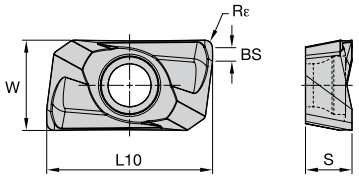
● first choice
○ alternate choice

P	M	K	N	S	H
●	●	○		○	
●	●	○	○	○	○

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10 mm	L10 in	S mm	S in	BS mm	BS in	hm mm	hm in	WP35CM	WU20PM
TPAN1103PPN	TPAN1103PPN	3	6	.250	10,96	.432	3,18	.125	0,71	.028	0,04	.002	6877241	2557715
TPAN1603PDR	TPAN1603PDR	3	10	.375	16,45	.648	3,18	.125	0,03	.790	0,05	.002	6877242	2568655
TPAN1603PPN	TPAN1603PPN	3	10	.375	16,45	.648	3,18	.125	1,17	.046	0,05	.002	6877204	2557665
TPAN2204PPN	TPAN2204PPN	3	13	.500	21,96	.865	4,76	.188	1,24	.049	0,06	.002	6877210	6869240
TPAN2204PDR	TPAN2204PDR	3	13	.500	21,96	.865	4,76	.188	1,35	.053	0,06	.002	6801236	-
TPAN2204PDR	TPAN2204PDR	3	13	.500	21,96	.865	4,76	.188	1,35	.053	0,07	.003	-	2557789
TPAN22T3AER	TPAN22T3AER	3	13	.512	22,49	.885	3,97	.156	2,11	.083	0,06	.002	6877243	-

Indexable Milling • Shoulder Milling ISO Inserts • APMT





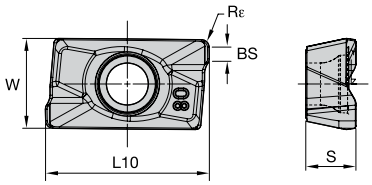
● first choice
○ alternate choice

P	●
M	●
K	○
N	○
S	○
H	○

ISO catalog number	ANSI catalog number	cutting edges	L10 mm	L10 in	W mm	W in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	WU20PM
APMT1135PDR	APMT1135PDR	2	11,20	.441	5,95	.234	3,50	.138	–	–	0,80	.031	0,05	.002	6196890
APMT1604PDR	APMT1604PDR	2	17,00	.669	9,24	.364	4,76	.188	1,38	.054	0,80	.031	0,05	.002	6196991

Indexable Milling • Shoulder Milling ISO Inserts • APPT-MM





● first choice
○ alternate choice

P	●
M	●
K	○
N	○
S	○
H	○

ISO catalog number	ANSI catalog number	cutting edges	L10 mm	L10 in	W mm	W in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	WU20PM
APPT100308PDSRMM	APPT100308PDSRMM	2	11,10	.437	6,70	.263	3,56	.140	–	–	0,80	.031	0,07	.003	6820930
APPT160408PDSRMM	APPT160408PDSRMM	2	–	–	9,41	.371	5,26	.207	1,49	.059	0,79	.031	0,06	.002	6443662



widia.com

WIDIA™

Solid End Milling

WIDIA Multi-Purpose End Mills B–B91

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VariMill I B178–B200

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HSS End Mills B354–B370

Multi-Purpose End Mills • Selection Guide • Inch

	WIDIA Solid End Milling Portfolio						
	WCE4	WCE4	WCE4	WCE4	WCE4	WCE4	WCE4
							
UOM	Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series	W401	W401	W401	W401	W401	W401	W411
Page	B24	B28	B32	B25	B29	B33	B24
Flute	4	4	4	4	4	4	4
Diameter D1	1/8—7/16"	1/8—7/16"	1/8—7/16"	1/2—1"	1/2—1"	1/2—1"	1/8—7/16"
Shank							
Length of Cut	Regular	Regular	Regular	Regular	Regular	Regular	Long
Corner Style							
Chamfer Size	—	.010—.020"	—	—	.020"	—	
Radius Sizes	—	—	.015—.090"	—	—	.030—.120"	—
Helix Angle	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H

Multi-Purpose End Mills • Selection Guide • Inch

	WIDIA Solid End Milling Portfolio						
	WCE4	WCE4	WCE4	WCE4	WCE4	WCE4	WCE4
							
UOM	Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series	W411	W411	W411	W411	W411	W421	W421
Page	B28	B32	B26	B30	B34	B25	B29
Flute	4	4	4	4	4	4	4
Diameter D1	1/8—7/16"	1/8—7/16"	1/2—1"	1/2—1"	1/2—1"	1/4—7/16"	1/4—7/16"
Shank							
Length of Cut	Long	Long	Long	Long	Long	Extended	Extended
Corner Style							
Chamfer Size	.010—.020"	—	—	.020"	—	—	.016—.020"
Radius Sizes	—	.015—.090"	—	—	.015—.090"	—	—
Helix Angle	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H

Multi-Purpose End Mills • Selection Guide • Inch

	WIDIA Solid End Milling Portfolio						
	WCE4	WCE4	WCE4	WCE4	WCE4	WCE4	WCE4
							
UOM	Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series	W421	W421	W421	W421	W431	W431	W431
Page	B33	B26	B30	B34	B27	B31	B35
Flute	4	4	4	4	4	4	4
Diameter D1	1/4—3/8"	1/2—3/4"	1/2—1"	1/2—1"	1/2—1"	1/2—1"	1/2"—1"
Shank							
Length of Cut	Extended	Extended	Extended	Extended	X-Long	X-Long	X-Long
Corner Style							
Chamfer Size	—	—	.020"	—	—	.020"	—
Radius Sizes	.015—.090"	—	—	.030—.120"	—	—	.030—.120"
Helix Angle	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H

Multi-Purpose End Mills • Selection Guide • Inch

	WIDIA Solid End Milling Portfolio					
	WCE4	WCE4	WCE4	WCE4	WCE4	WCE4
						
UOM	Inch	Inch	Inch	Inch	Inch	Inch
Series	W441	W441	W441	W40B	W40B	W41B
Page	B27	B31	B35	B36	B36	B37
Flute	4	4	4	4	4	4
Diameter D1	1/2"	1/2"	1/2"	1/8—3/8"	1/2—1"	1/2"
Shank						
Length of Cut	X-Long	X-Long	X-Long	Regular	Regular	Long
Corner Style						
Chamfer Size	—	.020"	—	—	—	—
Radius Sizes	—	—	.030—.120"	—	—	—
Helix Angle	37° / 39°	37° / 39°	37° / 39°	38°	38°	38°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No
Materials	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H

Multi-Purpose End Mills • Selection Guide • Inch

	WIDIA Solid End Milling Portfolio				
	GP	GP	GP	GP	GP
					
UOM	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**
Series	**I2S**	**I2R**	**I2B**	**I3S**	**I3S**
Page	B48–B49	B50	B51	B52	B52
Flute	2	2	2	3	3
Diameter D1	1/64—1"	1/16—1"	1/32—1"	1/32—1"	1/32—1"
Shank					
Length of Cut	Regular	Regular	Regular	Regular	Regular
Corner Style					
Chamfer Size	—	—	—	—	—
Radius Sizes	—	.010—.125"	—	1/32—1"	1/2—1"
Helix Angle	30°	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Inch

	WIDIA Solid End Milling Portfolio			
	GP	GP	GP	GP
				
UOM	**Inch**	**Inch**	**Inch**	**Inch**
Series	**I4S**	**I4S**	**I4R**	**I4B**
Page	B53	B53	B55	B56
Flute	4	4	4	4
Diameter D1	1/64—1 1/4"	1/2—1"	1/16—1"	1/32"—1"
Shank				
Length of Cut	Regular	Regular	Regular	Regular
Corner Style				
Chamfer Size	—	—	—	—
Radius Sizes	—	—	.010—.125"	—
Helix Angle	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes
Neck	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio					
	WCE4	WCE4	WCE4	WCE4	WCE4	WCE4
						
UOM	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series	**W401**	**W401**	**W401**	**W401**	**W4N1**	**W411**
Page	B37	B38	B38	B39	B39–B40	B40
Flute	4	4	4	4	4	4
Diameter D1	3—20mm	3—20mm	3—20mm	3—20mm	3—20mm	6—20mm
Shank						
Length of Cut	Regular	Regular	Regular	Regular	Regular	Long
Corner Style						
Chamfer Size	—	—	0,40—0,50mm	0,40—0,50mm	—	0,40—0,50mm
Radius Sizes	—	—	—	—	0,2–3mm	—
Helix Angle	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	Yes	No
Materials	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio	
	WCE4	WCE4
		
UOM	Metric	Metric
Series	W4NB	W4NB
Page	B41	B41
Flute	4	4
Diameter D1	5—20mm	5—20mm
Shank		
Length of Cut	Regular	Regular
Corner Style		
Chamfer Size	—	—
Radius Sizes	—	—
Helix Angle	38°	38°
Center Cutting	Yes	Yes
Neck	Yes	Yes
Materials	P M K S H	P M K S H

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio					
	GP	GP	GP	GP	GP	GP
						
UOM	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series	**4002**	**4002**	**4012**	**4012**	**D002**	**D002**
Page	B57–B58	B57–B58	B57–B58	B57–B58	B59	B59
Flute	2	2	2	2	2	2
Diameter D1	1–20mm	1–20mm	1–20mm	1–20mm	2–20mm	2–20mm
Shank						
Length of Cut	Regular	Regular	Long	Long	Regular	Regular
Corner Style						
Chamfer Size	–	0,1–0,3mm	–	0,1–0,3mm	–	0,1–0,3mm
Radius Sizes	–	–	–	–	–	–
Helix Angle	30°	30°	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio						
	GP	GP	GP	GP	GP	GP	GP
							
UOM	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series	**D002**	**D002**	**D002**	**D002**	**D002**	**D002**	**2819**
Page	B59	B59	B59	B59	B59	B59	B60
Flute	2	2	2	2	2	2	2
Diameter D1	12—20mm	12—20mm	2,5—20mm	2,5—20mm	2,5—20mm	2,5—20mm	3—20mm
Shank							
Length of Cut	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style							
Chamfer Size	—	0,1—0,3mm	—	0,1—0,3mm	—	0,1—0,3mm	—
Radius Sizes	—	—	—	—	—	—	—
Helix Angle	30°	30°	30°	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio						
	GP	GP	GP	GP	GP	GP	GP
							
UOM	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series	**2819**	**4001**	**4011**	**4021**	**D001**	**D011**	**2838**
Page	B60	B61	B61	B61	B62	B62	B62
Flute	2	2	2	2	2	2	2
Diameter D1	3–20mm	1–20mm	1–20mm	1–20mm	2–20mm	3–20mm	2–16mm
Shank							
Length of Cut	Regular	Regular	Long	Extended	Regular	Long	Regular
Corner Style							
Chamfer Size	0,1–0,3mm	–	–	–	–	–	–
Radius Sizes	–	–	–	–	–	–	–
Helix Angle	30°	30°	30°	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio						
	GP	GP	GP	GP	GP	GP	GP
							
UOM	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series	**4003..S**	**4003..S**	**4013..S**	**4013..S**	**4003**	**4003**	**4013**
Page	B63	B63	B63	B63	B64	B64	B64
Flute	3	3	3	3	3	3	3
Diameter D1	1—20mm	6—16mm	3—20mm	3—20mm	4—16mm	6—16mm	4—20mm
Shank							
Length of Cut	Reguar	Regular	Regular	Regular	Regular	Regular	Long
Corner Style							
Chamfer Size	–	–	–	–	–	–	–
Radius Sizes	–	–	–	–	–	–	–
Helix Angle	30°	30°	30°	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio						
	GP	GP	GP	GP	GP	GP	GP
							
UOM	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series	**4013**	**D003..S**	**D003..S**	**D013..S**	**D013..S**	**D003**	**D003**
Page	B64	B65	B65	B65	B65	B66	B66
Flute	3	3	3	3	3	3	3
Diameter D1	5—20mm	2—20mm	2—20mm	2—20mm	2—20mm	4—20mm	4—20mm
Shank							
Length of Cut	Long	Regular	Regular	Long	Long	Regular	Regular
Corner Style							
Chamfer Size	–	–	–	–	–	0,1—0,3mm	0,1—0,3mm
Radius Sizes	–	–	–	–	–	–	–
Helix Angle	30°	30°	30°	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio						
	GP	GP	GP	GP	GP	GP	GP
							
UOM	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series	**D013**	**D013**	**4004**	**4004**	**4004**	**4014**	**4014**
Page	B66	B66	B67–B68	B67–B68	B69	B67–B68	B67–B68
Flute	3	3	4	4	4	4	4
Diameter D1	4—20mm	4—20mm	1—20mm	1—20mm	2—20mm	3—20mm	3—20mm
Shank							
Length of Cut	Long	Long	Regular	Regular	Regular	Long	Long
Corner Style							
Chamfer Size	0,1—0,3mm	0,1—0,3mm	—	0,1—0,3mm	—	—	0,1—0,3mm
Radius Sizes	—	—	—	—	0,5–1mm	—	—
Helix Angle	30°	30°	30°	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio						
	GP	GP	GP	GP	GP	GP	GP
							
UOM	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series	**4014**	**4024**	**4024**	**4024**	**D004**	**D004**	**D004**
Page	B69	B67–B68	B67–B68	B69	B70–B71	B70–B71	B70–B71
Flute	4	4	4	4	4	4	4
Diameter D1	3—20mm	3—20mm	3—20mm	3—20mm	2—20mm	4—20mm	12—20mm
Shank							
Length of Cut	Long	Extended	Extended	Extended	Regular	Regular	Regular
Corner Style							
Chamfer Size	—	—	0,1—0,3mm	—	—	0,1—0,3mm	—
Radius Sizes	0,5—1mm	—	—	0,5—1mm	—	—	—
Helix Angle	30°	30°	30°	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio						
	GP	GP	GP	GP	GP	GP	GP
							
UOM	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series	**D004**	**D014**	**D014**	**D014**	**D014**	**2528**	**2528**
Page	B70–B71	B70–B71	B70–B71	B70–B71	B70–B71	B72	B72
Flute	4	4	4	4	4	4	4
Diameter D1	12–20mm	2–20mm	4–20mm	12–20mm	12–20mm	4–20mm	4–20mm
Shank							
Length of Cut	Regular	Long	Long	Long	Long	Regular	Regular
Corner Style							
Chamfer Size	0,1–0,3mm	–	0,1–0,3mm	–	0,1–0,3mm	–	0,1–0,3mm
Radius Sizes	–	–	–	–	–	–	–
Helix Angle	30°	30°	30°	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck	No	No	No	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N	P M K N

Multi-Purpose End Mills • Selection Guide • Metric

	WIDIA Solid End Milling Portfolio			
	GP	GP	GP	GP
				
UOM	**Metric**	**Metric**	**Metric**	**Metric**
Series	**4000**	**4010**	**D010**	**2848**
Page	B73	B73	B74	B75
Flute	4	4	4	4
Diameter D1	2—20mm	3—20mm	3—20mm	4—20mm
Shank				
Length of Cut	Regular	Long	Regular	Regular
Corner Style				
Chamfer Size	—	—	—	—
Radius Sizes	—	—	—	—
Helix Angle	30°	30°	30°	30°
Center Cutting	Yes	Yes	Yes	Yes
Neck	No	No	No	No
Materials	P M K N	P M K N	P M K N	P M K N



widia.com

WIDIA™

WCE End Mill

Versatile Solid Carbide End Mills • Roughing/Finishing

The WCE solid end milling line features an advanced geometry to enable material versatility for end users seeking a cost-effective solution while machining small batches.



WCE4, 4-flute geometry combines the asymmetrical index and variable helix features at an affordable price while ensuring material and application versatility, including demanding operations like full slots and heavy cuts.

VERSATILE

Designed for use on multiple materials, including steel, stainless steel, and cast iron.

RELIABLE

Advanced design, coating, and geometry — including asymmetrical index and variable helix — combined to improve performance and offer consistent tool life.

AFFORDABLE

Attractively priced for small-to-medium shops that change machine setup often and need to know they can count on the tool without worrying about specific geometries or grades.

AFFORDABLE PERFORMANCE

PRODUCT

GRADE

WU20PD

FLUTES

4

DIAMETER RANGE

1/8–1" (3–20mm)

CORNER CONDITIONS

Sharp Edges
Chamfered
Radiused
Ball Nose

INDUSTRY

GENERAL ENGINEERING

MATERIALS

FIRST CHOICE

P M K

SECOND CHOICE

S

APPLICATIONS



SIDE/ SHOULDER MILLING ROUGHING



SLOTTING SQUARE END



HELICAL MILLING



RAMPING BLANK



PLUNGE MILLING



3D PROFILING

VARIABLE HELIX

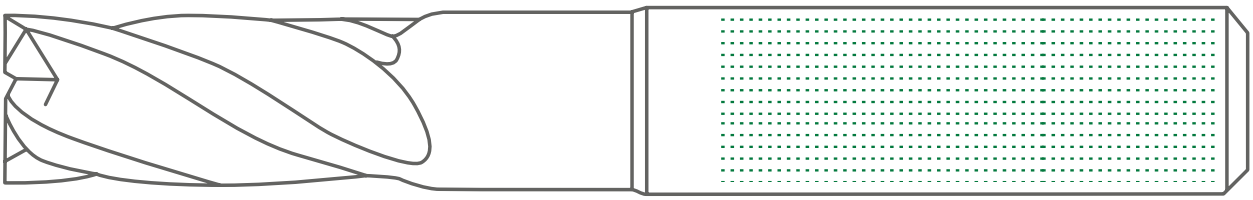
to reduce vibrations and increase overall cutting stability.

ECCENTRIC RELIEF

to provide vibration dampening and increase tool life on stainless steels.

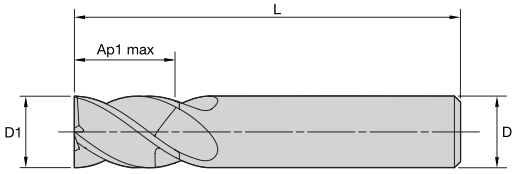
CORE APER

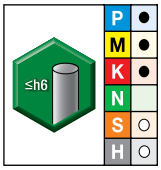
for improved chip evacuation and tool stability.



WCE4 • Series W401 • Sharp Edge • 4 Flute • Cylindrical Shank • Inch







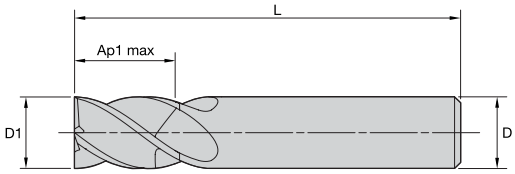
WU20PE

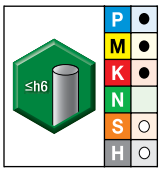
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945540	W401E03000SZT	1/8	1/8	1/4	1 1/2	4
6945591	W401E05001SZT	3/16	3/16	5/16	2	4
6945592	W401E07003SZT	1/4	1/4	3/8	2	4
6945583	W401E08004SZT	5/16	5/16	1/2	2	4
6945584	W401E10005SZT	3/8	3/8	1/2	2	4
6945696	W401E1100DSZT	7/16	7/16	5/8	2 1/2	4

WCE4 • Series W411 • Sharp Edge • 4 Flute • Cylindrical Shank • Inch







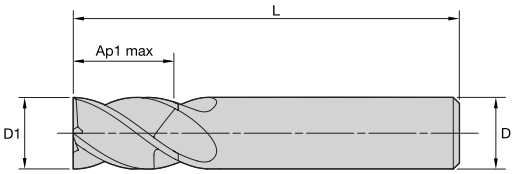
WU20PE

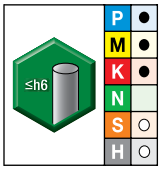
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945917	W411E03010SZT	1/8	1/8	1/2	2	4
6945593	W411E05011SZT	3/16	3/16	5/8	2 1/4	4
6945595	W411E07013SZT	1/4	1/4	3/4	2 1/2	4
6945585	W411E08014SZT	5/16	5/16	3/4	2 1/2	4
6945586	W411E10015SZT	3/8	3/8	7/8	2 1/2	4
6945711	W411E1101DSZT	7/16	7/16	7/8	2 1/2	4

WCE4 • Series W421 • Sharp Edge • 4 Flute • Cylindrical Shank • Inch







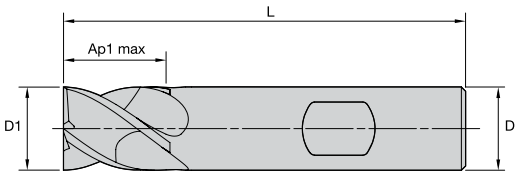
● first choice
○ alternate choice

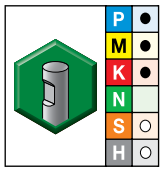
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945918	W421E07023SZT	1/4	1/4	1 1/4	3 1/4	4
6945945	W421E08024SZT	5/16	5/16	1 1/4	3 1/4	4
6945946	W421E10025SZT	3/8	3/8	1 1/2	4	4
6946188	W421E1102DSZT	7/16	7/16	2	4	4

WCE4 • Series W401 • Sharp Edge • 4 Flute • Weldon® Shank • Inch







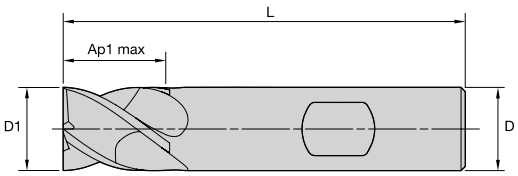
● first choice
○ alternate choice

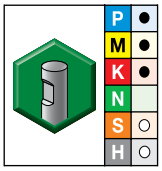
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945697	W401E13006SZW	1/2	1/2	5/8	2 1/2	4
6945698	W401E16008SZW	5/8	5/8	3/4	3	4
6945699	W401E19009SZW	3/4	3/4	7/8	3 1/2	4
6945700	W401E2500ASZW	1	1	1 1/2	4	4

WCE4 • Series W411 • Sharp Edge • 4 Flute • Weldon® Shank • Inch







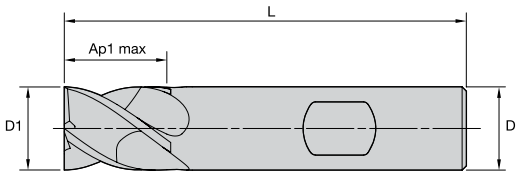
● first choice
○ alternate choice

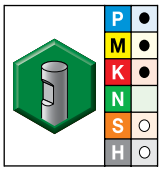
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945712	W411E13016SZW	1/2	1/2	1 1/4	3	4
6945713	W411E16018SZW	5/8	5/8	1 1/4	3 1/2	4
6945714	W411E19019SZW	3/4	3/4	1 1/2	4	4
6945715	W411E2501ASZW	1	1	2	5	4

WCE4 • Series W421 • Sharp Edge • 4 Flute • Weldon Shank • Inch







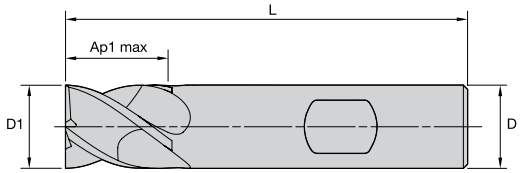
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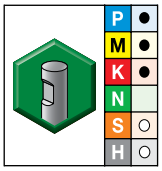
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945716	W421E13026SZW	1/2	1/2	1 1/2	4	4
6945717	W421E16028SZW	5/8	5/8	1 5/8	4 1/8	4
6945718	W421E19029SZW	3/4	3/4	2 1/4	5	4

WCE4 • Series W431 • Sharp Edge • 4 Flute • Weldon® Shank • Inch







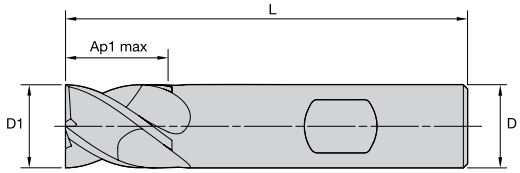
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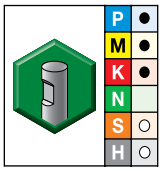
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6946189	W431E13036SZW	1/2	1/2	2	4	4
6946190	W431E19039SZW	3/4	3/4	3	6	4
6946291	W431E2503ASZW	1	1	4	7	4

WCE4 • Series W441 • Sharp Edge • 4 Flute • Weldon Shank • Inch







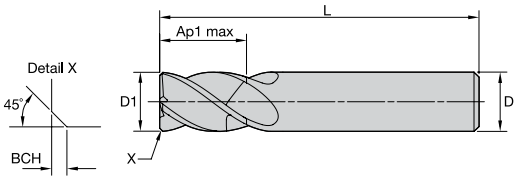
● first choice
○ alternate choice

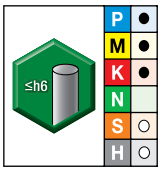
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order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6946292	W441E13046SZW	1/2	1/2	2 1/2	4 1/2	4

WCE4 • Series W401 • Chamfered • 4 Flute • Cylindrical Shank • Inch







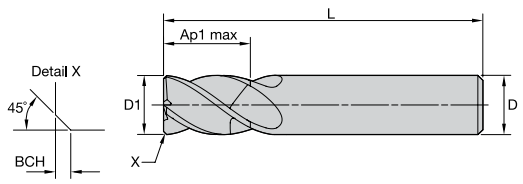
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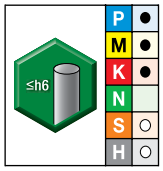
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945596	W401E03000CHT	1/8	1/8	1/4	1 1/2	.010	4
6945597	W401E05001CHT	3/16	3/16	5/16	2	.010	4
6945598	W401E07003CYT	1/4	1/4	3/8	2	.016	4
6945587	W401E08004CYT	5/16	5/16	1/2	2	.016	4
6945588	W401E10005CTT	3/8	3/8	1/2	2	.020	4
6945720	W401E1100DCTT	7/16	7/16	5/8	2 1/2	.020	4

WCE4 • Series W411 • Chamfered • 4 Flute • Cylindrical Shank • Inch







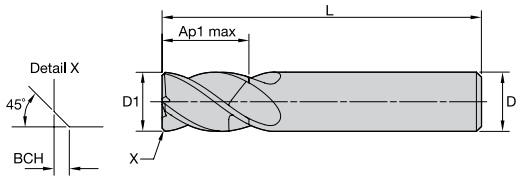
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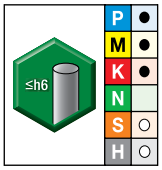
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945919	W411E03010CHT	1/8	1/8	1/2	2	.010	4
6945599	W411E05011CHT	3/16	3/16	5/8	2 1/4	.010	4
6945600	W411E07013CYT	1/4	1/4	3/4	2 1/2	.016	4
6945589	W411E08014CYT	5/16	5/16	3/4	2 1/2	.016	4
6945590	W411E10015CTT	3/8	3/8	7/8	2 1/2	.020	4
6945725	W411E1101DCTT	7/16	7/16	7/8	2 1/2	.020	4

WCE4 • Series W421 • Chamfered • 4 Flute • Cylindrical Shank • Inch







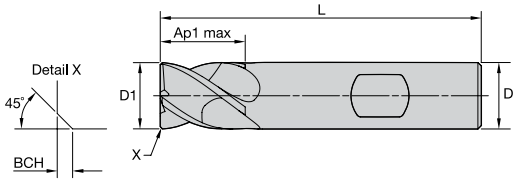
● first choice
○ alternate choice

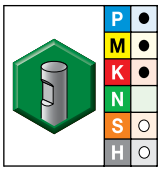
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945920	W421E07023CYT	1/4	1/4	1 1/4	3 1/4	.016	4
6945947	W421E08024CYT	5/16	5/16	1 1/4	3 1/4	.016	4
6945948	W421E10025CTT	3/8	3/8	1 1/2	4	.020	4
6946293	W421E1102DCTT	7/16	7/16	2	4	.020	4

WCE4 • Series W401 • Chamfered • 4 Flute • Weldon® Shank • Inch







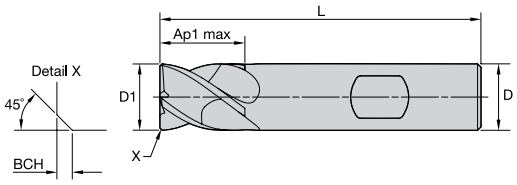
● first choice
○ alternate choice

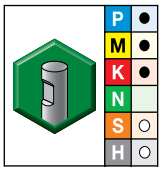
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945721	W401E13006CTW	1/2	1/2	5/8	2 1/2	.020	4
6945722	W401E16008CTW	5/8	5/8	3/4	3	.020	4
6945723	W401E19009CTW	3/4	3/4	7/8	3 1/2	.020	4
6945724	W401E2500ACTW	1	1	1 1/2	4	.020	4

WCE4 • Series W411 • Chamfered • 4 Flute • Weldon® Shank • Inch







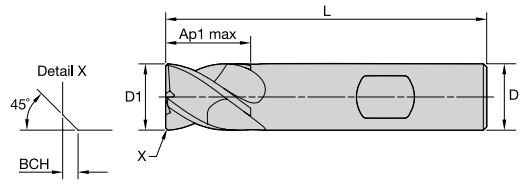
● first choice
○ alternate choice

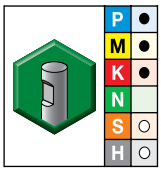
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945726	W411E13016CTW	1/2	1/2	1 1/4	3	.020	4
6945727	W411E16018CTW	5/8	5/8	1 1/4	3 1/2	.020	4
6945728	W411E19019CTW	3/4	3/4	1 1/2	4	.020	4
6945729	W411E2501ACTW	1	1	2	5	.020	4

WCE4 • Series W421 • Chamfered • 4 Flute • Weldon Shank • Inch







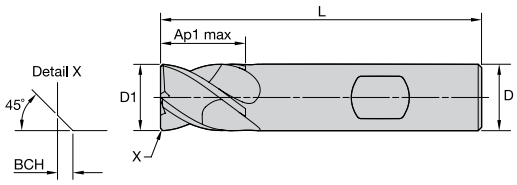
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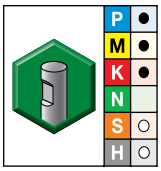
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945730	W421E13026CTW	1/2	1/2	1 1/2	4	.020	4
6945731	W421E16028CTW	5/8	5/8	1 5/8	4 1/8	.020	4
6945732	W421E19029CTW	3/4	3/4	2 1/4	5	.020	4
6945733	W421E2502ACTW	1	1	3	6	.020	4

WCE4 • Series W431 • Chamfered • 4 Flute • Weldon® Shank • Inch







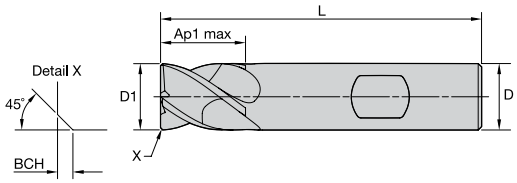
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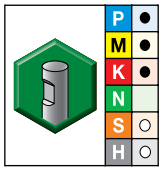
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6946294	W431E13036CTW	1/2	1/2	2	4	.020	4
6946295	W431E19039CTW	3/4	3/4	3	6	.020	4
6946296	W431E2503ACTW	1	1	4	7	.020	4

WCE4 • Series W441 • Chamfered • 4 Flute • Weldon Shank • Inch







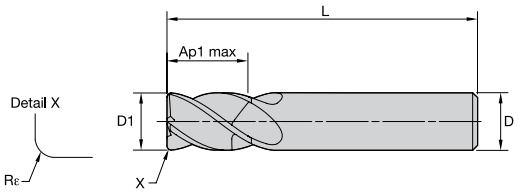
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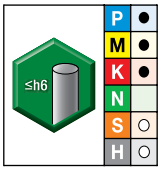
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6946297	W441E13046CTW	1/2	1/2	2 1/2	4 1/2	.020	4

WCE4 • Series W401 • Radiused • 4 Flute • Cylindrical Shank • Inch







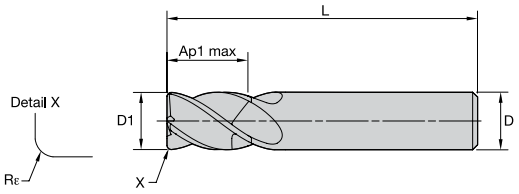
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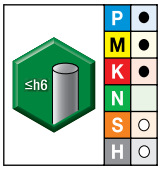
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6945648	W401E03000RAT	1/8	1/8	1/4	1 1/2	.015	4
6945649	W401E05001RAT	3/16	3/16	5/16	2	.015	4
6945650	W401E05001RET	3/16	3/16	5/16	2	.030	4
6945651	W401E07003RAT	1/4	1/4	3/8	2	.015	4
6945652	W401E07003RET	1/4	1/4	3/8	2	.030	4
6945653	W401E07003RGT	1/4	1/4	3/8	2	.060	4
6945659	W401E08004RAT	5/16	5/16	1/2	2	.015	4
6945660	W401E08004RET	5/16	5/16	1/2	2	.030	4
6945671	W401E08004RGT	5/16	5/16	1/2	2	.060	4
6945672	W401E10005RAT	3/8	3/8	1/2	2	.015	4
6945673	W401E10005RET	3/8	3/8	1/2	2	.030	4
6945674	W401E10005RGT	3/8	3/8	1/2	2	.060	4
6945675	W401E10005RJT	3/8	3/8	1/2	2	.090	4

WCE4 • Series W411 • Radiused • 4 Flute • Cylindrical Shank • Inch







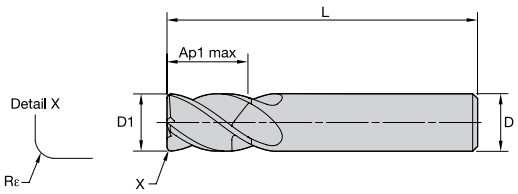
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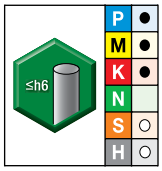
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6945941	W411E03010RAT	1/8	1/8	1/2	2	.015	4
6945654	W411E05011RAT	3/16	3/16	5/8	2 1/4	.015	4
6945655	W411E05011RET	3/16	3/16	5/8	2 1/4	.030	4
6945656	W411E07013RAT	1/4	1/4	3/4	2 1/2	.015	4
6945657	W411E07013RET	1/4	1/4	3/4	2 1/2	.030	4
6945658	W411E07013RGT	1/4	1/4	3/4	2 1/2	.060	4
6945676	W411E08014RAT	5/16	5/16	3/4	2 1/2	.015	4
6945677	W411E08014RET	5/16	5/16	3/4	2 1/2	.030	4
6945678	W411E08014RGT	5/16	5/16	3/4	2 1/2	.060	4
6945679	W411E10015RAT	3/8	3/8	7/8	2 1/2	.015	4
6945680	W411E10015RET	3/8	3/8	7/8	2 1/2	.030	4
6945681	W411E10015RGT	3/8	3/8	7/8	2 1/2	.060	4
6945682	W411E10015RJT	3/8	3/8	7/8	2 1/2	.090	4

WCE4 • Series W421 • Radiused • 4 Flute • Cylindrical Shank • Inch







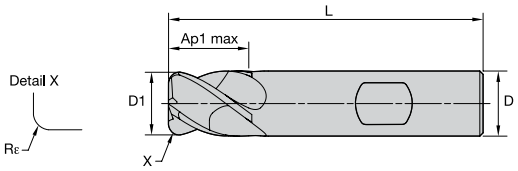
● first choice
○ alternate choice

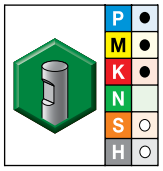
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6945942	W421E07023RAT	1/4	1/4	1 1/4	3 1/4	.015	4
6945943	W421E07023RET	1/4	1/4	1 1/4	3 1/4	.030	4
6945944	W421E07023RGT	1/4	1/4	1 1/4	3 1/4	.060	4
6945949	W421E08024RAT	5/16	5/16	1 1/4	3 1/4	.015	4
6945950	W421E08024RET	5/16	5/16	1 1/4	3 1/4	.030	4
6945951	W421E08024RGT	5/16	5/16	1 1/4	3 1/4	.060	4
6945952	W421E10025RAT	3/8	3/8	1 1/2	4	.015	4
6945953	W421E10025RET	3/8	3/8	1 1/2	4	.030	4
6945954	W421E10025RGT	3/8	3/8	1 1/2	4	.060	4
6945955	W421E10025RJT	3/8	3/8	1 1/2	4	.090	4

WCE4 • Series W401 • Radiused • 4 Flute • Weldon® Shank • Inch







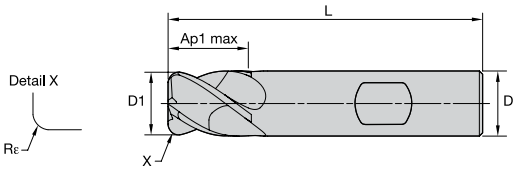
● first choice
○ alternate choice

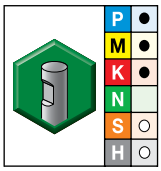
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6945817	W401E13006REW	1/2	1/2	5/8	2 1/2	.030	4
6945818	W401E13006RGW	1/2	1/2	5/8	2 1/2	.060	4
6945819	W401E13006RJW	1/2	1/2	5/8	2 1/2	.090	4
6945820	W401E13006RKW	1/2	1/2	5/8	2 1/2	.120	4
6945841	W401E16008REW	5/8	5/8	3/4	3	.030	4
6945842	W401E16008RGW	5/8	5/8	3/4	3	.060	4
6945843	W401E16008RKW	5/8	5/8	3/4	3	.120	4
6945844	W401E19009REW	3/4	3/4	7/8	3 1/2	.030	4
6945845	W401E19009RGW	3/4	3/4	7/8	3 1/2	.060	4
6945846	W401E19009RJW	3/4	3/4	7/8	3 1/2	.090	4
6945847	W401E19009RKW	3/4	3/4	7/8	3 1/2	.120	4
6945848	W401E2500AREW	1	1	1 1/2	4	.030	4
6945849	W401E2500ARGW	1	1	1 1/2	4	.060	4
6945850	W401E2500ARJW	1	1	1 1/2	4	.090	4
6945851	W401E2500ARKW	1	1	1 1/2	4	.120	4

WCE4 • Series W411 • Radiused • 4 Flute • Weldon® Shank • Inch







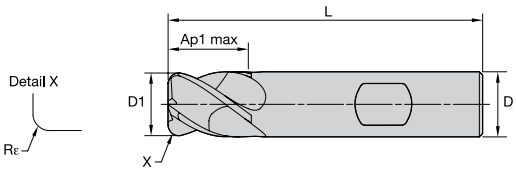
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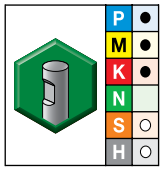
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6945852	W411E13016REW	1/2	1/2	1 1/4	3	.030	4
6945853	W411E13016RGW	1/2	1/2	1 1/4	3	.060	4
6945854	W411E13016RJW	1/2	1/2	1 1/4	3	.090	4
6945855	W411E13016RKW	1/2	1/2	1 1/4	3	.120	4
6945856	W411E16018REW	5/8	5/8	1 1/4	3 1/2	.030	4
6945857	W411E16018RGW	5/8	5/8	1 1/4	3 1/2	.060	4
6945858	W411E16018RKW	5/8	5/8	1 1/4	3 1/2	.120	4
6945859	W411E19019REW	3/4	3/4	1 1/2	4	.030	4
6945860	W411E19019RGW	3/4	3/4	1 1/2	4	.060	4
6945861	W411E19019RJW	3/4	3/4	1 1/2	4	.090	4
6945862	W411E19019RKW	3/4	3/4	1 1/2	4	.120	4
6945863	W411E2501AREW	1	1	2	5	.030	4
6945864	W411E2501ARGW	1	1	2	5	.060	4
6945865	W411E2501ARJW	1	1	2	5	.090	4
6945866	W411E2501ARKW	1	1	2	5	.120	4

WCE4 • Series W421 • Radiused • 4 Flute • Weldon Shank • Inch







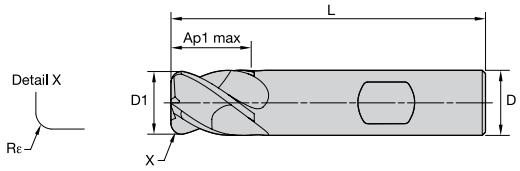
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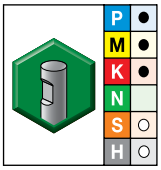
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6945867	W421E13026REW	1/2	1/2	1 1/2	4	.030	4
6945868	W421E13026RGW	1/2	1/2	1 1/2	4	.060	4
6945869	W421E13026RJW	1/2	1/2	1 1/2	4	.090	4
6945870	W421E13026RKW	1/2	1/2	1 1/2	4	.120	4
6945871	W421E16028REW	5/8	5/8	1 5/8	4 1/8	.030	4
6945872	W421E16028RGW	5/8	5/8	1 5/8	4 1/8	.060	4
6945873	W421E16028RKW	5/8	5/8	1 5/8	4 1/8	.120	4
6945874	W421E19029REW	3/4	3/4	2 1/4	5	.030	4
6945875	W421E19029RGW	3/4	3/4	2 1/4	5	.060	4
6945876	W421E19029RJW	3/4	3/4	2 1/4	5	.090	4
6945877	W421E19029RKW	3/4	3/4	2 1/4	5	.120	4
6945878	W421E2502AREW	1	1	3	6	.030	4
6945879	W421E2502ARGW	1	1	3	6	.060	4
6945880	W421E2502ARJW	1	1	3	6	.090	4
6945881	W421E2502ARKW	1	1	3	6	.120	4

WCE4 • Series W431 • Radiused • 4 Flute • Weldon® Shank • Inch







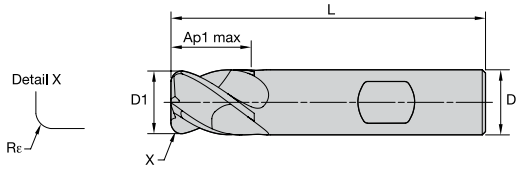
● first choice
○ alternate choice

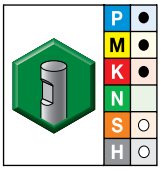
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6946298	W431E13036REW	1/2	1/2	2	4	.030	4
6946299	W431E13036RGW	1/2	1/2	2	4	.060	4
6946300	W431E13036RJW	1/2	1/2	2	4	.090	4
6946301	W431E13036RKW	1/2	1/2	2	4	.120	4
6946302	W431E16038REW	5/8	5/8	2 1/4	5	.030	4
6946303	W431E16038RGW	5/8	5/8	2 1/4	5	.060	4
6946304	W431E16038RKW	5/8	5/8	2 1/4	5	.120	4
6946305	W431E19039REW	3/4	3/4	3	6	.030	4
6946306	W431E19039RGW	3/4	3/4	3	6	.060	4
6946307	W431E19039RJW	3/4	3/4	3	6	.090	4
6946308	W431E19039RKW	3/4	3/4	3	6	.120	4
6946309	W431E2503AREW	1	1	4	7	.030	4
6946310	W431E2503ARGW	1	1	4	7	.060	4
6946321	W431E2503ARJW	1	1	4	7	.090	4
6946322	W431E2503ARKW	1	1	4	7	.120	4

WCE4 • Series W441 • Radiused • 4 Flute • Weldon Shank • Inch







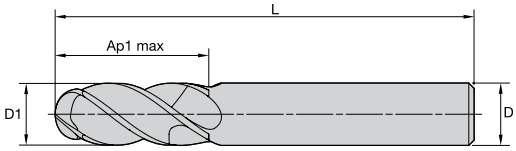
● first choice
○ alternate choice

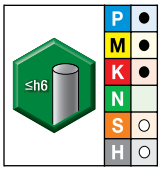
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6946323	W441E13046REW	1/2	1/2	2 1/2	4 1/2	.030	4
6946324	W441E13046RGW	1/2	1/2	2 1/2	4 1/2	.060	4
6946325	W441E13046RJW	1/2	1/2	2 1/2	4 1/2	.090	4
6946326	W441E13046RKW	1/2	1/2	2 1/2	4 1/2	.120	4

WCE4 • Series W40B • Ball Nose • 4 Flute • Cylindrical Shank • Inch







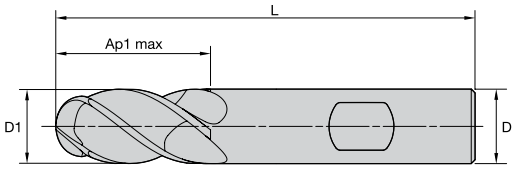
● first choice
○ alternate choice

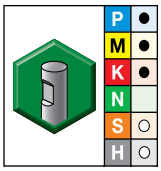
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945890	W40BE03000RBT	1/8	1/8	1/2	2	4
6945891	W40BE05001RBT	3/16	3/16	5/8	2 1/4	4
6945892	W40BE07003RBT	1/4	1/4	3/4	2 1/2	4
6945893	W40BE08004RBT	5/16	5/16	3/4	2 1/2	4
6945894	W40BE10005RBT	3/8	3/8	7/8	2 1/2	4

WCE4 • Series W40B • Ball Nose • 4 Flute • Weldon® Shank • Inch







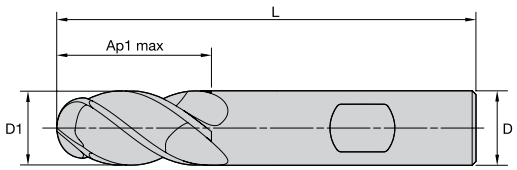
● first choice
○ alternate choice

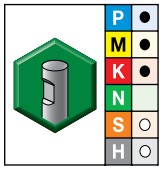
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945911	W40BE13006RBW	1/2	1/2	1	3	4
6945912	W40BE16008RBW	5/8	5/8	1 1/4	3 1/2	4
6945913	W40BE19009RBW	3/4	3/4	1 1/2	4	4
6945914	W40BE2500ARBW	1	1	1 1/2	4	4

WCE4 • Series W41B • Ball Nose • 4 Flute • Weldon® Shank • Inch







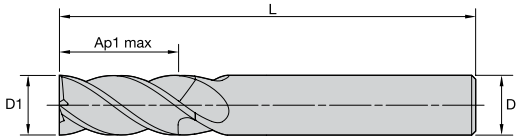
● first choice
○ alternate choice

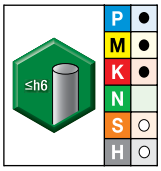
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945915	W41BE13006RBW	1/2	1/2	1 1/4	3	4

WCE4 • Series W401 • Sharp Edge • 4 Flute • Cylindrical Shank • Metric







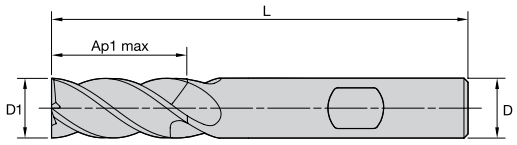
● first choice
○ alternate choice

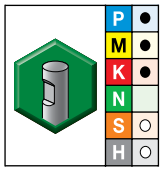
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945502	W401M03003SZT	3,0	6	8,00	57	4
6945503	W401M04003SZT	4,0	6	11,00	57	4
6945504	W401M05003SZT	5,0	6	13,00	57	4
6945505	W401M06003SZT	6,0	6	13,00	57	4
6945548	W401M08004SZT	8,0	8	19,00	63	4
6945549	W401M10005SZT	10,0	10	22,00	72	4
6945684	W401M12006SZT	12,0	12	26,00	83	4
6945685	W401M16008SZT	16,0	16	32,00	92	4
6945686	W401M20009SZT	20,0	20	38,00	104	4

WCE4 • Series W401 • Sharp Edge • 4 Flute • Weldon® Shank • Metric







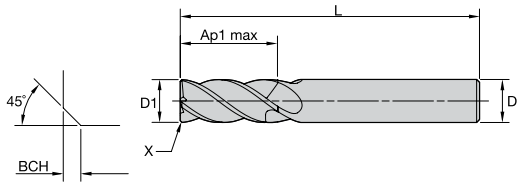
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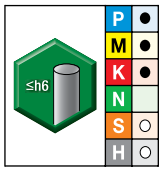
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945510	W401M03003SZW	3,0	6	8,00	57	4
6945541	W401M04003SZW	4,0	6	11,00	57	4
6945542	W401M05003SZW	5,0	6	13,00	57	4
6945543	W401M06003SZW	6,0	6	13,00	57	4
6945562	W401M08004SZW	8,0	8	19,00	63	4
6945563	W401M10005SZW	10,0	10	22,00	72	4
6945690	W401M12006SZW	12,0	12	26,00	83	4
6945691	W401M16008SZW	16,0	16	32,00	92	4
6945692	W401M20009SZW	20,0	20	38,00	104	4

WCE4 • Series W401 • Chamfered • 4 Flute • Cylindrical Shank • Metric







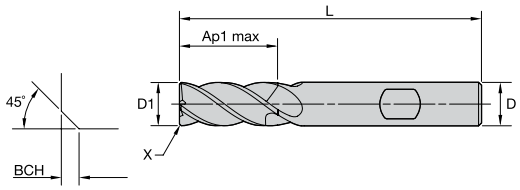
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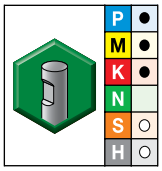
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945506	W401M03003CAT	3,0	6	8,00	57	0,20	4
6945507	W401M04003CAT	4,0	6	11,00	57	0,20	4
6945508	W401M05003CAT	5,0	6	13,00	57	0,30	4
6945509	W401M06003CAT	6,0	6	13,00	57	0,40	4
6945550	W401M08004CAT	8,0	8	19,00	63	0,40	4
6945561	W401M10005CET	10,0	10	22,00	72	0,50	4
6945687	W401M12006CET	12,0	12	26,00	83	0,50	4
6945688	W401M16008CET	16,0	16	32,00	92	0,50	4
6945689	W401M20009CET	20,0	20	38,00	104	0,50	4

WCE4 • Series W401 • Chamfered • 4 Flute • Weldon® Shank • Metric







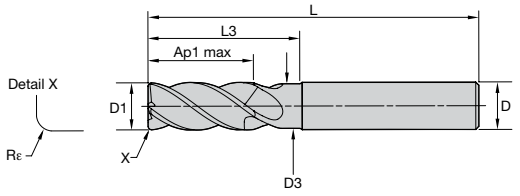
● first choice
○ alternate choice

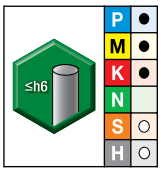
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945544	W401M03003CAW	3,0	6	8,00	57	0,20	4
6945545	W401M04003CAW	4,0	6	11,00	57	0,20	4
6945546	W401M05003CAW	5,0	6	13,00	57	0,30	4
6945547	W401M06003CAW	6,0	6	13,00	57	0,40	4
6945564	W401M08004CAW	8,0	8	19,00	63	0,40	4
6945565	W401M10005CEW	10,0	10	22,00	72	0,50	4
6945693	W401M12006CEW	12,0	12	26,00	83	0,50	4
6945694	W401M16008CEW	16,0	16	32,00	92	0,50	4
6945695	W401M20009CEW	20,0	20	38,00	104	0,50	4

WCE4 • Series W4N1 • Radiused • 4 Flute • Necked • Cylindrical Shank • Metric







● first choice
○ alternate choice

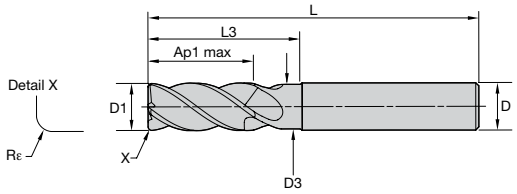
WU20PE

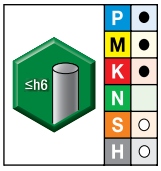
order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6945620	W4N1M03003RAT	3,0	6	2,82	8,00	57	15,00	0,20	4
6945631	W4N1M04003RAT	4,0	6	3,76	11,00	57	16,00	0,20	4
6945632	W4N1M04003RET	4,0	6	3,76	11,00	57	16,00	0,50	4
6945633	W4N1M05003RAT	5,0	6	4,70	13,00	57	18,00	0,20	4
6945634	W4N1M05003RET	5,0	6	4,70	13,00	57	18,00	0,50	4
6945635	W4N1M05003RJT	5,0	6	4,70	13,00	57	18,00	1,00	4
6945636	W4N1M06003RET	6,0	6	5,64	13,00	57	21,00	0,50	4
6945638	W4N1M06003RHT	6,0	6	5,64	13,00	57	21,00	1,50	4
6945637	W4N1M06003RJT	6,0	6	5,64	13,00	57	21,00	1,00	4
6945640	W4N1M08004RET	8,0	8	7,52	19,00	63	27,00	0,50	4
6945642	W4N1M08004RHT	8,0	8	7,52	19,00	63	27,00	1,50	4
6945641	W4N1M08004RJT	8,0	8	7,52	19,00	63	27,00	1,00	4
6945643	W4N1M08004RKT	8,0	8	7,52	19,00	63	27,00	2,00	4
6945644	W4N1M10005RET	10,0	10	9,40	22,00	72	32,00	0,50	4
6945646	W4N1M10005RHT	10,0	10	9,40	22,00	72	32,00	1,50	4
6945645	W4N1M10005RJT	10,0	10	9,40	22,00	72	32,00	1,00	4

WCE4 • Series W4N1 • Radiused • 4 Flute • Necked • Cylindrical Shank • Metric

(continued)







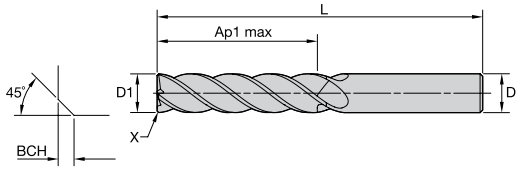
● first choice
○ alternate choice

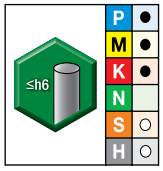
WU20PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6945647	W4N1M10005RKT	10,0	10	9,40	22,00	72	32,00	2,00	4
6945128	W4N1M12006RET	12,0	12	11,28	26,00	83	38,00	0,50	4
6945130	W4N1M12006RHT	12,0	12	11,28	26,00	83	38,00	1,50	4
6945129	W4N1M12006RJT	12,0	12	11,28	26,00	83	38,00	1,00	4
6945481	W4N1M12006RKT	12,0	12	11,28	26,00	83	38,00	2,00	4
6945482	W4N1M12006RQT	12,0	12	11,28	26,00	83	38,00	4,00	4
6945483	W4N1M16008RJT	16,0	16	15,04	32,00	92	44,00	1,00	4
6945484	W4N1M16008RKT	16,0	16	15,04	32,00	92	44,00	2,00	4
6945485	W4N1M16008RPT	16,0	16	15,04	32,00	92	44,00	3,00	4
6945486	W4N1M16008RQT	16,0	16	15,04	32,00	92	44,00	4,00	4
6945487	W4N1M20009RJT	20,0	20	18,80	38,00	104	53,00	1,00	4
6945488	W4N1M20009RKT	20,0	20	18,80	38,00	104	53,00	2,00	4
6945489	W4N1M20009RPT	20,0	20	18,80	38,00	104	53,00	3,00	4
6945490	W4N1M20009RQT	20,0	20	18,80	38,00	104	53,00	4,00	4

WCE4 • Series W411 • Chamfered • 4 Flute • Long Length • Cylindrical Shank • Metric







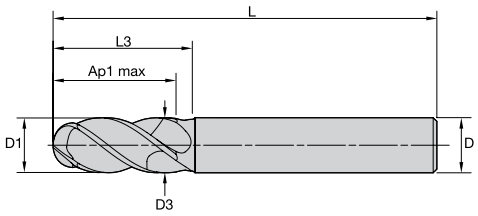
● first choice
○ alternate choice

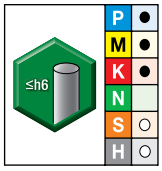
WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6946013	W411M06013CAT	6,0	6	32,00	76	0,40	4
6946014	W411M08014CAT	8,0	8	32,00	87	0,40	4
6946015	W411M10015CET	10,0	10	38,00	89	0,50	4
6946046	W411M12016CET	12,0	12	51,00	100	0,50	4
6946047	W411M16018CET	16,0	16	57,00	125	0,50	4
6946048	W411M20019CET	20,0	20	57,00	125	0,50	4

WCE4 • Series W4NB • Ball Nose • 4 Flute • Cylindrical Shank • Metric







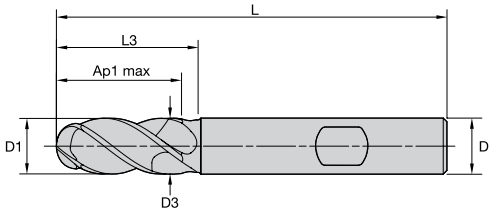
● first choice
○ alternate choice

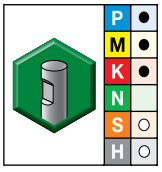
WU20PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6945882	W4NBM05003RBT	5,0	6	4,70	13,00	57	18,00	4
6945883	W4NBM06003RBT	6,0	6	5,64	13,00	57	21,00	4
6945886	W4NBM08004RBT	8,0	8	7,52	19,00	63	27,00	4
6945887	W4NBM10005RBT	10,0	10	9,40	22,00	72	32,00	4
6945895	W4NBM12006RBT	12,0	12	11,28	26,00	83	30,00	4
6945896	W4NBM16008RBT	16,0	16	15,04	32,00	92	38,00	4
6945897	W4NBM20009RBT	20,0	20	18,80	38,00	104	50,00	4

WCE4 • Series W4NB • Ball Nose • 4 Flute • Weldon® Shank • Metric







● first choice
○ alternate choice

WU20PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6945884	W4NBM05003RBW	5,0	6	4,70	13,00	57	18,00	4
6945885	W4NBM06003RBW	6,0	6	5,64	13,00	57	21,00	4
6945888	W4NBM08004RBW	8,0	8	7,52	19,00	63	27,00	4
6945889	W4NBM10005RBW	10,0	10	9,40	22,00	72	32,00	4
6945898	W4NBM12006RBW	12,0	12	11,28	26,00	83	30,00	4
6945899	W4NBM16008RBW	16,0	16	15,04	32,00	92	38,00	4
6945900	W4NBM20009RBW	20,0	20	18,80	38,00	104	50,00	4

Application Data • WCE Side Milling • Slotting • Inch





Material Group		Side Milling		Slotting	WU20PE Cutting Speed — Vc (SFM)			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
									D1 — Diameter									
		ap	ae	ap	min	Start	max	fraction	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
P	0	ap1max	0.4 x D1	1.0 x D1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	1	ap1max	0.4 x D1	1.0 x D1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.4 x D1	1.0 x D1	460	540	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	3	ap1max	0.4 x D1	1.0 x D1	390	450	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	4	ap1max	0.4 x D1	0.75 x D1	300	400	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	5	ap1max	0.4 x D1	1.0 x D1	200	260	330	IPT	.0006	.0009	.0012	.0017	.0018	.0021	.0023	.0027	.0031	.0036
	6	ap1max	0.4 x D1	0.75 x D1	160	200	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
M	1	ap1max	0.4 x D1	1.0 x D1	300	340	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.4 x D1	1.0 x D1	200	230	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
	3	ap1max	0.4 x D1	1.0 x D1	200	210	230	IPT	.0005	.00008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
K	1	ap1max	0.4 x D1	1.0 x D1	390	440	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.4 x D1	1.0 x D1	360	410	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	3	ap1max	0.4 x D1	1.0 x D1	360	390	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
S	1	ap1max	0.4 x D1	0.3 x D1	160	230	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.4 x D1	0.3 x D1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	3	ap1max	0.4 x D1	1.0 x D1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	4	ap1max	0.4 x D1	1.0 x D1	160	180	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033
H	1	ap1max	0.4 x D1	0.75 x D1	260	360	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	2	ap1max	0.4 x D1	0.5 x D1	230	310	390	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028

Application Data • WCE Side Milling • Slotting BN • Inch





Material Group		Side Milling		Slotting	WU20PE Cutting Speed — Vc (SFM)			Recommended feed per tooth (Fz = IPT) for side milling (A). For slotting (B), reduce Fz by 20%.										
									D1 — Diameter									
		ap	ae	ap	min	Start	max	fraction	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
P	0	ap1max	0.4 x D1	1.0 x D1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	1	ap1max	0.4 x D1	1.0 x D1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.4 x D1	1.0 x D1	460	540	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	3	ap1max	0.4 x D1	1.0 x D1	390	450	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	4	ap1max	0.4 x D1	0.75 x D1	300	400	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	5	ap1max	0.4 x D1	1.0 x D1	200	260	330	IPT	.0006	.0009	.0012	.0017	.0018	.0021	.0023	.0027	.0031	.0036
	6	ap1max	0.4 x D1	0.75 x D1	160	200	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
M	1	ap1max	0.4 x D1	1.0 x D1	300	340	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.4 x D1	1.0 x D1	200	230	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
	3	ap1max	0.4 x D1	1.0 x D1	200	210	230	IPT	.0005	.00008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
K	1	ap1max	0.4 x D1	1.0 x D1	390	440	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.4 x D1	1.0 x D1	360	410	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	3	ap1max	0.4 x D1	1.0 x D1	360	390	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
S	1	ap1max	0.4 x D1	0.3 x D1	160	230	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.4 x D1	0.3 x D1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	3	ap1max	0.4 x D1	1.0 x D1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	4	ap1max	0.4 x D1	1.0 x D1	160	180	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033
H	1	ap1max	0.4 x D1	0.75 x D1	260	360	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	2	ap1max	0.4 x D1	0.5 x D1	230	310	390	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028

Application Data • WCE Side Milling • Long • Inch





Material Group		Side Milling		WU20PE Cutting Speed — Vc (SFM)			Recommended feed per tooth (fz = IPT) for side milling. No slotting operations recommended.										
								D1 — Diameter									
		ap	ae	min	Start	max	fraction	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
P	0	ap1max	0.2xD1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	1	ap1max	0.2xD1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.2xD1	460	540	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	3	ap1max	0.2xD1	390	450	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	4	ap1max	0.2xD1	300	400	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	5	ap1max	0.2xD1	200	260	330	IPT	.0006	.0009	.0012	.0017	.0018	.0021	.0023	.0027	.0031	.0036
	6	ap1max	0.15xD1	160	200	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
M	1	ap1max	0.2xD1	300	340	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.2xD1	200	230	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
	3	ap1max	0.2xD1	200	210	230	IPT	.0005	.00008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
K	1	ap1max	0.2xD1	390	440	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.2xD1	360	410	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	3	ap1max	0.2xD1	360	390	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
S	1	ap1max	0.1xD1	160	230	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.1xD1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	3	ap1max	0.15xD1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	4	ap1max	0.15xD1	160	180	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033
H	1	ap1max	0.15xD1	260	360	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	2	ap1max	0.15xD1	230	310	390	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028

Application Data • WCE Side Milling • Slotting • Metric







Material Group		Side Milling		Slotting	WU20PE Cutting Speed — Vc m/min			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.											
									D1 — Diameter										
		ap	ae	ap	min	Start	max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	ap1max	0,4 x D1	1,0 x D1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	1	ap1max	0,4 x D1	1,0 x D1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	ap1max	0,4 x D1	1,0 x D1	140	165	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	3	ap1max	0,4 x D1	1,0 x D1	120	140	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	4	ap1max	0,4 x D1	0,75 x D1	90	120	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	ap1max	0,4 x D1	1,0 x D1	60	80	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	6	ap1max	0,4 x D1	0,75 x D1	50	65	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
M	1	ap1max	0,4 x D1	1,0 x D1	90	100	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	ap1max	0,4 x D1	1,0 x D1	60	70	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	ap1max	0,4 x D1	1,0 x D1	60	65	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
K	1	ap1max	0,4 x D1	1,0 x D1	120	135	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	ap1max	0,4 x D1	1,0 x D1	110	125	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	ap1max	0,4 x D1	1,0 x D1	110	120	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
S	1	ap1max	0,4 x D1	0,3 x D1	50	70	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	ap1max	0,4 x D1	0,3 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	ap1max	0,4 x D1	1,0 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	ap1max	0,4 x D1	1,0 x D1	50	55	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	ap1max	0,4 x D1	0,75 x D1	80	110	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	2	ap1max	0,4 x D1	0,5 x D1	70	90	120	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071

Application Data • WCE Side Milling • Slotting BN • Metric



Material Group		Side Milling		Slotting	WU20PE Cutting Speed — Vc m/min			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.													
									D1 — Diameter												
		ap	ae	ap	min	Start	max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	ap1max	0,4 x D1	1,0 x D1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	1	ap1max	0,4 x D1	1,0 x D1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	ap1max	0,4 x D1	1,0 x D1	140	165	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	3	ap1max	0,4 x D1	1,0 x D1	120	140	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	4	ap1max	0,4 x D1	0,75 x D1	90	120	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	ap1max	0,4 x D1	1,0 x D1	60	80	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	6	ap1max	0,4 x D1	0,75 x D1	50	65	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
M	1	ap1max	0,4 x D1	1,0 x D1	90	100	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	ap1max	0,4 x D1	1,0 x D1	60	70	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	ap1max	0,4 x D1	1,0 x D1	60	65	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
K	1	ap1max	0,4 x D1	1,0 x D1	120	135	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	ap1max	0,4 x D1	1,0 x D1	110	125	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	ap1max	0,4 x D1	1,0 x D1	110	120	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
S	1	ap1max	0,4 x D1	0,3 x D1	50	70	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	ap1max	0,4 x D1	0,3 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	ap1max	0,4 x D1	1,0 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	ap1max	0,4 x D1	1,0 x D1	50	55	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	ap1max	0,4 x D1	0,75 x D1	80	110	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	2	ap1max	0,4 x D1	0,5 x D1	70	90	120	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071

Application Data • WCE Side Milling • Long • Metric



Material Group		Side Milling		WU20PE Cutting Speed — Vc m/min			Recommended feed per tooth (fz = mm/z) for side milling. No slotting operations recommended.													
								D1 — Diameter												
		ap	ae	min	Start	max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	ap1max	0,2xD1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	1	ap1max	0,2xD1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	ap1max	0,2xD1	140	165	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	3	ap1max	0,2xD1	120	140	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	4	ap1max	0,2xD1	90	120	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	ap1max	0,2xD1	60	80	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	6	ap1max	0,15xD1	50	65	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
M	1	ap1max	0,2xD1	90	100	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	ap1max	0,2xD1	60	70	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	ap1max	0,2xD1	60	65	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
K	1	ap1max	0,2xD1	120	135	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	ap1max	0,2xD1	110	125	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	ap1max	0,2xD1	110	120	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
S	1	ap1max	0,1xD1	50	70	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	ap1max	0,1xD1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	ap1max	0,15xD1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	ap1max	0,15xD1	50	55	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	ap1max	0,15xD1	80	110	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	2	ap1max	0,15xD1	70	90	120	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071

WCE • Adjustment Factor Table for Feed Calculation

To calculate application-specific cutting data, please use Kv coefficient table to the right for adaptation of cutting speed and KFz for feed, respectively.

*Vc new = Vc * Kv*
*Fz new = IPT * KFz*

Calculation example:
Application: D = 20mm; M2 material group;
Ae = 2mm
Cutting data recommendation: Vc = 80 m/min;
Fz = 0,089 mm/th
Adjustment coefficients: Ae = 2mm equals 10,0%;
Kv = 1,35; KFz = 1,7

Final cutting data recommendation:
*Vc new = 80 * 1,35 = 108 m/min*
*Fz new = 0,089 * 1,7 = 0,15 mm/min*

Inch

	Ae/D	2%	4%	5%	8%	10%	20%	30%	40%	50%
Speed factor	Kv	2	1.5	1.45	1.4	1.35	1.25	1.2	1	1
Feed factor	KFz	2.4	2.3	2.2	2	1.7	1.25	1.02	1	1

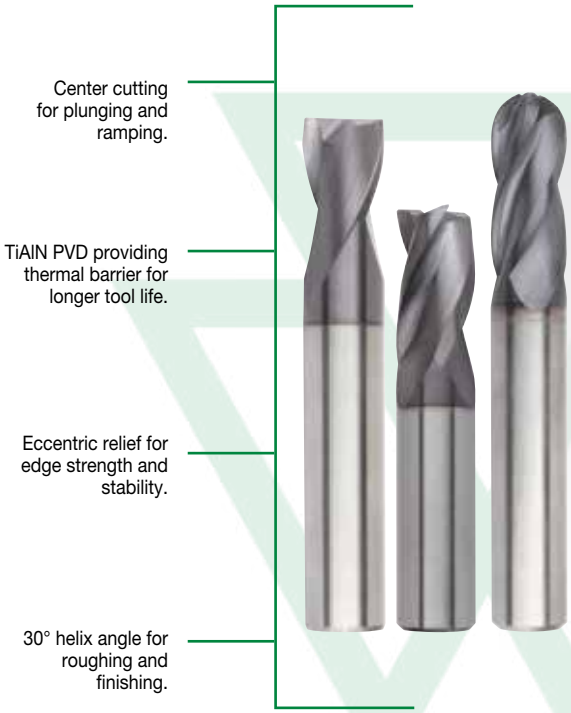
Metric

	Ae/D	2%	4%	5%	8%	10%	20%	30%	40%	50%
Speed factor	Kv	2	1,5	1,45	1,4	1,35	1,25	1,2	1	1
Feed factor	KFz	2,4	2,3	2,2	2	1,7	1,25	1,02	1	1

GP End Mills

General-Purpose Solid Carbide End Mills

The GP solid end milling line is a group of highly versatile end mills created for small shop customers to manage inventory effectively by reducing the initial tooling investment and increasing the value to recondition.



The GP end mills perform plunging, slotting, and profiling operations in a wide range of materials and applications. These versatile end mills were designed to provide high metal removal rates and excellent surface conditions at a value price. A wide range of diameters, lengths, and corner styles (such as chamfered, sharp edge, and ball nose) are available from stock.

VERSATILE

One design and grade to machine a wide range of materials.

RELIABLE

Mid-level performance and productivity in all machine conditions, including unstable setups.

VALUABLE

Low initial investment with simple regrind capability.

VALUABLE VERSATILITY

PRODUCT

GRADE

TiAlN, UNCOATED

FLUTES

2–4

DIAMETER RANGE

1/32–1" (1–20mm)

CORNER CONDITIONS

Sharp Edges
Chamfered
Radiused
Ball Nose

INDUSTRY

GENERAL ENGINEERING

MATERIALS

FIRST CHOICE

P M K N

APPLICATIONS


SIDE/ SHOULDER MILLING ROUGHING


SLOTTING SQUARE END


HELICAL MILLING


RAMPING BLANK


3D PROFILING

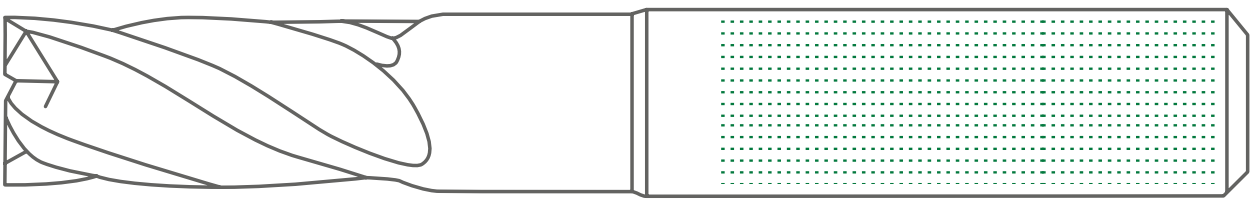
ECCENTRIC RELIEF

for edge strength and stability.

30° HELIX ANGLE

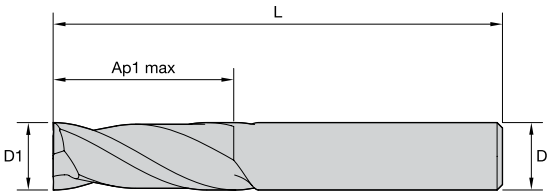
for high versatility.

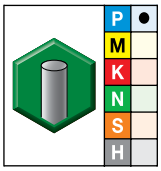
CYLINDRICAL AND WELDON® SHANK

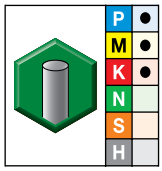


GP End Mills • Series I2S • Sharp Edge • 2 Flute • Inch









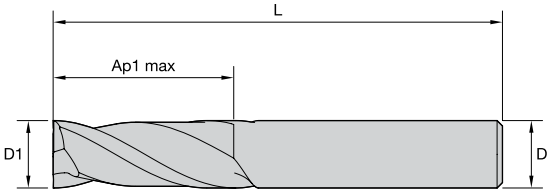
● first choice
○ alternate choice

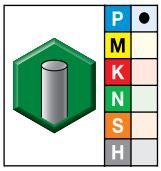
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–		5872793	I2S0016T003R	1/64	1/8	1/32	1 1/2	2
5873649	I2S0031T007R	5872794	I2S0031T007R	1/32	1/8	5/64	1 1/2	2
5873661	I2S0062T012R	5872796	I2S0062T012R	1/16	1/8	1/8	1 1/2	2
5873650	I2S0062T018L	5872795	I2S0062T018L	1/16	1/8	3/16	1 1/2	2
5873662	I2S0062T050X	5872797	I2S0062T050X	1/16	1/8	1/2	2	2
5873663	I2S0078T018R	5872798	I2S0078T018R	5/64	1/8	3/16	1 1/2	2
5873664	I2S0094T018S	5872799	I2S0094T018S	3/32	1/8	3/16	1 1/2	2
5873665	I2S0094T037R	5872800	I2S0094T037R	3/32	1/8	3/8	1 1/2	2
5873666	I2S0094T062L	5872841	I2S0094T062L	3/32	1/8	5/8	2	2
–		5872843	I2S0109T037R	7/64	1/8	3/8	1 1/2	2
5873667	I2S0125T025S	5872844	I2S0125T025S	1/8	1/8	1/4	1 1/2	2
5873669	I2S0125T050R	5872845	I2S0125T050R	1/8	1/8	1/2	1 1/2	2
5873670	I2S0125T075L	5872846	I2S0125T075L	1/8	1/8	3/4	2 1/4	2
5873671	I2S0125T075X	5872847	I2S0125T075X	1/8	1/8	3/4	3	2
–		5872848	I2S0141T056R	9/64	3/16	9/16	2	2
–		5872849	I2S0156T031R	5/32	3/16	5/16	2	2
5873674	I2S0156T056L	5872850	I2S0156T056L	5/32	3/16	9/16	2	2
–		5872851	I2S0172T062R	11/64	3/16	5/8	2	2
–		5872852	I2S0188T031S	3/16	3/16	5/16	1 1/2	2
5873676	I2S0188T062R	5872853	I2S0188T062R	3/16	3/16	5/8	2	2
5873677	I2S0188T075L	5872854	I2S0188T075L	3/16	3/16	3/4	2 1/2	2
5873678	I2S0188T112X	5872855	I2S0188T112X	3/16	3/16	1 1/8	3	2
–		5872856	I2S0219T043R	7/32	1/4	7/16	2	2
–		5872857	I2S0219T062L	7/32	1/4	5/8	2 1/2	2
5873681	I2S0250T050S	5872858	I2S0250T050S	1/4	1/4	1/2	2	2
5873682	I2S0250T075R	5872859	I2S0250T075R	1/4	1/4	3/4	2 1/2	2
5873683	I2S0250T112R	5872860	I2S0250T112R	1/4	1/4	1 1/8	3	2
5873684	I2S0250T125L		–	1/4	1/4	1 1/4	3 1/2	2
5873685	I2S0250T150X	5872861	I2S0250T150X	1/4	1/4	1 1/2	4	2
–		5872862	I2S0281T075R	9/32	5/16	3/4	2 1/2	2
–		5872941	I2S0312T050S	5/16	5/16	1/2	2	2
5873687	I2S0312T081R	5872863	I2S0312T081R	5/16	5/16	13/16	2 1/2	2
–		5872864	I2S0312T112L	5/16	5/16	1 1/8	3	2
5873689	I2S0312T162X	5872865	I2S0312T162X	5/16	5/16	1 5/8	4	2
5873690	I2S0344T100R	5872866	I2S0344T100R	11/32	3/8	1	2 1/2	2
5873691	I2S0375T062S	5872867	I2S0375T062S	3/8	3/8	5/8	2	2
5873692	I2S0375T100R	5872868	I2S0375T100R	3/8	3/8	1	2 1/2	2
5873693	I2S0375T112R	5872869	I2S0375T112R	3/8	3/8	1 1/8	3	2
5873694	I2S0375T175L	5872870	I2S0375T175L	3/8	3/8	1 3/4	4	2
–		5872881	I2S0375T300X	3/8	3/8	3	6	2
–		5872882	I2S0406T100R	13/32	7/16	1	2 3/4	2
–		5872883	I2S0437T062S	7/16	7/16	5/8	2 1/2	2
5873698	I2S0437T100R	5872884	I2S0437T100R	7/16	7/16	1	2 1/2	2
–		5872885	I2S0437T200L	7/16	7/16	2	4	2
–		5872886	I2S0437T300X	7/16	7/16	3	6	2
5873711	I2S0469T100R	5872887	I2S0469T100R	15/32	1/2	1	3	2
5873712	I2S0500T062S	5872888	I2S0500T062S	1/2	1/2	5/8	2 1/2	2
5873713	I2S0500T100R	5872889	I2S0500T100R	1/2	1/2	1	3	2
5873714	I2S0500T200L	5872890	I2S0500T200L	1/2	1/2	2	4	2
–		5872891	I2S0500T300X	1/2	1/2	3	6	2
–		5872892	I2S0562T075R	9/16	9/16	3/4	3	2
–		5872893	I2S0562T125L	9/16	9/16	1 1/4	3 1/2	2
–		5872894	I2S0562T225X	9/16	9/16	2 1/4	5	2
–		5872895	I2S0625T075S	5/8	5/8	3/4	3	2
5873720	I2S0625T125R	5872896	I2S0625T125R	5/8	5/8	1 1/4	3 1/2	2
–		5872897	I2S0625T225R	5/8	5/8	2 1/4	5	2

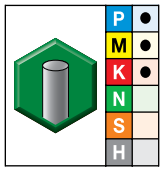
GP End Mills • Series I2S • Sharp Edge • 2 Flute • Inch

(continued)







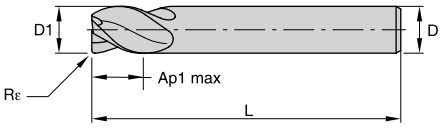


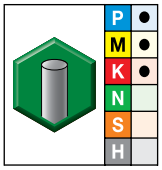
● first choice
○ alternate choice

UNCOATED		TiAlN						
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–		5872898	I2S0625T300L	5/8	5/8	3	6	2
–		5872899	I2S0625T400X	5/8	5/8	4	7	2
–		5872900	I2S0687T137R	11/16	3/4	1 3/8	4	2
–		5872901	I2S0750T100S	3/4	3/4	1	3	2
5873726	I2S0750T150R	5872902	I2S0750T150R	3/4	3/4	1 1/2	4	2
–		5872903	I2S0750T225R	3/4	3/4	2 1/4	5	2
–		5872904	I2S0750T300L	3/4	3/4	3	6	2
–		5872905	I2S0750T400X	3/4	3/4	4	7	2
–		5872906	I2S0875T150R	7/8	7/8	1 1/2	4	2
–		5872907	I2S0875T225L	7/8	7/8	2 1/4	5	2
–		5872908	I2S1000T150S	1	1	1 1/2	4	2
–		5872909	I2S1000T225R	1	1	2 1/4	5	2
–		5872910	I2S1000T300L	1	1	3	6	2
–		5872921	I2S1000T400X	1	1	4	7	2

GP End Mills • Series I2R • Radiused • 2 Flute • Inch







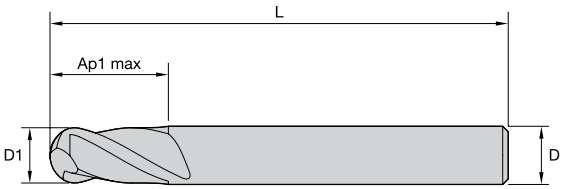
● first choice
○ alternate choice

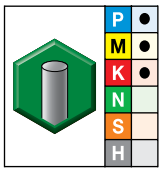
TiAlN

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6286059	I2R0062T012R010	1/16	1/8	1/8	1 1/2	.010	2
6286060	I2R0062T012R015	1/16	1/8	1/8	1 1/2	.015	2
6286101	I2R0094T037R010	3/32	1/8	3/8	1 1/2	.010	2
6286102	I2R0094T037R015	3/32	1/8	3/8	1 1/2	.015	2
6286103	I2R0125T050R010	1/8	1/8	1/2	1 1/2	.010	2
6286104	I2R0125T050R015	1/8	1/8	1/2	1 1/2	.015	2
6286105	I2R0125T050R020	1/8	1/8	1/2	1 1/2	.020	2
6286106	I2R0125T050R030	1/8	1/8	1/2	1 1/2	.030	2
6286107	I2R0188T062R010	3/16	3/16	5/8	2	.010	2
6286108	I2R0188T062R015	3/16	3/16	5/8	2	.015	2
6286109	I2R0188T062R020	3/16	3/16	5/8	2	.020	2
6286110	I2R0188T062R030	3/16	3/16	5/8	2	.030	2
6286131	I2R0250T075R015	1/4	1/4	3/4	2 1/2	.015	2
6286132	I2R0250T075R020	1/4	1/4	3/4	2 1/2	.020	2
6286133	I2R0250T075R030	1/4	1/4	3/4	2 1/2	.030	2
6286134	I2R0250T075R045	1/4	1/4	3/4	2 1/2	.045	2
6286135	I2R0250T075R060	1/4	1/4	3/4	2 1/2	.060	2
6286136	I2R0312T081R015	5/16	5/16	13/16	2 1/2	.015	2
6286137	I2R0312T081R020	5/16	5/16	13/16	2 1/2	.020	2
6286138	I2R0312T081R030	5/16	5/16	13/16	2 1/2	.030	2
6286139	I2R0312T081R045	5/16	5/16	13/16	2 1/2	.045	2
6286140	I2R0312T081R060	5/16	5/16	13/16	2 1/2	.060	2
6286151	I2R0375T100R015	3/8	3/8	1	2 1/2	.015	2
6286152	I2R0375T100R020	3/8	3/8	1	2 1/2	.020	2
6286153	I2R0375T100R030	3/8	3/8	1	2 1/2	.030	2
6286154	I2R0375T100R045	3/8	3/8	1	2 1/2	.045	2
6286155	I2R0375T100R060	3/8	3/8	1	2 1/2	.060	2
6286763	I2R0500T100R015	1/2	1/2	1	3	.015	2
6286764	I2R0500T100R020	1/2	1/2	1	3	.020	2
6286765	I2R0500T100R030	1/2	1/2	1	3	.030	2
6286766	I2R0500T100R045	1/2	1/2	1	3	.045	2
6286767	I2R0500T100R060	1/2	1/2	1	3	.060	2
6286768	I2R0625T125R015	5/8	5/8	1 1/4	3 1/2	.015	2
6286769	I2R0625T125R020	5/8	5/8	1 1/4	3 1/2	.020	2
6286770	I2R0625T125R030	5/8	5/8	1 1/4	3 1/2	.030	2
6286811	I2R0625T125R045	5/8	5/8	1 1/4	3 1/2	.045	2
6286812	I2R0625T125R060	5/8	5/8	1 1/4	3 1/2	.060	2
6286813	I2R0625T125R090	5/8	5/8	1 1/4	3 1/2	.090	2
6286814	I2R0625T125R125	5/8	5/8	1 1/4	3 1/2	.125	2
6286815	I2R0750T150R015	3/4	3/4	1 1/2	4	.015	2
6286816	I2R0750T150R020	3/4	3/4	1 1/2	4	.020	2
6286817	I2R0750T150R030	3/4	3/4	1 1/2	4	.030	2
6286818	I2R0750T150R045	3/4	3/4	1 1/2	4	.045	2
6286819	I2R0750T150R060	3/4	3/4	1 1/2	4	.060	2
6286820	I2R0750T150R090	3/4	3/4	1 1/2	4	.090	2
6286821	I2R0750T150R125	3/4	3/4	1 1/2	4	.125	2
6286822	I2R0875T150R015	7/8	7/8	1 1/2	4	.015	2
6286823	I2R0875T150R020	7/8	7/8	1 1/2	4	.020	2
6286824	I2R0875T150R030	7/8	7/8	1 1/2	4	.030	2
6286825	I2R0875T150R045	7/8	7/8	1 1/2	4	.045	2
6286826	I2R0875T150R060	7/8	7/8	1 1/2	4	.060	2
6286827	I2R0875T150R090	7/8	7/8	1 1/2	4	.090	2
6286828	I2R0875T150R125	7/8	7/8	1 1/2	4	.125	2
6286829	I2R1000T150R015	1	1	1 1/2	4	.015	2
6286830	I2R1000T150R020	1	1	1 1/2	4	.020	2
6286851	I2R1000T150R030	1	1	1 1/2	4	.030	2
6286852	I2R1000T150R045	1	1	1 1/2	4	.045	2
6286853	I2R1000T150R060	1	1	1 1/2	4	.060	2
6286854	I2R1000T150R090	1	1	1 1/2	4	.090	2
6286855	I2R1000T150R125	1	1	1 1/2	4	.125	2

GP End Mills • Series I2B • Ball Nose • 2 Flute • Inch







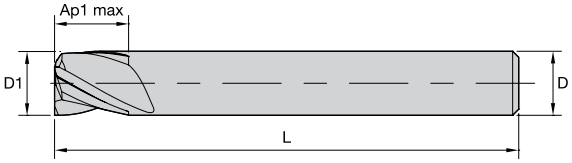
● first choice
○ alternate choice

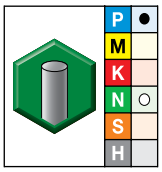
TiAlN

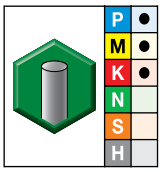
order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5878172	I2B0031T007R	1/32	1/8	5/64	1 1/2	2
5878174	I2B0046T018R	3/64	1/8	3/16	1 1/2	2
5878173	I2B0062T018R	1/16	1/8	3/16	1 1/2	2
5878175	I2B0078T018R	5/64	1/8	3/16	1 1/2	2
5878176	I2B0093T018R	3/32	1/8	3/16	1 1/2	2
5878177	I2B0093T037L	3/32	1/8	3/8	1 1/2	2
5878178	I2B0109T037R	7/64	1/8	3/8	1 1/2	2
5878179	I2B0125T025S	1/8	1/8	1/4	1 1/2	2
5878180	I2B0125T050R	1/8	1/8	1/2	1 1/2	2
5878181	I2B0125T075L	1/8	1/8	3/4	2 1/4	2
5878182	I2B0125T075X	1/8	1/8	3/4	3	2
5878183	I2B0156T031R	5/32	3/16	5/16	2	2
5878184	I2B0156T056L	5/32	3/16	9/16	2	2
5878185	I2B0187T031S	3/16	3/16	5/16	1 1/2	2
5878186	I2B0187T062R	3/16	3/16	5/8	2	2
5878187	I2B0187T075L	3/16	3/16	3/4	2 1/2	2
5878188	I2B0187T100X	3/16	3/16	1	4	2
5878189	I2B0218T062R	7/32	1/4	5/8	2 1/2	2
5878190	I2B0250T050S	1/4	1/4	1/2	2	2
5878191	I2B0250T075R	1/4	1/4	3/4	2 1/2	2
5878192	I2B0250T112R	1/4	1/4	1 1/8	3	2
5878193	I2B0250T150L	1/4	1/4	1 1/2	4	2
5878194	I2B0250T150X	1/4	1/4	1 1/2	6	2
5878195	I2B0312T050S	5/16	5/16	1/2	2	2
5878196	I2B0312T081R	5/16	5/16	13/16	2 1/2	2
5878197	I2B0312T112L	5/16	5/16	1 1/8	3	2
5878199	I2B0375T062S	3/8	3/8	5/8	2	2
5878200	I2B0375T087R	3/8	3/8	7/8	2 1/2	2
5878201	I2B0375T112R	3/8	3/8	1 1/8	3	2
5878202	I2B0375T175L	3/8	3/8	1 3/4	4	2
5878203	I2B0375T300X	3/8	3/8	3	6	2
5878204	I2B0406T100R	13/32	7/16	1	2 1/2	2
5878205	I2B0437T100R	7/16	7/16	1	2 1/2	2
5878206	I2B0500T062S	1/2	1/2	5/8	2 1/2	2
5878207	I2B0500T100R	1/2	1/2	1	3	2
5878208	I2B0500T150X	1/2	1/2	1 1/2	6	2
5878209	I2B0500T200L	1/2	1/2	2	4	2
5878210	I2B0500T300L	1/2	1/2	3	6	2
5878211	I2B0625T125R	5/8	5/8	1 1/4	3 1/2	2
5878212	I2B0625T225L	5/8	5/8	2 1/4	5	2
5878213	I2B0625T300X	5/8	5/8	3	6	2
5878214	I2B0750T100S	3/4	3/4	1	3	2
5878215	I2B0750T150R	3/4	3/4	1 1/2	4	2
5878216	I2B0750T200X	3/4	3/4	2	6	2
5878217	I2B0750T225L	3/4	3/4	2 1/4	5	2
5878218	I2B0750T300X	3/4	3/4	3	6	2
5878219	I2B0875T150R	7/8	7/8	1 1/2	4	2
5878220	I2B1000T150R	1	1	1 1/2	4	2
5878221	I2B1000T300L	1	1	3	6	2

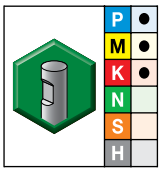
GP End Mills • Series I3S • Sharp Edge • 3 Flute • Inch









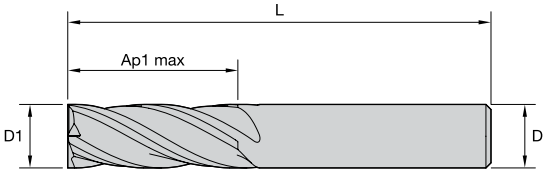


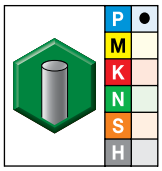
● first choice
○ alternate choice

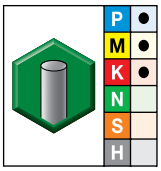
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order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6144206	I3S0031T007R	6144077	I3S0031T007R		–	1/32	1/8	5/64	1 1/2	3
6144208	I3S0062T019R	6144079	I3S0062T019R		–	1/16	1/8	3/16	1 1/2	3
–		6144080	I3S0078T011R		–	5/64	1/8	7/64	1 1/2	3
6144210	I3S0094T037R	6144141	I3S0094T037R		–	3/32	1/8	3/8	1 1/2	3
–		6144142	I3S0109T037R		–	7/64	1/8	3/8	1 1/2	3
6144232	I3S0125T025R		–		–	1/8	1/8	1/4	1 1/2	3
6144233	I3S0125T050L	6144144	I3S0125T050L		–	1/8	1/8	1/2	2 1/2	3
6144234	I3S0125T062X	6144145	I3S0125T062X		–	1/8	1/8	5/8	3	3
6144236	I3S0156T056R	6144147	I3S0156T056R		–	5/32	3/16	9/16	2	3
6144237	I3S0188T031S	6144148	I3S0188T031S		–	3/16	3/16	5/16	2	3
6144238	I3S0188T056R	6144149	I3S0188T056R		–	3/16	3/16	9/16	2	3
6144239	I3S0188T062L	6144150	I3S0188T062L		–	3/16	3/16	5/8	3	3
–		6144151	I3S0188T100X		–	3/16	3/16	1	4	3
–		6144153	I3S0219T062R		–	7/32	1/4	5/8	2 1/2	3
–		6144154	I3S0219T075L		–	7/32	1/4	3/4	2 1/2	3
6144244	I3S0250T050S	6144155	I3S0250T050S		–	1/4	1/4	1/2	2	3
6144245	I3S0250T075R	6144156	I3S0250T075R		–	1/4	1/4	3/4	2 1/2	3
6144246	I3S0250T100L	6144157	I3S0250T100L		–	1/4	1/4	1	3	3
–		6144158	I3S0250T150X		–	1/4	1/4	1 1/2	4	3
–		6144161	I3S0281T081L		–	9/32	5/16	13/16	2 1/2	3
–		6144159	I3S0281T075R		–	9/32	5/16	3/4	2 1/2	3
6144262	I3S0312T050R	6144163	I3S0312T050R		–	5/16	5/16	1/2	2	3
–		6144165	I3S0312T081L		–	5/16	5/16	13/16	2 1/2	3
6144272	I3S0375T050S	6144183	I3S0375T050S		–	3/8	3/8	1/2	2	3
6144275	I3S0375T088R	6144185	I3S0375T088R		–	3/8	3/8	7/8	2 1/2	3
6144277	I3S0375T100L	6144187	I3S0375T100L		–	3/8	3/8	1	2 1/2	3
6144279	I3S0375T112X	6144189	I3S0375T112X		–	3/8	3/8	1 1/8	3	3
–		6144192	I3S0437T062R		–	7/16	7/16	5/8	2 1/2	3
–		6144193	I3S0437T088L		–	7/16	7/16	7/8	2 1/2	3
–		6144194	I3S0437T100X		–	7/16	7/16	1	2 1/2	3
6144284	I3S0500T100R	6144195	I3S0500T100R		–	1/2	1/2	1	3	3
–		6144196	I3S0500T200L	6144162	I3S0500W200L	1/2	1/2	2	4	3
–		6144198	I3S0563T112R	6144166	I3S0563W112R	9/16	5/8	1 1/8	3 1/2	3
–		6144199	I3S0625T075R	6144168	I3S0625W075R	5/8	5/8	3/4	3	3
–		6144200	I3S0625T125L	6144170	I3S0625W125L	5/8	5/8	1 1/4	3 1/2	3
–		6144201	I3S0750T100R		–	3/4	3/4	1	3	3
–		6144202	I3S0750T150L	6144184	I3S0750W150L	3/4	3/4	1 1/2	4	3
–		6144203	I3S0750T225X	6144186	I3S0750W225X	3/4	3/4	2 1/4	5	3
–		6144204	I3S1000T150R		–	1	1	1 1/2	4	3
–		6144205	I3S1000T225X	6144190	I3S1000W225X	1	1	2 1/4	5	3

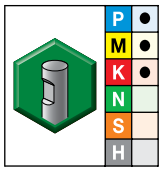
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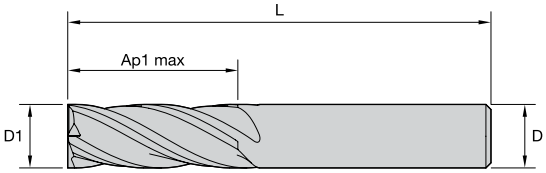
● first choice
○ alternate choice

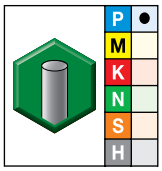
UNCOATED		TiAlN		TiAlN						
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
	–	5879053	I4S0016T003R		–	1/64	1/8	1/32	1 1/2	4
	–	5879054	I4S0031T008R		–	1/32	1/8	5/64	1 1/2	4
5879198	I4S0062T010R	5879055	I4S0062T011R		–	1/16	1/8	7/64	1 1/2	4
5879199	I4S0078T019R		–		–	5/64	1/8	3/16	1 1/2	4
	–	5879056	I4S0078T018R		–	5/64	1/8	3/16	1 1/2	4
5879200	I4S0094T037R	5879057	I4S0093T037R		–	3/32	1/8	3/8	1 1/2	4
	–	5879058	I4S0093T062L		–	3/32	1/8	5/8	2	4
	–	5879059	I4S0109T037R		–	7/64	1/8	3/8	1 1/2	4
	–	5879060	I4S0125T025S		–	1/8	1/8	1/4	1 1/2	4
5879201	I4S0125T050R	5879131	I4S0125T050R		–	1/8	1/8	1/2	1 1/2	4
	–	5879132	I4S0125T075L		–	1/8	1/8	3/4	2 1/4	4
5879202	I4S0125T100X	5879133	I4S0125T100X		–	1/8	1/8	1	3	4
	–	5879134	I4S0140T056R		–	9/64	3/16	9/16	2	4
	–	5879135	I4S0156T056R		–	5/32	3/16	9/16	2	4
5879203	I4S0187T062R	5879136	I4S0187T062R		–	3/16	3/16	5/8	2	4
	–	5879137	I4S0187T075S		–	3/16	3/16	3/4	1 1/2	4
	–	5879138	I4S0187T075L		–	3/16	3/16	3/4	2 1/2	4
5879204	I4S0187T112L	5879139	I4S0187T112L		–	3/16	3/16	1 1/8	3	4
	–	5879140	I4S0187T112X		–	3/16	3/16	1 1/8	3 1/4	4
	–	5879141	I4S0203T062R		–	13/64	1/4	5/8	2 1/2	4
	–	5879142	I4S0218T043R		–	7/32	1/4	7/16	2	4
	–	5879143	I4S0218T062L		–	7/32	1/4	5/8	2 1/2	4
	–	5879144	I4S0234T075R		–	15/64	1/4	3/4	2 1/2	4
5879205	I4S0250T050S	5879145	I4S0250T050S		–	1/4	1/4	1/2	2	4
5879206	I4S0250T075R	5879146	I4S0250T075R		–	1/4	1/4	3/4	2 1/2	4
5879207	I4S0250T112L	5879147	I4S0250T112L		–	1/4	1/4	1 1/8	3	4
5879208	I4S0250T150X	5879148	I4S0250T150X		–	1/4	1/4	1 1/2	4	4
	–	5879149	I4S0265T075R		–	17/64	5/16	3/4	2 1/2	4
	–	5879150	I4S0281T075R		–	9/32	5/16	3/4	2 1/2	4
	–	5879151	I4S0296T081R		–	19/64	5/16	13/16	2 1/2	4
5879209	I4S0312T050S	5879152	I4S0312T050S		–	5/16	5/16	1/2	2	4
5879210	I4S0312T081R	5879153	I4S0312T081R		–	5/16	5/16	13/16	2 1/2	4
5879211	I4S0312T112L	5879154	I4S0312T112L		–	5/16	5/16	1 1/8	3	4
5879212	I4S0312T162X	5879155	I4S0312T162X		–	5/16	5/16	1 5/8	4	4
	–	5879156	I4S0328T100R		–	21/64	3/8	1	2 1/2	4
	–	5879157	I4S0343T100R		–	11/32	3/8	1	2 1/2	4
	–	5879158	I4S0359T100R		–	23/64	3/8	1	2 1/2	4
5879213	I4S0375T062S	5879159	I4S0375T062S		–	3/8	3/8	5/8	2	4
5879214	I4S0375T100R	5879160	I4S0375T100R		–	3/8	3/8	1	2 1/2	4
5879215	I4S0375T112L	5879161	I4S0375T112L		–	3/8	3/8	1 1/8	3	4
5879216	I4S0375T175X	5879162	I4S0375T175X		–	3/8	3/8	1 3/4	4	4
	–	5879163	I4S0390T100R		–	25/64	7/16	1	2 3/4	4
	–	5879164	I4S0406T100R		–	13/32	7/16	1	2 3/4	4
	–	5879165	I4S0421T100R		–	27/64	7/16	1	2 3/4	4
5879217	I4S0437T100S	5879166	I4S0437T100S		–	7/16	7/16	1	2 1/2	4
	–	5879167	I4S0437T100R		–	7/16	7/16	1	2 3/4	4
5879218	I4S0437T200L	5879168	I4S0437T200L		–	7/16	7/16	2	4	4
5879219	I4S0437T300X	5879169	I4S0437T300X		–	7/16	7/16	3	6	4
	–	5879170	I4S0453T100R		–	29/64	1/2	1	3	4
	–	5879171	I4S0468T100R		–	15/32	1/2	1	3	4
	–	5879172	I4S0484T100R		–	31/64	1/2	1	3	4
5879220	I4S0500T062S	5879173	I4S0500T062S		–	1/2	1/2	5/8	2 1/2	4
5879221	I4S0500T100R	5879174	I4S0500T100R	5879527	I4S0500W100R	1/2	1/2	1	3	4
5879222	I4S0500T200L	5879175	I4S0500T200L	5879528	I4S0500W200L	1/2	1/2	2	4	4
5879223	I4S0500T300X	5879176	I4S0500T300X	5879529	I4S0500W300X	1/2	1/2	3	6	4
5879224	I4S0562T075R	5879177	I4S0562T075R	5879530	I4S0562W075R	9/16	9/16	3/4	3	4

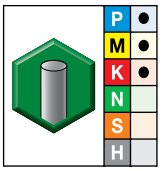
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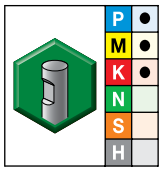
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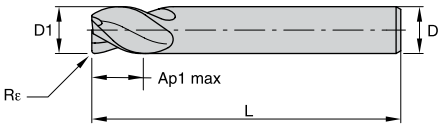


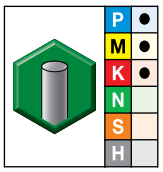
● first choice
○ alternate choice

UNCOATED		TiAlN		TiAlN						
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5879225	I4S0562T125L	5879178	I4S0562T125L	5879551	I4S0562W125L	9/16	9/16	1 1/4	3 1/2	4
	—	5879179	I4S0562T225X	5879552	I4S0562W225X	9/16	9/16	2 1/4	5	4
5879227	I4S0625T075S	5879180	I4S0625T075S	5879553	I4S0625W075S	5/8	5/8	3/4	3	4
5879228	I4S0625T125R	5879181	I4S0625T125R	5879554	I4S0625W125R	5/8	5/8	1 1/4	3 1/2	4
5879229	I4S0625T225L	5879182	I4S0625T225L	5879555	I4S0625W225L	5/8	5/8	2 1/4	5	4
5879230	I4S0625T400X	5879183	I4S0625T400X	5879556	I4S0625W400X	5/8	5/8	4	7	4
	—	5879184	I4S0687T137R		—	11/16	3/4	1 3/8	4	4
5879241	I4S0750T100S	5879185	I4S0750T100S		—	3/4	3/4	1	3	4
5879242	I4S0750T150R	5879186	I4S0750T150R	5879558	I4S0750W150R	3/4	3/4	1 1/2	4	4
5879243	I4S0750T225R	5879187	I4S0750T225R	5879559	I4S0750W225R	3/4	3/4	2 1/4	5	4
5879244	I4S0750T300L	5879188	I4S0750T300L	5879560	I4S0750W300L	3/4	3/4	3	6	4
5879245	I4S0750T400X	5879189	I4S0750T400X	5879561	I4S0750W400X	3/4	3/4	4	7	4
	—	5879190	I4S0812T150R		—	13/16	7/8	1 1/2	4	4
5879246	I4S0875T150R	5879191	I4S0875T150R	5879562	I4S0875W150R	7/8	7/8	1 1/2	4	4
5879247	I4S0875T225L	5879192	I4S0875T225L	5879563	I4S0875W225L	7/8	7/8	2 1/4	5	4
5879248	I4S1000T150S	5879193	I4S1000T150S		—	1	1	1 1/2	4	4
5879249	I4S1000T225R	5879194	I4S1000T225R	5879565	I4S1000W225R	1	1	2 1/4	5	4
5879250	I4S1000T300L	5879195	I4S1000T300L	5879566	I4S1000W300L	1	1	3	6	4
5879261	I4S1000T400X	5879196	I4S1000T400X	5879567	I4S1000W400X	1	1	4	7	4
5879262	I4S1250T200R	5879197	I4S1250T200R		—	1 1/4	1 1/4	2	4 1/2	4

GP End Mills • Series I4R • Radiused • 4 Flute • Inch







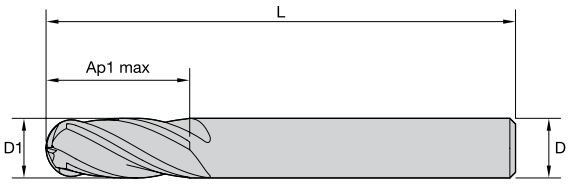
● first choice
○ alternate choice

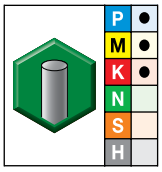
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order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6282423	I4R0062T011R010	1/16	1/8	1/8	1 1/2	.010	4
6282424	I4R0062T011R015	1/16	1/8	1/8	1 1/2	.015	4
6282426	I4R0094T037R010	3/32	1/8	3/8	1 1/2	.010	4
6282427	I4R0094T037R015	3/32	1/8	3/8	1 1/2	.015	4
6282428	I4R0125T050R010	1/8	1/8	1/2	1 1/2	.010	4
6282429	I4R0125T050R015	1/8	1/8	1/2	1 1/2	.015	4
6282430	I4R0125T050R020	1/8	1/8	1/2	1 1/2	.020	4
6282441	I4R0125T050R030	1/8	1/8	1/2	1 1/2	.030	4
6282442	I4R0187T062R010	3/16	3/16	5/8	2	.010	4
6282443	I4R0187T062R015	3/16	3/16	5/8	2	.015	4
6282444	I4R0187T062R020	3/16	3/16	5/8	2	.020	4
6282446	I4R0187T062R030	3/16	3/16	5/8	2	.030	4
6282447	I4R0250T075R015	1/4	1/4	3/4	2 1/2	.015	4
6282448	I4R0250T075R020	1/4	1/4	3/4	2 1/2	.020	4
6282449	I4R0250T075R030	1/4	1/4	3/4	2 1/2	.030	4
6282450	I4R0250T075R045	1/4	1/4	3/4	2 1/2	.045	4
6282461	I4R0250T075R060	1/4	1/4	3/4	2 1/2	.060	4
6282462	I4R0312T081R015	5/16	5/16	13/16	2 1/2	.015	4
6282463	I4R0312T081R020	5/16	5/16	13/16	2 1/2	.020	4
6282464	I4R0312T081R030	5/16	5/16	13/16	2 1/2	.030	4
6282465	I4R0312T081R045	5/16	5/16	13/16	2 1/2	.045	4
6282467	I4R0312T081R060	5/16	5/16	13/16	2 1/2	.060	4
6285506	I4R0375T100R015	3/8	3/8	1	2 1/2	.015	4
6282468	I4R0375T100R020	3/8	3/8	1	2 1/2	.020	4
6282469	I4R0375T100R030	3/8	3/8	1	2 1/2	.030	4
6282470	I4R0375T100R045	3/8	3/8	1	2 1/2	.045	4
6282501	I4R0375T100R060	3/8	3/8	1	2 1/2	.060	4
6282503	I4R0500T100R015	1/2	1/2	1	3	.015	4
6282504	I4R0500T100R020	1/2	1/2	1	3	.020	4
6282505	I4R0500T100R030	1/2	1/2	1	3	.030	4
6282506	I4R0500T100R045	1/2	1/2	1	3	.045	4
6282507	I4R0500T100R060	1/2	1/2	1	3	.060	4
6282508	I4R0625T125R015	5/8	5/8	1 1/4	3 1/2	.015	4
6282509	I4R0625T125R020	5/8	5/8	1 1/4	3 1/2	.020	4
6282510	I4R0625T125R030	5/8	5/8	1 1/4	3 1/2	.030	4
6282531	I4R0625T125R045	5/8	5/8	1 1/4	3 1/2	.045	4
6282532	I4R0625T125R060	5/8	5/8	1 1/4	3 1/2	.060	4
6282533	I4R0625T125R090	5/8	5/8	1 1/4	3 1/2	.090	4
6282535	I4R0625T125R125	5/8	5/8	1 1/4	3 1/2	.125	4
6282536	I4R0750T150R015	3/4	3/4	1 1/2	4	.015	4
6282537	I4R0750T150R020	3/4	3/4	1 1/2	4	.020	4
6282538	I4R0750T150R030	3/4	3/4	1 1/2	4	.030	4
6282539	I4R0750T150R045	3/4	3/4	1 1/2	4	.045	4
6282540	I4R0750T150R060	3/4	3/4	1 1/2	4	.060	4
6282561	I4R0750T150R090	3/4	3/4	1 1/2	4	.090	4
6282562	I4R0750T150R125	3/4	3/4	1 1/2	4	.125	4
6282563	I4R0875T150R015	7/8	7/8	1 1/2	4	.015	4
6282564	I4R0875T150R020	7/8	7/8	1 1/2	4	.020	4
6282565	I4R0875T150R030	7/8	7/8	1 1/2	4	.030	4
6282566	I4R0875T150R045	7/8	7/8	1 1/2	4	.045	4
6282567	I4R0875T150R060	7/8	7/8	1 1/2	4	.060	4
6282568	I4R0875T150R090	7/8	7/8	1 1/2	4	.090	4
6282569	I4R0875T150R125	7/8	7/8	1 1/2	4	.125	4
6282570	I4R1000T150R015	1	1	1 1/2	4	.015	4
6282571	I4R1000T150R020	1	1	1 1/2	4	.020	4
6282572	I4R1000T150R030	1	1	1 1/2	4	.030	4
6282573	I4R1000T150R045	1	1	1 1/2	4	.045	4
6282574	I4R1000T150R060	1	1	1 1/2	4	.060	4
6282575	I4R1000T150R090	1	1	1 1/2	4	.090	4
6282576	I4R1000T150R125	1	1	1 1/2	4	.125	4

GP End Mills • Series I4B • Ball Nose • 4 Flute • Inch







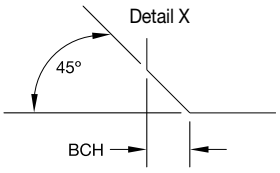
● first choice
○ alternate choice

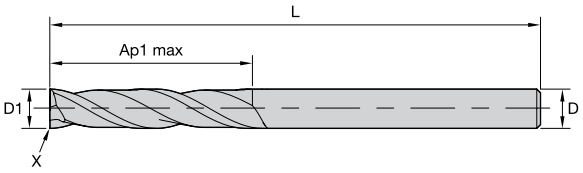
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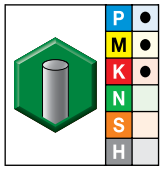
order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5825624	I4B0031T008R	1/32	1/8	5/64	1 1/2	4
5825625	I4B0047T012R	3/64	1/8	1/8	1 1/2	4
5825626	I4B0062T019R	1/16	1/8	3/16	1 1/2	4
5825627	I4B0078T019R	5/64	1/8	3/16	1 1/2	4
5825628	I4B0094T019R	3/32	1/8	3/16	1 1/2	4
5825643	I4B0094T037L	3/32	1/8	3/8	1 1/2	4
5825645	I4B0109T037R	7/64	1/8	3/8	1 1/2	4
5825646	I4B0125T025S	1/8	1/8	1/4	1 1/2	4
5825647	I4B0125T050R	1/8	1/8	1/2	1 1/2	4
5825648	I4B0125T075L	1/8	1/8	3/4	2 1/4	4
5825649	I4B0125T075X	1/8	1/8	3/4	3	4
5825650	I4B0141T056R	9/64	3/16	9/16	2	4
5825651	I4B0156T031R	5/32	3/16	5/16	2	4
5825652	I4B0156T056L	5/32	3/16	9/16	2	4
5825653	I4B0172T062R	11/64	3/16	5/8	2	4
5825654	I4B0187T031S	3/16	3/16	5/16	1 1/2	4
5825655	I4B0187T062R	3/16	3/16	5/8	2	4
5825656	I4B0187T075L	3/16	3/16	3/4	2 1/2	4
5825657	I4B0187T100X	3/16	3/16	1	4	4
5825658	I4B0203T062R	13/64	1/4	5/8	2 1/2	4
5825659	I4B0219T062R	7/32	1/4	5/8	2 1/2	4
5825660	I4B0234T075R	15/64	1/4	3/4	2 1/2	4
5825661	I4B0250T050S	1/4	1/4	1/2	2	4
5825663	I4B0250T075R	1/4	1/4	3/4	2 1/2	4
5825664	I4B0250T112R	1/4	1/4	1 1/8	3	4
5825665	I4B0250T150L	1/4	1/4	1 1/2	4	4
5825666	I4B0250T150X	1/4	1/4	1 1/2	6	4
5825667	I4B0266T075R	17/64	5/16	3/4	2 1/2	4
5825668	I4B0281T075R	9/32	5/16	3/4	2 1/2	4
5825669	I4B0312T050S	5/16	5/16	1/2	2	4
5825670	I4B0312T081R	5/16	5/16	13/16	2 1/2	4
5825681	I4B0312T112L	5/16	5/16	1 1/8	3	4
5825682	I4B0312T162X	5/16	5/16	1 5/8	4	4
5825683	I4B0344T100R	11/32	3/8	1	2 1/2	4
5825684	I4B0375T100S	3/8	3/8	1	2 1/2	4
5825685	I4B0375T100L	3/8	3/8	1	4	4
5825686	I4B0375T112R	3/8	3/8	1 1/8	3	4
5825687	I4B0375T150X	3/8	3/8	1 1/2	6	4
5825688	I4B0437T100R	7/16	1/2	1	2 1/2	4
5825689	I4B0500T100S	1/2	1/2	1	3	4
5825690	I4B0500T100R	1/2	1/2	1	4	4
5825691	I4B0500T150X	1/2	1/2	1 1/2	6	4
5825693	I4B0500T200L	1/2	1/2	2	4 1/2	4
5825692	I4B0500T200R	1/2	1/2	2	4	4
5825694	I4B0500T300X	1/2	1/2	3	6	4
5825695	I4B0562T125R	9/16	9/16	1 1/4	3 1/2	4
5825696	I4B0625T075S	5/8	5/8	3/4	3	4
5825697	I4B0625T125R	5/8	5/8	1 1/4	3 1/2	4
5825698	I4B0625T225L	5/8	5/8	2 1/4	5	4
5825699	I4B0625T300X	5/8	5/8	3	6	4
5825700	I4B0750T100R	3/4	3/4	1	3	4
5825711	I4B0750T150L	3/4	3/4	1 1/2	4	4
5825712	I4B0750T300X	3/4	3/4	3	6	4
5825713	I4B0875T150R	7/8	7/8	1 1/2	4	4
5825714	I4B1000T150R	1	1	1 1/2	4	4
5825715	I4B1000T225L	1	1	2 1/4	5	4

GP End Mills • Series 4002 4012 • Square End • 2 Flute • Metric









● first choice
○ alternate choice

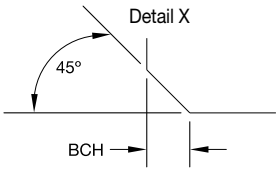
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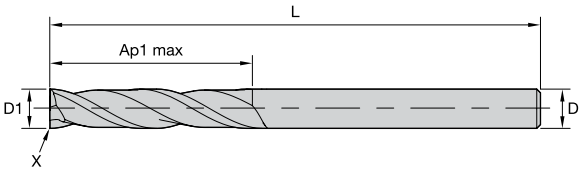
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5873484	40020100T004	1,0	3	4,00	38	–	2
5873485	40020150T004	1,5	3	4,00	38	–	2
5873486	40020180T004	1,8	3	4,00	38	–	2
5873487	40020200T006	2,0	3	6,30	38	–	2
5873488	40020250T006	2,5	3	6,30	38	–	2
5873489	40020300T009	3,0	3	9,50	38	–	2
5873490	40020300T019	3,0	3	19,00	63	–	2
5873491	40120300T025	3,0	3	25,00	75	–	2
5873492	40020350T012	3,5	4	12,00	54	–	2
5873493	40020400T012	4,0	4	12,00	50	0,10	2
6092621	40020400T012S	4,0	4	12,00	50	–	2
5873494	40020400T019	4,0	4	19,00	63	0,10	2
6092622	40020400T019S	4,0	4	19,00	63	–	2
6092623	40120400T031S	4,0	4	31,00	75	–	2
5873495	40120400T031	4,0	4	31,00	75	0,10	2
6092624	40020450T014S	4,5	6	14,00	50	–	2
5873496	40020450T014	4,5	6	14,00	50	0,10	2
5873498	40020500T014	5,0	5	14,00	50	0,10	2
6092627	40020500T014S	5,0	5	14,00	50	–	2
5873499	40020500T020	5,0	5	20,00	63	0,10	2
6092628	40020500T020S	5,0	5	20,00	63	–	2
6092631	40120500T031S	5,0	5	31,00	100	–	2
5873500	40120500T031	5,0	5	31,00	100	0,10	2
5873501	40020550T014	5,5	6	14,00	50	0,10	2
6092632	40020550T014S	5,5	6	14,00	50	–	2
6092633	40020600T016S	6,0	6	16,00	50	–	2
5873502	40020600T016	6,0	6	16,00	50	0,10	2
5873503	40020600T028	6,0	6	28,00	76	0,10	2
6092634	40020600T028S	6,0	6	28,00	76	–	2
6092636	40120600T038S	6,0	6	38,00	100	–	2
5873504	40120600T038	6,0	6	38,00	100	0,10	2
5873505	40020700T020	7,0	7	20,00	63	0,10	2
6092637	40020700T020S	7,0	7	20,00	63	–	2
5873506	40020800T020	8,0	8	20,00	63	0,20	2
6092638	40020800T020S	8,0	8	20,00	63	–	2
6092639	40020800T028S	8,0	8	28,00	76	–	2
5873507	40020800T028	8,0	8	28,00	76	0,20	2
6092640	40120800T041S	8,0	8	41,00	100	–	2
5873508	40120800T041	8,0	8	41,00	100	0,20	2
5873509	40020900T020	9,0	9	20,00	63	0,20	2
6092641	40020900T020S	9,0	9	20,00	63	–	2
5873510	40021000T022	10,0	10	22,00	72	0,20	2
6092643	40021000T022S	10,0	10	22,00	72	–	2
6092644	40021000T032S	10,0	10	32,00	89	–	2
5873511	40021000T032	10,0	10	32,00	89	0,20	2
6092645	40121000T045S	10,0	10	45,00	100	–	2
5873512	40121000T045	10,0	10	45,00	100	0,20	2
6092646	40021100T025S	11,0	11	25,00	76	–	2
5873513	40021100T025	11,0	11	25,00	76	0,30	2
5873514	40021200T025	12,0	12	25,00	76	0,30	2
6092647	40021200T025S	12,0	12	25,00	76	–	2
5873515	40021200T045	12,0	12	45,00	100	0,30	2
6092648	40021200T045S	12,0	12	45,00	100	–	2
6092650	40121200T075S	12,0	12	75,00	150	–	2
5873516	40121200T075	12,0	12	75,00	150	0,30	2
6092651	40021400T032S	14,0	14	32,00	83	–	2

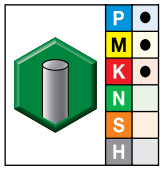
GP End Mills • Series 4002 4012 • Square End • 2 Flute • Metric

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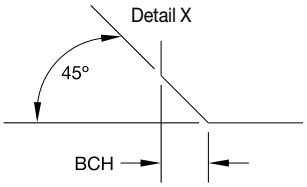
● first choice
○ alternate choice

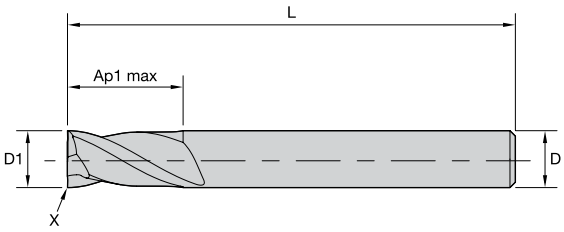
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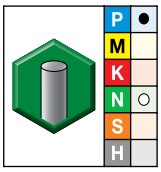
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5873517	40021400T032	14,0	14	32,00	83	0,30	2
6092653	40021400T050S	14,0	14	50,00	100	–	2
5873518	40021400T050	14,0	14	50,00	100	0,30	2
6092654	40121400T075S	14,0	14	75,00	150	–	2
5873519	40121400T075	14,0	14	75,00	150	0,30	2
5873520	40021600T032	16,0	16	32,00	89	0,30	2
6092657	40021600T032S	16,0	16	32,00	89	–	2
6092658	40021600T056S	16,0	16	56,00	110	–	2
5873531	40021600T056	16,0	16	56,00	110	0,30	2
6092659	40121600T075S	16,0	16	75,00	150	–	2
5873532	40121600T075	16,0	16	75,00	150	0,30	2
5873533	40021800T038	18,0	18	38,00	100	0,30	2
6092660	40021800T038S	18,0	18	38,00	100	–	2
5873536	40022000T038	20,0	20	38,00	104	0,30	2
6092683	40022000T038S	20,0	20	38,00	104	–	2
5873537	40022000T056	20,0	20	56,00	125	0,30	2
6092684	40022000T056S	20,0	20	56,00	125	–	2
6092685	40122000T075S	20,0	20	75,00	150	–	2
5873538	40122000T075	20,0	20	75,00	150	0,30	2

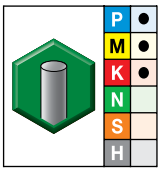
GP End Mills • Series D002 D012 • Square End • 2 Flute • Metric

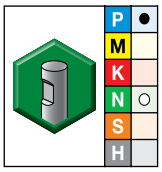


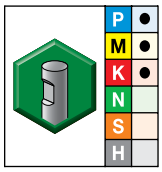










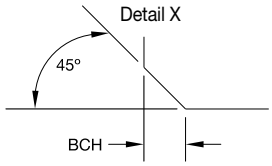


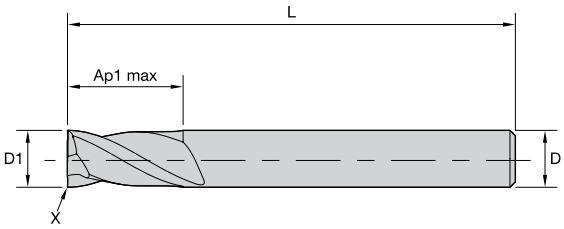
● first choice
○ alternate choice

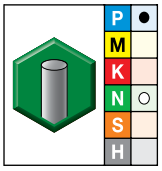
UNCOATED		TiAlN		UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
5877567	D0020200T003	5877330	D0020200T003	–		–		2,0	6	3,00	50	–	2
	–	5877501	D0020250T003	–		–		2,5	6	3,00	50	–	2
5877569	D0120250T007	5877502	D0120250T007	–		–		2,5	6	7,00	57	–	2
5877571	D0020300T004	5877503	D0020300T004	–		–		3,0	6	4,00	50	–	2
5877572	D0120300T007	5877504	D0120300T007	–		–		3,0	6	7,00	57	–	2
5877573	D0020350T004	5877505	D0020350T004	–		–		3,5	6	4,00	50	–	2
	–	5877506	D0020400T005	–		–		4,0	6	5,00	54	0,10	2
	–	6092298	D0020400T005S	–		–		4,0	6	5,00	54	–	2
6092392	D0120400T008S	6092299	D0120400T008S	–		–		4,0	6	8,00	57	–	2
5877575	D0120400T008	5877507	D0120400T008	–		–		4,0	6	8,00	57	0,10	2
	–	6092300	D0020450T005S	–		–		4,5	6	5,00	54	–	2
	–	5877509	D0020450T005	–		–		4,5	6	5,00	54	0,10	2
	–	6092301	D0120450T008S	–		–		4,5	6	8,00	57	–	2
	–	5877510	D0120450T008	–		–		4,5	6	8,00	57	0,10	2
6092397	D0020500T006S	6092302	D0020500T006S	–		–		5,0	6	6,00	54	–	2
	–	5877511	D0020500T006	–		–		5,0	6	6,00	54	0,10	2
6092398	D0120500T010S	6092303	D0120500T010S	–		–		5,0	6	10,00	57	–	2
5877579	D0120500T010	5877512	D0120500T010	–		–		5,0	6	10,00	57	0,10	2
6092399	D0020600T007S	6092304	D0020600T007S	–		–		6,0	6	7,00	54	–	2
5877581	D0020600T007	5877513	D0020600T007	–		–		6,0	6	7,00	54	0,10	2
6092411	D0120600T010S	6092305	D0120600T010S	–		–		6,0	6	10,00	57	–	2
5877582	D0120600T010	5877514	D0120600T010	–		–		6,0	6	10,00	57	0,10	2
6092412	D0020700T008S	6092306	D0020700T008S	–		–		7,0	8	8,00	58	–	2
	–	5877515	D0020700T008	–		–		7,0	8	8,00	58	0,10	2
6092414	D0120700T013S	6092307	D0120700T013S	–		–		7,0	8	13,00	63	–	2
5877584	D0120700T013	5877516	D0120700T013	–		–		7,0	8	13,00	63	0,10	2
6092415	D0020800T009S	6092308	D0020800T009S	–		–		8,0	8	9,00	58	–	2
	–	5877517	D0020800T009	–		–		8,0	8	9,00	58	0,20	2
6092416	D0120800T016S	6092309	D0120800T016S	–		–		8,0	8	16,00	63	–	2
5877586	D0120800T016	5877518	D0120800T016	–		–		8,0	8	16,00	63	0,20	2
6092418	D0020900T010S	6092310	D0020900T010S	–		–		9,0	10	10,00	66	–	2
5877588	D0020900T010		–	–		–		9,0	10	10,00	66	0,20	2
	–	6092321	D0120900T016S	–		–		9,0	10	16,00	72	–	2
	–	5877521	D0120900T016	–		–		9,0	10	16,00	72	0,20	2
6092421	D0021000T011S	6092322	D0021000T011S	–		–		10,0	10	11,00	66	–	2
5877590	D0021000T011	5877522	D0021000T011	–		–		10,0	10	11,00	66	0,20	2
6092422	D0121000T019S	6092323	D0121000T019S	–		–		10,0	10	19,00	72	–	2
	–	5877523	D0121000T019	–		–		10,0	10	19,00	72	0,20	2
6092423	D0021200T012S	6092324	D0021200T012S	–		6092334	D0021200W012S	12,0	12	12,00	73	–	2
5877592	D0021200T012	5877524	D0021200T012	–		5877535	D0021200W012	12,0	12	12,00	73	0,30	2
6092424	D0121200T022S	6092325	D0121200T022S	–		6092335	D0121200W022S	12,0	12	22,00	83	–	2
	–	5877525	D0121200T022	–		5877537	D0121200W022	12,0	12	22,00	83	0,30	2
6092426	D0021400T014S	6092326	D0021400T014S	–		6092336	D0021400W014S	14,0	14	14,00	75	–	2
	–	5877526	D0021400T014	–		5877538	D0021400W014	14,0	14	14,00	75	0,30	2
	–	6092327	D0121400T022S	–		6092337	D0121400W022S	14,0	14	22,00	83	–	2
5877595	D0121400T022	5877527	D0121400T022	–		5877539	D0121400W022	14,0	14	22,00	83	0,30	2
	–	6092328	D0021600T016S	–		6092338	D0021600W016S	16,0	16	16,00	82	–	2
	–	5877529	D0021600T016	–		5877540	D0021600W016	16,0	16	16,00	82	0,30	2
	–	6092329	D0121600T026S	6092350	D0121600W026S	6092339	D0121600W026S	16,0	16	26,00	92	–	2
	–	5877530	D0121600T026	–		5877551	D0121600W026	16,0	16	26,00	92	0,30	2
	–	6092330	D0021800T018S	–		6092340	D0021800W018S	18,0	18	18,00	84	–	2
	–	5877531	D0021800T018	–		5877552	D0021800W018	18,0	18	18,00	84	0,30	2
	–	6092331	D0121800T026S	–		6092341	D0121800W026S	18,0	18	26,00	92	–	2
	–	5877532	D0121800T026	–		5877553	D0121800W026	18,0	18	26,00	92	0,30	2
	–	6092332	D0022000T020S	–		6092342	D0022000W020S	20,0	20	20,00	92	–	2
	–	5877533	D0022000T020	–		5877554	D0022000W020	20,0	20	20,00	92	0,30	2
	–	6092333	D0122000T032S	–		6092344	D0122000W032S	20,0	20	32,00	104	–	2
5877602	D0122000T032	5877534	D0122000T032	–		5877555	D0122000W032	20,0	20	32,00	104	0,30	2

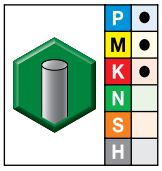
GP End Mills • Series 2819 • Square End • 2 Flute • Metric DIN 6528









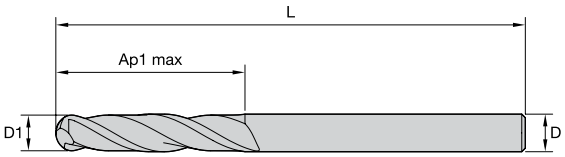


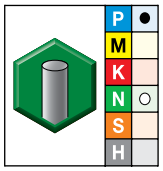
● first choice
○ alternate choice

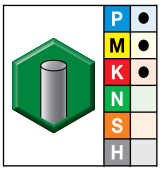
UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
–		5877603	28190300T007	3,0	3	8,00	50	–	2
6092573	28190400T008S	6092528	28190400T008S	4,0	4	8,00	50	–	2
–		5877604	28190400T008	4,0	4	8,00	50	0,10	2
–		6092529	28190500T010S	5,0	5	10,00	50	–	2
–		5877605	28190500T010	5,0	5	10,00	50	0,10	2
–		6092530	28190600T010S	6,0	6	10,00	57	–	2
–		5877606	28190600T010	6,0	6	10,00	57	0,10	2
–		6092562	28190800T016S	8,0	8	16,00	63	–	2
–		5877608	28190800T016	8,0	8	16,00	63	0,20	2
–		6092563	28190900T016S	9,0	9	16,00	67	–	2
–		5877609	28190900T016	9,0	9	16,00	67	0,20	2
–		6092565	28191000T019S	10,0	10	19,00	72	–	2
–		5877610	28191000T019	10,0	10	19,00	72	0,20	2
–		6092566	28191200T022S	12,0	12	22,00	83	–	2
–		5877611	28191200T022	12,0	12	22,00	83	0,30	2
–		6092567	28191400T022S	14,0	14	22,00	83	–	2
–		5877612	28191400T022	14,0	14	22,00	83	0,30	2
–		6092568	28191500T026S	15,0	15	26,00	92	–	2
–		5877613	28191500T026	15,0	15	26,00	92	0,30	2
–		6092569	28191600T026S	16,0	16	26,00	92	–	2
–		5877614	28191600T026	16,0	16	26,00	92	0,30	2
–		6092571	28192000T032S	20,0	20	32,00	104	–	2
–		5877616	28192000T032	20,0	20	32,00	104	0,30	2

GP End Mills • Series 4001 4011 4021 • Ball Nose • 2 Flute • Metric







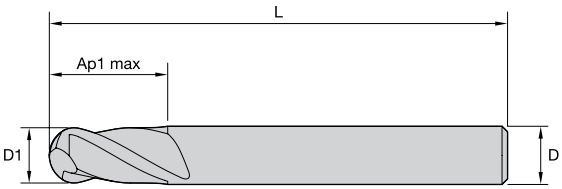


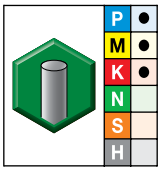
● first choice
○ alternate choice

UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5880425	40010100T004	5880387	40010100T004	1,0	3	4,00	38	2
5880426	40010150T005	5880388	40010150T005	1,5	3	5,00	38	2
5880427	40010200T006	5880389	40010200T006	2,0	3	6,30	38	2
—		5880390	40010250T007	2,5	3	7,00	38	2
5880429	40010300T009	5880391	40010300T009	3,0	3	9,50	38	2
—		6232631	40110300T019	3,0	3	19,00	63	2
—		6232632	40210300T025	3,0	3	25,00	75	2
—		5880392	40010350T012	3,5	4	12,00	50	2
5880430	40010400T012	5880393	40010400T012	4,0	4	12,00	50	2
—		5880395	40110400T019	4,0	4	19,00	63	2
5880432	40210400T031	5880396	40210400T031	4,0	4	31,00	75	2
5880433	40010500T014	6209446	40010500T014	5,0	5	14,00	50	2
—		6209447	40110500T020	5,0	5	20,00	63	2
—		5880397	40210500T014	5,0	6	14,00	50	2
5880435	40010600T020	5880398	40010600T020	6,0	6	20,00	63	2
5880436	40110600T028	5880399	40110600T028	6,0	6	28,00	76	2
5880437	40210600T038	5880400	40210600T038	6,0	6	38,00	100	2
5880438	40010800T020	5880401	40010800T020	8,0	8	20,00	63	2
5880439	40110800T028	5880402	40110800T028	8,0	8	28,00	76	2
5880440	40210800T040	5880403	40210800T040	8,0	8	40,00	100	2
5880441	40011000T022	5880404	40011000T022	10,0	10	22,00	76	2
5880442	40111000T032	5880405	40111000T032	10,0	10	32,00	89	2
5880443	40211000T045	5880406	40211000T045	10,0	10	45,00	100	2
5880444	40011200T025	5880407	40011200T025	12,0	12	25,00	75	2
5880445	40111200T045	5880408	40111200T045	12,0	12	45,00	100	2
5880446	40211200T075	5880409	40211200T075	12,0	12	75,00	150	2
—		5880410	40011400T032	14,0	14	32,00	89	2
5880448	40011600T032	5880411	40011600T032	16,0	16	32,00	89	2
—		6209448	40111600T056	16,0	16	56,00	110	2
—		6209449	40211600T075	16,0	16	75,00	150	2
5880449	40012000T038	5880412	40012000T038	20,0	20	38,00	100	2
5880450	40112000T075	5880413	40112000T075	20,0	20	75,00	150	2

GP End Mills • Series D001 D011 • Ball Nose • 2 Flute • Metric







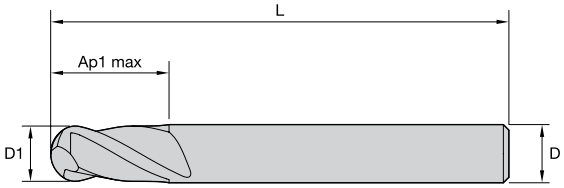
● first choice
○ alternate choice

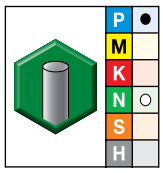
TiAlN

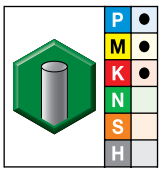
order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5880362	D0110200T006	2,0	6	6,00	57	2
5880363	D0010300T004	3,0	6	4,00	50	2
5880364	D0110300T007	3,0	6	7,00	57	2
5880365	D0010400T005	4,0	6	5,00	54	2
5880366	D0110400T008	4,0	6	8,00	57	2
5880367	D0110500T010	5,0	6	10,00	57	2
5880368	D0110600T010	6,0	6	10,00	57	2
5880369	D0110700T013	7,0	8	13,00	63	2
5880370	D0110800T016	8,0	8	16,00	63	2
5880381	D0111000T019	10,0	10	19,00	72	2
5880382	D0111200T022	12,0	12	22,00	83	2
5880383	D0111400T022	14,0	14	22,00	83	2
5880384	D0111600T026	16,0	16	26,00	92	2
5880385	D0012000T020	20,0	20	20,00	92	2
5880386	D0112000T032	20,0	20	32,00	104	2

GP End Mills • Series 2838 • Ball Nose • 2 Flute • Metric







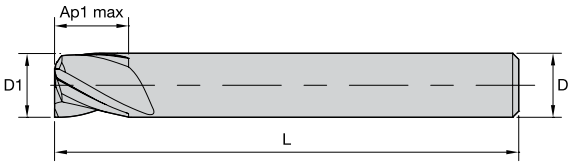


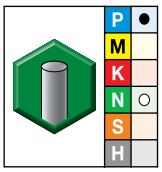
● first choice
○ alternate choice

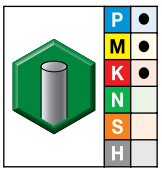
UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
–		5880451	28380200T007	2,0	2	7,00	50	2
–		5880452	28380300T007	3,0	3	7,00	50	2
–		5880453	28380400T008	4,0	4	8,00	50	2
–		5880454	28380500T010	5,0	5	10,00	50	2
5880465	28380600T010	5880455	28380600T010	6,0	6	10,00	57	2
–		5880456	28380800T016	8,0	8	16,00	63	2
–		5880457	28381000T019	10,0	10	19,00	72	2
–		5880458	28381200T022	12,0	12	22,00	83	2
–		5880459	28381400T022	14,0	14	22,00	83	2
–		5880460	28381600T026	16,0	16	26,00	92	2

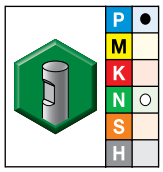
GP End Mills • Series 4003 4013 • Sharp Edge • 3 Flute • Metric

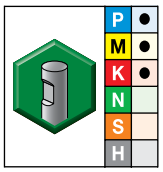










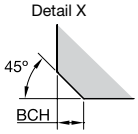


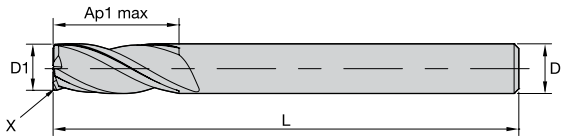
● first choice
○ alternate choice

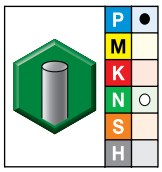
UNCOATED		TiAlN		UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6144570	40030100T004S	6144056	40030100T004S		–		–	1,0	3	4,00	38	3
6144651	40030150T004S	6144057	40030150T004S		–		–	1,5	3	4,00	38	3
6144652	40030200T006S	6144058	40030200T006S		–		–	2,0	3	6,30	38	3
6144653	40030250T006S	6144059	40030250T006S		–		–	2,5	3	6,30	38	3
6144654	40030300T009S	6144060	40030300T009S		–		–	3,0	3	9,50	38	3
6145303	40130300T019S	6145199	40130300T019S	6145319	40130300W019S	6145243	40130300W019S	3,0	6	19,00	63	3
6144655	40030400T012S	6144551	40030400T012S		–		–	4,0	4	12,00	50	3
6145305	40130400T019S	6145200	40130400T019S		–		–	4,0	4	19,00	63	3
6144656	40030500T014S	6144552	40030500T014S		–		–	5,0	6	14,00	50	3
	–	6145231	40130500T020S		–	6145247	40130500W020S	5,0	6	20,00	63	3
6144657	40030600T016S	6144553	40030600T016S		–	6144565	40030600W016S	6,0	6	16,00	50	3
6145309	40130600T028S	6145232	40130600T028S		–		–	6,0	6	28,00	75	3
6144658	40030800T019S	6144554	40030800T019S		–	6144566	40030800W019S	8,0	8	19,00	63	3
6145311	40130800T028S	6145233	40130800T028S		–		–	8,0	8	28,00	75	3
6144659	40031000T022S	6144555	40031000T022S		–	6144567	40031000W022S	10,0	10	22,00	76	3
6145313	40131000T032S	6145234	40131000T032S		–		–	10,0	10	32,00	89	3
6144660	40031200T025S	6144556	40031200T025S		–	6144568	40031200W025S	12,0	12	25,00	75	3
6145315	40131200T045S	6145235	40131200T045S		–	6145255	40131200W045S	12,0	12	45,00	100	3
6144661	40031600T032S	6144557	40031600T032S		–	6144569	40031600W032S	16,0	16	32,00	89	3
6145317	40131600T056S	6145238	40131600T056S		–	6145257	40131600W056S	16,0	16	56,00	110	3
6145318	40132000T064S	6145241	40132000T064S		–	6145259	40132000W064S	20,0	20	64,00	125	3

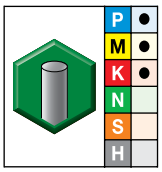
GP End Mills • Series 4003 4013 • Chamfered • 3 Flute • Metric

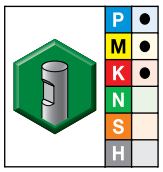










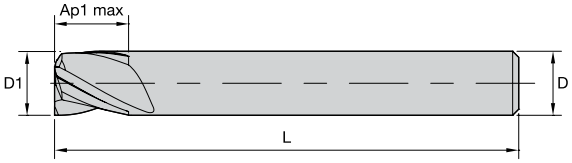


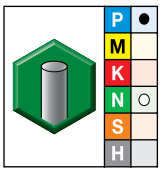
● first choice
○ alternate choice

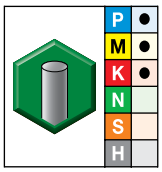
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order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
	–	6145107	40030400T012		–	4,0	4	12,00	50	0,10	3
	–	6145181	40130400T019		–	4,0	4	19,00	63	0,10	3
6145275	40130500T020	6145182	40130500T020	6145190	40130500W020	5,0	6	20,00	63	0,10	3
6145242	40030600T016	6145109	40030600T016	6145176	40030600W016	6,0	6	16,00	50	0,10	3
6145276	40130600T028	6145183	40130600T028		–	6,0	6	28,00	75	0,10	3
	–	6145110	40030800T019		–	8,0	8	19,00	63	0,20	3
6145277	40130800T028	6145184	40130800T028		–	8,0	8	28,00	75	0,20	3
	–	6145171	40031000T022	6145178	40031000W022	10,0	10	22,00	76	0,20	3
6145278	40131000T032	6145185	40131000T032		–	10,0	10	32,00	89	0,20	3
6145248	40031200T025	6145172	40031200T025	6145179	40031200W025	12,0	12	25,00	75	0,30	3
6145279	40131200T045	6145186	40131200T045	6145194	40131200W045	12,0	12	45,00	100	0,30	3
6145250	40031600T032	6145173	40031600T032	6145180	40031600W032	16,0	16	32,00	89	0,30	3
	–	6145187	40131600T056	6145195	40131600W056	16,0	16	56,00	110	0,30	3
	–	6145188	40132000T064	6145196	40132000W064	20,0	20	64,00	125	0,30	3

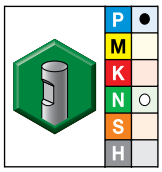
GP End Mills • Series D003 D013 • Sharp Edge • 3 Flute • Metric

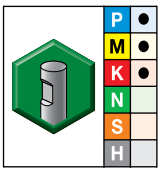










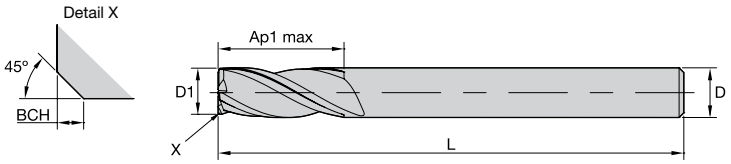


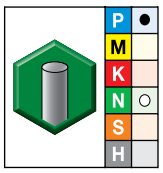
● first choice
○ alternate choice

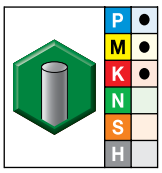
UNCOATED		TiAlN		UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6144450	D0030200T003S	6144351	D0030200T003S		–	6144388	D0030200W003S	2,0	6	3,00	50	3
6143764	D0130200T006S	6144441	D0130200T006S	6143831	D0130200W006S	6144467	D0130200W006S	2,0	6	6,00	57	3
–		6144352	D0030250T003S		–	6144390	D0030250W003S	2,5	6	3,00	50	3
6143765	D0130250T007S	6144442	D0130250T007S	6143832	D0130250W007S	6144469	D0130250W007S	2,5	6	7,00	57	3
6144454	D0030300T004S	6144353	D0030300T004S	6144488	D0030300W004S	6144392	D0030300W004S	3,0	6	4,00	50	3
6143766	D0130300T007S	6144443	D0130300T007S	6143833	D0130300W007S	6144471	D0130300W007S	3,0	6	7,00	57	3
6144456	D0030350T004S	6144354	D0030350T004S		–	6144394	D0030350W004S	3,5	6	4,00	50	3
–		6144444	D0130350T007S	6143834	D0130350W007S	6144473	D0130350W007S	3,5	6	7,00	57	3
–		6144355	D0030400T005S	6144492	D0030400W005S	6144396	D0030400W005S	4,0	6	5,00	54	3
6143768	D0130400T008S	6144445	D0130400T008S	6143835	D0130400W008S	6144475	D0130400W008S	4,0	6	8,00	57	3
–		6144446	D0130450T008S	6143836	D0130450W008S		–	4,5	6	8,00	57	3
–		6144357	D0030500T006S		–	6144400	D0030500W006S	5,0	6	6,00	54	3
6143770	D0130500T010S	6144447	D0130500T010S	6143837	D0130500W010S		–	5,0	6	10,00	57	3
–		6144358	D0030550T007S		–		–	5,5	6	7,00	54	3
–		6144448	D0130550T010S		–	6144481	D0130550W010S	5,5	6	10,00	57	3
–		6144360	D0030600T007S		–	6144404	D0030600W007S	6,0	6	7,00	54	3
6143822	D0130600T010S	6144449	D0130600T010S	6143839	D0130600W010S	6144483	D0130600W010S	6,0	6	10,00	57	3
6144468	D0030700T008S	6144372	D0030700T008S		–	6144406	D0030700W008S	7,0	8	8,00	58	3
–		6144451	D0130700T013S		–	6144485	D0130700W013S	7,0	8	13,00	63	3
–		6144374	D0030800T009S		–	6144408	D0030800W009S	8,0	8	9,00	58	3
–		6144453	D0130800T016S		–	6144487	D0130800W016S	8,0	8	16,00	63	3
–		6144376	D0031000T011S		–	6144410	D0031000W011S	10,0	10	11,00	66	3
–		–		6143842	D0131000W019S	6144489	D0131000W019S	10,0	10	19,00	72	3
–		6144378	D0031200T012S		–	6144412	D0031200W012S	12,0	12	12,00	73	3
–		6144457	D0131200T022S		–	6144491	D0131200W022S	12,0	12	22,00	83	3
–		6144380	D0031400T014S		–	6144414	D0031400W014S	14,0	14	14,00	75	3
6143827	D0131400T022S	6144459	D0131400T022S		–	6144493	D0131400W022S	14,0	14	22,00	83	3
–		6144382	D0031600T016S		–	6144416	D0031600W016S	16,0	16	16,00	82	3
–		6144461	D0131600T026S		–	6144495	D0131600W026S	16,0	16	26,00	92	3
–		6144384	D0031800T018S		–	6144418	D0031800W018S	18,0	18	18,00	84	3
–		6144463	D0131800T026S		–	6144497	D0131800W026S	18,0	18	26,00	92	3
6144482	D0032000T020S	6144386	D0032000T020S		–	6144420	D0032000W020S	20,0	20	20,00	92	3
–		6144465	D0132000T032S		–	6144499	D0132000W032S	20,0	20	32,00	104	3

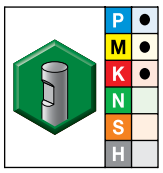
GP End Mills • Series D003 D013 • Chamfered • 3 Flute • Metric









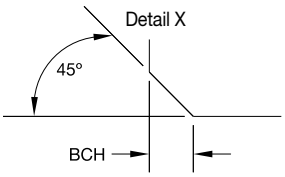


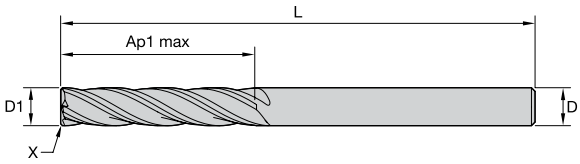
● first choice
○ alternate choice

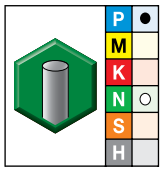
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order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
–		6144295	D0030400T005	6144318	D0030400W005	4,0	6	5,00	54	0,10	3
–		6144359	D0130400T008	6144395	D0130400W008	4,0	6	8,00	57	0,10	3
–		6144296	D0030450T005	6144319	D0030450W005	4,5	6	5,00	54	0,10	3
–		6144371	D0130450T008	6144397	D0130450W008	4,5	6	8,00	57	0,10	3
6145044	D0030500T006	6144297	D0030500T006	6144320	D0030500W006	5,0	6	6,00	54	0,10	3
–		6144373	D0130500T010	6144399	D0130500W010	5,0	6	10,00	57	0,10	3
–		6144298	D0030550T007	6144331	D0030550W007	5,5	6	7,00	54	0,10	3
–		6144375	D0130550T010	6144401	D0130550W010	5,5	6	10,00	57	0,10	3
–		6144299	D0030600T007	6144332	D0030600W007	6,0	6	7,00	54	0,10	3
–		6144377	D0130600T010	6144403	D0130600W010	6,0	6	10,00	57	0,10	3
–		6144300	D0030700T008	6144333	D0030700W008	7,0	8	8,00	58	0,10	3
–		6144379	D0130700T013	6144405	D0130700W013	7,0	8	13,00	63	0,10	3
–		6144311	D0030800T009	6144334	D0030800W009	8,0	8	9,00	58	0,20	3
6145087	D0130800T016	6144381	D0130800T016	6144407	D0130800W016	8,0	8	16,00	63	0,20	3
–		6144312	D0031000T011	6144335	D0031000W011	10,0	10	11,00	66	0,20	3
–		6144383	D0131000T019	6144409	D0131000W019	10,0	10	19,00	72	0,20	3
–		6144313	D0031200T012	6144336	D0031200W012	12,0	12	12,00	73	0,30	3
–		6144385	D0131200T022	6144411	D0131200W022	12,0	12	22,00	83	0,30	3
–		6144314	D0031400T014	6144337	D0031400W014	14,0	14	14,00	75	0,30	3
–		6144387	D0131400T022	6144413	D0131400W022	14,0	14	22,00	83	0,30	3
–		6144315	D0031600T016	6144338	D0031600W016	16,0	16	16,00	82	0,30	3
–		6144389	D0131600T026		–	16,0	16	26,00	92	0,30	3
–		6144316	D0031800T018	6144339	D0031800W018	18,0	18	18,00	84	0,30	3
–		6144391	D0131800T026	6144417	D0131800W026	18,0	18	26,00	92	0,30	3
–		6144317	D0032000T020		–	20,0	20	20,00	92	0,30	3
–		6144393	D0132000T032	6144419	D0132000W032	20,0	20	32,00	104	0,30	3

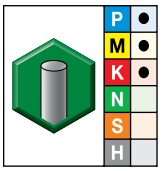
GP End Mills • Series 4004 4014 4024 • Square End • 4 Flute • Metric











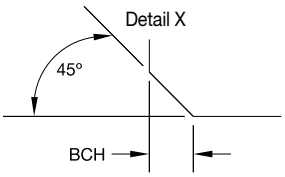
● first choice
○ alternate choice

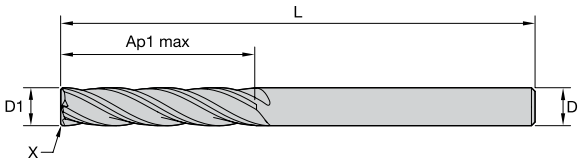
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order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
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5826086	40040150T004	5826017	40040150T004	1,5	3	4,00	38	–	4
5826087	40040200T006	5826018	40040200T006	2,0	3	6,30	38	–	4
5826088	40040250T006	5826019	40040250T006	2,5	3	6,30	38	–	4
5826089	40040300T009	5826020	40040300T009	3,0	3	9,50	38	–	4
5826090	40140300T019	5826021	40140300T019	3,0	3	19,00	63	–	4
5826101	40240300T025	5826022	40240300T025	3,0	3	25,00	75	–	4
5826102	40040350T012	5826023	40040350T012	3,5	4	12,00	50	–	4
5826103	40040400T011	5826024	40040400T011	4,0	4	11,00	50	0,10	4
6085522	40040400T011S	6085576	40040400T011S	4,0	4	11,00	50	–	4
	–	6085577	40140400T019S	4,0	4	19,00	63	–	4
	–	5826025	40140400T019	4,0	4	19,00	63	0,10	4
	–	6085578	40240400T031S	4,0	4	31,00	75	–	4
	–	5826026	40240400T031	4,0	4	31,00	75	0,10	4
	–	6085579	40040450T014S	4,5	5	14,00	50	–	4
5826104	40040450T014	5826027	40040450T014	4,5	5	14,00	50	0,10	4
	–	6085580	40040500T013S	5,0	5	13,00	50	–	4
	–	5826028	40040500T013	5,0	5	13,00	50	0,10	4
	–	6085581	40040500T020S	5,0	5	20,00	63	–	4
5826105	40040500T020	5826029	40040500T020	5,0	5	20,00	63	0,10	4
	–	6085582	40140500T030S	5,0	5	30,00	75	–	4
	–	5826030	40140500T030	5,0	5	30,00	75	0,10	4
	–	6085583	40240500T031S	5,0	5	31,00	100	–	4
	–	5826031	40240500T031	5,0	5	31,00	100	0,10	4
6085525	40040600T016S	6085584	40040600T016S	6,0	6	16,00	50	–	4
5826106	40040600T016	5826032	40040600T016	6,0	6	16,00	50	0,10	4
6085526	40140600T028S	6085585	40140600T028S	6,0	6	28,00	75	–	4
5826107	40140600T028	5826033	40140600T028	6,0	6	28,00	75	0,10	4
6085527	40240600T038S	6085586	40240600T038S	6,0	6	38,00	100	–	4
5826108	40240600T038	5826034	40240600T038	6,0	6	38,00	100	0,10	4
	–	6085587	40040700T020S	7,0	8	20,00	63	–	4
	–	5826035	40040700T020	7,0	8	20,00	63	0,10	4
	–	6200965	40040800T021S	8,0	8	20,00	63	–	4
6085528	40040800T020S	6085588	40040800T020S	8,0	8	20,00	50	–	4
5826109	40040800T020	5826036	40040800T020	8,0	8	20,00	50	0,20	4
6085529	40140800T028S	6085589	40140800T028S	8,0	8	28,00	75	–	4
5826110	40140800T028	5826037	40140800T028	8,0	8	28,00	75	0,20	4
6085530	40240800T041S	6085590	40240800T041S	8,0	8	41,00	100	–	4
5826111	40240800T041	5826038	40240800T041	8,0	8	41,00	100	0,20	4
	–	6085591	40040900T020S	9,0	9	20,00	63	–	4
	–	5826039	40040900T020	9,0	9	20,00	63	0,20	4
5826113	40041000T022	5826040	40041000T022	10,0	10	22,00	72	0,20	4
6085531	40041000T022S	6085592	40041000T022S	10,0	10	22,00	72	–	4
6085532	40141000T032S	6085593	40141000T032S	10,0	10	32,00	89	–	4
5826114	40141000T032	5826041	40141000T032	10,0	10	32,00	89	0,20	4
6085533	40241000T045S	6085594	40241000T045S	10,0	10	45,00	100	–	4
5826115	40241000T045	5826042	40241000T045	10,0	10	45,00	100	0,20	4
5826141	40041200W025		–	12,0	12	25,00	75	0,30	4
6085534	40041200T025S	6085610	40041200W025S	12,0	12	25,00	75	–	4
	–	5826043	40041200T025	12,0	12	25,00	89	0,30	4
	–	6085595	40041200T025S	12,0	12	25,00	89	–	4
5826116	40041200T025	5826070	40041200W025	12,0	12	25,00	75	0,30	4
6085549	40041200W025S		–	12,0	12	25,00	75	–	4
6085535	40141200T045S	6085596	40141200T045S	12,0	12	45,00	100	–	4
5826117	40141200T045	5826044	40141200T045	12,0	12	45,00	100	0,30	4
	–	6085611	40141200W045S	12,0	12	45,00	100	–	4

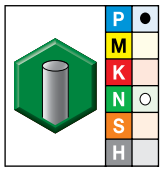
GP End Mills • Series 4004 4014 4024 • Square End • 4 Flute • Metric

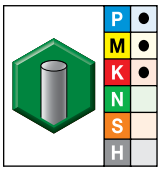
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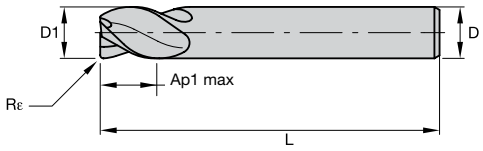


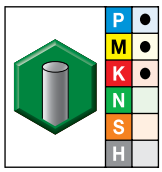
● first choice
○ alternate choice

UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
–		5826071	40141200W045	12,0	12	45,00	100	0,30	4
6085536	40241200T075S	6085597	40241200T075S	12,0	12	75,00	150	–	4
5826118	40241200T075	5826045	40241200T075	12,0	12	75,00	150	0,30	4
–		6085612	40241200W075S	12,0	12	75,00	150	–	4
–		5826072	40241200W075	12,0	12	75,00	150	0,30	4
–		6085613	40041400W032S	14,0	14	32,00	83	–	4
–		5826073	40041400W032	14,0	14	32,00	83	0,30	4
6085537	40041400T032S	6085598	40041400T032S	14,0	14	32,00	83	–	4
5826119	40041400T032	5826046	40041400T032	14,0	14	32,00	83	0,30	4
–		6085599	40141400T050S	14,0	14	50,00	100	–	4
–		5826047	40141400T050	14,0	14	50,00	100	0,30	4
–		6085614	40141400W050S	14,0	14	50,00	100	–	4
–		5826074	40141400W050	14,0	14	50,00	100	0,30	4
–		6085600	40241400T075S	14,0	14	75,00	150	–	4
–		5826049	40241400T075	14,0	14	75,00	150	0,30	4
–		6085615	40241400W075S	14,0	14	75,00	150	–	4
–		5826075	40241400W075	14,0	14	75,00	150	0,30	4
–		6085616	40041600W032S	16,0	16	32,00	92	–	4
–		5826076	40041600W032	16,0	16	32,00	92	0,30	4
6085540	40041600T032S	6085601	40041600T032S	16,0	16	32,00	92	–	4
5826122	40041600T032	5826061	40041600T032	16,0	16	32,00	92	0,30	4
5826123	40141600T056	5826062	40141600T056	16,0	16	56,00	110	0,30	4
–		6102465	40141600W056S	16,0	16	56,00	110	–	4
–		5826077	40141600W056	16,0	16	56,00	110	0,30	4
6085541	40141600T056S	6085602	40141600T056S	16,0	16	56,00	110	–	4
6085542	40241600T075S	6085603	40241600T075S	16,0	16	75,00	150	–	4
5826124	40241600T075	5826063	40241600T075	16,0	16	75,00	150	0,30	4
–		6085427	40241600W075S	16,0	16	75,00	150	–	4
–		5826078	40241600W075	16,0	16	75,00	150	0,30	4
6086533	40041800W038S	6085428	40041800W038S	18,0	18	38,00	100	–	4
6085543	40041800T038S	6085604	40041800T038S	18,0	18	38,00	100	–	4
5826125	40041800T038	5826064	40041800T038	18,0	18	38,00	100	0,30	4
–		6085605	40141800T060S	18,0	18	60,00	125	–	4
–		5826065	40141800T060	18,0	18	60,00	125	0,30	4
–		6085606	40241800T075S	18,0	18	75,00	150	–	4
–		5826066	40241800T075	18,0	18	75,00	150	0,30	4
6085546	40042000T038S	6085607	40042000T038S	20,0	20	38,00	104	–	4
–		5826082	40042000W038	20,0	20	38,00	104	0,30	4
5826128	40042000T038	5826067	40042000T038	20,0	20	38,00	104	0,30	4
–		6085511	40042000W038S	20,0	20	38,00	104	–	4
–		5826083	40142000W056	20,0	20	56,00	125	0,30	4
–		5826068	40142000T056	20,0	20	56,00	125	0,30	4
6085547	40142000T056S	6085608	40142000T056S	20,0	20	56,00	125	–	4
–		6085512	40142000W056S	20,0	20	56,00	125	–	4
6085548	40242000T075S	6085609	40242000T075S	20,0	20	75,00	150	–	4
–		5826069	40242000T075	20,0	20	75,00	150	0,30	4
–		6085513	40242000W075S	20,0	20	75,00	150	–	4
–		5826084	40242000W075	20,0	20	75,00	150	0,30	4

GP End Mills • Series 4004 4014 4024 • Radiused • 4 Flute • Metric







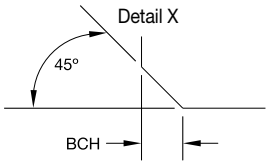
● first choice
○ alternate choice

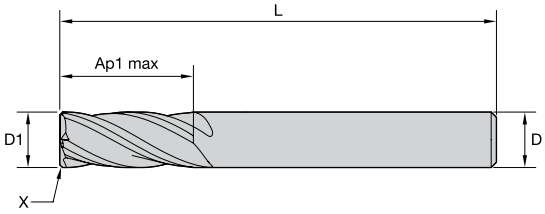
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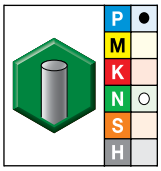
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6337590	40040200T006R050	2,0	3	6,30	38	0,50	4
6337731	40040300T009R050	3,0	3	9,50	38	0,50	4
6337732	40040300T009R100	3,0	3	9,50	38	1,00	4
6337892	40140300T019R050	3,0	3	19,00	63	0,50	4
6338335	40240300T025R050	3,0	3	25,00	75	0,50	4
6337733	40040400T011R050	4,0	4	11,00	50	0,50	4
6337734	40040400T011R100	4,0	4	11,00	50	1,00	4
6337893	40140400T019R050	4,0	4	19,00	63	0,50	4
6337894	40140400T019R100	4,0	4	19,00	63	1,00	4
6338336	40240400T031R050	4,0	4	31,00	75	0,50	4
6338337	40240400T031R100	4,0	4	31,00	75	1,00	4
6337735	40040500T013R050	5,0	5	13,00	50	0,50	4
6337895	40140500T030R050	5,0	5	30,00	75	0,50	4
6337896	40140500T030R100	5,0	5	30,00	75	1,00	4
6337737	40040600T016R100	6,0	6	16,00	50	1,00	4
6337736	40040600T016R050	6,0	6	16,00	50	0,50	4
6337897	40140600T028R050	6,0	6	28,00	75	0,50	4
6337898	40140600T028R100	6,0	6	28,00	75	1,00	4
6338338	40240600T038R050	6,0	6	38,00	100	0,50	4
6338339	40240600T038R100	6,0	6	38,00	100	1,00	4
6337739	40040800T020R100	8,0	8	20,00	50	1,00	4
6337738	40040800T020R050	8,0	8	20,00	50	0,50	4
6337899	40140800T028R050	8,0	8	28,00	75	0,50	4
6337900	40140800T028R100	8,0	8	28,00	75	1,00	4
6338340	40240800T041R050	8,0	8	41,00	100	0,50	4
6338341	40240800T041R100	8,0	8	41,00	100	1,00	4
6337740	40041000T022R050	10,0	10	22,00	72	0,50	4
6337741	40041000T022R100	10,0	10	22,00	72	1,00	4
6337912	40141000T032R100	10,0	10	32,00	89	1,00	4
6337911	40141000T032R050	10,0	10	32,00	89	0,50	4
6338342	40241000T045R050	10,0	10	45,00	100	0,50	4
6338343	40241000T045R100	10,0	10	45,00	100	1,00	4
6337742	40041200T025R050	12,0	12	25,00	89	0,50	4
6337743	40041200T025R100	12,0	12	25,00	89	1,00	4
6337914	40141200T045R100	12,0	12	45,00	100	1,00	4
6337913	40141200T045R050	12,0	12	45,00	100	0,50	4
6338344	40241200T075R050	12,0	12	75,00	150	0,50	4
6338345	40241200T075R100	12,0	12	75,00	150	1,00	4
6337744	40041600T032R050	16,0	16	32,00	92	0,50	4
6337745	40041600T032R100	16,0	16	32,00	92	1,00	4
6337915	40141600T056R050	16,0	16	56,00	110	0,50	4
6338346	40241600T075R050	16,0	16	75,00	150	0,50	4
6338347	40241600T075R100	16,0	16	75,00	150	1,00	4
6338349	40242000T075R050	20,0	20	75,00	150	0,50	4

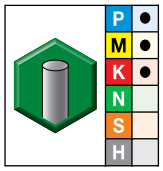
GP End Mills • Series D004 D014 • Square End • 4 Flute • Metric DIN 6527

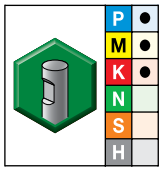












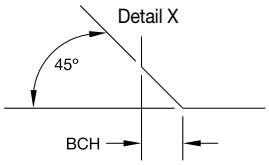
● first choice
○ alternate choice

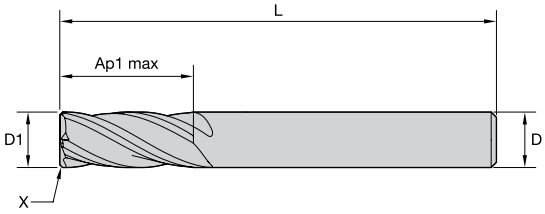
TiAlN		UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
5825894	D0040200T004	–		–		2,0	6	4,00	50	–	4
5825895	D0140200T007	–		–		2,0	6	7,00	57	–	4
5825896	D0140250T008	–		–		2,5	6	8,00	57	–	4
5825897	D0040300T005	–		–		3,0	6	5,00	50	–	4
5825898	D0140300T008	–		–		3,0	6	8,00	57	–	4
5825899	D0140350T010	–		–		3,5	6	10,00	57	–	4
5825900	D0040400T008	–		–		4,0	6	8,00	54	0,10	4
6085348	D0040400T008S	–		–		4,0	6	8,00	54	–	4
6085349	D0140400T011S	–		–		4,0	6	11,00	57	–	4
5825931	D0140400T011	–		–		4,0	6	11,00	57	0,10	4
6085350	D0140450T011S	–		–		4,5	6	11,00	57	–	4
5825932	D0140450T011	–		–		4,5	6	11,00	57	0,10	4
6085361	D0040500T009S	–		–		5,0	6	9,00	54	–	4
5825933	D0040500T009	–		–		5,0	6	9,00	54	0,10	4
6085362	D0140500T013S	–		–		5,0	6	13,00	57	–	4
5825934	D0140500T013	–		–		5,0	6	13,00	57	0,10	4
6085363	D0140550T013S	–		–		5,5	6	13,00	57	–	4
5825935	D0140550T013	–		–		5,5	6	13,00	57	0,10	4
6085364	D0040600T010S	–		–		6,0	6	10,00	54	–	4
5825936	D0040600T010	–		–		6,0	6	10,00	54	0,10	4
6085365	D0140600T013S	–		–		6,0	6	13,00	57	–	4
5825937	D0140600T013	–		–		6,0	6	13,00	57	0,10	4
6085366	D0140650T016S	–		–		6,5	8	16,00	63	–	4
5825938	D0140650T016	–		–		6,5	8	16,00	63	0,10	4
6085367	D0040700T011S	–		–		7,0	8	11,00	58	–	4
5825939	D0040700T011	–		–		7,0	8	11,00	58	0,10	4
6085368	D0140700T016S	–		–		7,0	8	16,00	63	–	4
5825940	D0140700T016	–		–		7,0	8	16,00	63	0,10	4
6085369	D0140750T019S	–		–		7,5	8	19,00	63	–	4
5825941	D0140750T019	–		–		7,5	8	19,00	63	0,10	4
6085370	D0040800T012S	–		–		8,0	8	12,00	58	–	4
5825942	D0040800T012	–		–		8,0	8	12,00	58	0,20	4
6085371	D0140800T019S	–		–		8,0	8	19,00	63	–	4
5825943	D0140800T019	–		–		8,0	8	19,00	63	0,20	4
6085372	D0040900T013S	–		–		9,0	10	13,00	66	–	4
5825944	D0040900T013	–		–		9,0	10	13,00	66	0,20	4
6085373	D0140900T019S	–		–		9,0	10	19,00	72	–	4
5825945	D0140900T019	–		–		9,0	10	19,00	72	0,20	4
6085374	D0041000T014S	–		–		10,0	10	14,00	66	–	4
5825946	D0041000T014	–		–		10,0	10	14,00	66	0,20	4
6085375	D0141000T022S	–		–		10,0	10	22,00	72	–	4
5825947	D0141000T022	–		–		10,0	10	22,00	72	0,20	4
6085376	D0041200T016S	6085406	D0041200W016S	6085396	D0041200W016S	12,0	12	16,00	73	–	4
5825948	D0041200T016	–		5825958	D0041200W016	12,0	12	16,00	73	0,30	4
6085377	D0141200T026S	–		6085397	D0141200W026S	12,0	12	26,00	83	–	4
5825949	D0141200T026	5825969	D0141200W026	5825959	D0141200W026	12,0	12	26,00	83	0,30	4
–		–		6085407	D0141200W026S	12,0	12	26,00	83	–	4
6085378	D0041400T018S	–		–		14,0	14	18,00	75	–	4
5825950	D0041400T018	5825970	D0041400W018	5825960	D0041400W018	14,0	14	18,00	75	0,30	4
6085379	D0141400T026S	–		6085399	D0141400W026S	14,0	14	26,00	83	–	4
5825951	D0141400T026	–		5825961	D0141400W026	14,0	14	26,00	83	0,30	4
–		–		6085409	D0141400W026S	14,0	14	26,00	83	–	4
6085380	D0041600T022S	6085410	D0041600W022S	6085400	D0041600W022S	16,0	16	22,00	82	–	4
5825952	D0041600T022	5825972	D0041600W022	5825962	D0041600W022	16,0	16	22,00	82	0,30	4
6085391	D0141600T032S	6085421	D0141600W032S	6085401	D0141600W032S	16,0	16	32,00	92	–	4
5825953	D0141600T032	5825973	D0141600W032	5825963	D0141600W032	16,0	16	32,00	92	0,30	4

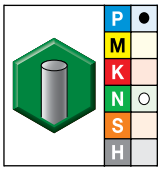
GP End Mills • Series D004 D014 • Square End • 4 Flute • Metric DIN 6527

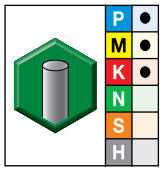
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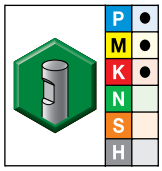










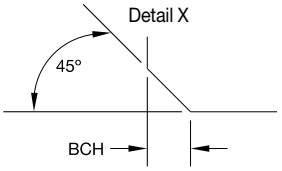


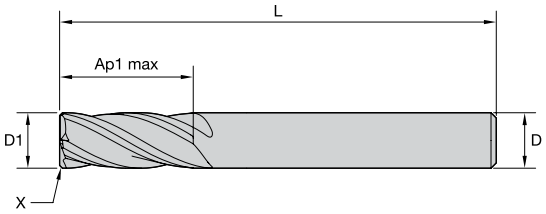
● first choice
○ alternate choice

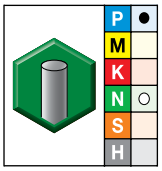
TiAlN		UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6085392	D0041800T024S	6086478	D0041800W024S	6085402	D0041800W024S	18,0	18	24,00	84	–	4
5825954	D0041800T024		–	5825964	D0041800W024	18,0	18	24,00	84	0,30	4
6085393	D0141800T032S		–	6085403	D0141800W032S	18,0	18	32,00	92	–	4
5825955	D0141800T032		–	5825965	D0141800W032	18,0	18	32,00	92	0,30	4
6085394	D0042000T026S		–	6085404	D0042000W026S	20,0	20	26,00	92	–	4
5825956	D0042000T026	5825976	D0042000W026	5825966	D0042000W026	20,0	20	26,00	92	0,30	4
6085395	D0142000T038S	6086491	D0142000W038S	6085405	D0142000W038S	20,0	20	38,00	104	–	4
5825957	D0142000T038	5825977	D0142000W038	5825967	D0142000W038	20,0	20	38,00	104	0,30	4

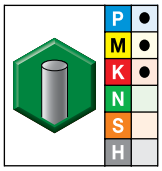
GP End Mills • Series 2528 • Square End • 4 Flute • Metric DIN 6528









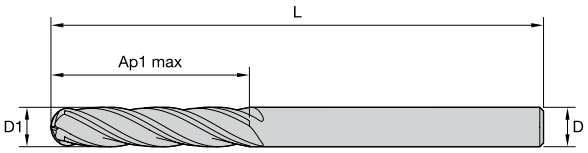


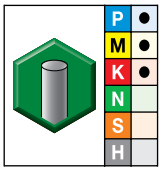
● first choice
○ alternate choice

UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
–		6086492	25280400T011S	4,0	4	11,00	50	–	4
–		5825978	25280400T011	4,0	4	11,00	50	0,10	4
–		6086493	25280500T013S	5,0	5	13,00	50	–	4
–		5825979	25280500T013	5,0	5	13,00	50	0,10	4
6086509	25280600T013S	6086494	25280600T013S	6,0	6	13,00	57	–	4
–		5825980	25280600T013	6,0	6	13,00	57	0,10	4
–		6086495	25280800T019S	8,0	8	19,00	63	–	4
–		5825981	25280800T019	8,0	8	19,00	63	0,20	4
–		6086496	25281000T022S	10,0	10	22,00	72	–	4
–		5825982	25281000T022	10,0	10	22,00	72	0,20	4
–		6086497	25281200T026S	12,0	12	26,00	83	–	4
–		5825983	25281200T026	12,0	12	26,00	83	0,30	4
–		6086498	25281400T026S	14,0	14	26,00	83	–	4
–		5825984	25281400T026	14,0	14	26,00	83	0,30	4
–		6086499	25281600T032S	16,0	16	32,00	92	–	4
–		5825985	25281600T032	16,0	16	32,00	92	0,30	4
–		6086500	25281800T032S	18,0	18	32,00	92	–	4
–		5825986	25281800T032	18,0	18	32,00	92	0,30	4
–		6086501	25282000T038S	20,0	20	38,00	104	–	4
–		5825987	25282000T038	20,0	20	38,00	104	0,30	4

GP End Mills • Series 4000 4010 • Ball Nose • 4 Flute • Metric







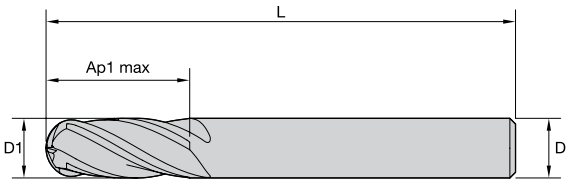
● first choice
○ alternate choice

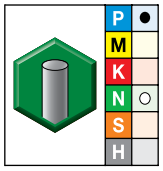
TiAlN

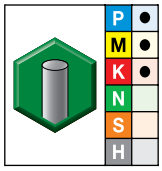
order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5825555	40000200T006	2,0	3	6,30	38	4
6231685	40000300T009	3,0	3	9,50	38	4
6232637	40100300T019	3,0	3	19,00	63	4
5825556	40000300T020	3,0	3	20,00	75	4
5825557	40000400T014	4,0	4	14,00	50	4
5825558	40100400T025	4,0	4	25,00	75	4
5825559	40000500T016	5,0	5	16,00	50	4
5825560	40100500T030	5,0	5	30,00	75	4
5825573	40000600T016	6,0	6	16,00	50	4
5825574	40100600T019	6,0	6	19,00	63	4
5825575	40100600T030	6,0	6	30,00	75	4
5825576	40000800T019	8,0	8	19,00	63	4
6232638	40100800T028	8,0	8	28,00	76	4
5825577	40100800T040	8,0	8	40,00	100	4
5825578	40001000T022	10,0	10	22,00	72	4
6232639	40101000T032	10,0	10	32,00	89	4
5825579	40101000T040	10,0	10	40,00	100	4
5825580	40001200T025	12,0	12	25,00	75	4
5825581	40101200T045	12,0	12	45,00	150	4
6232640	40101200T046	12,0	12	46,00	100	4
6232671	40101200T075	12,0	12	75,00	150	4
5825583	40001400T032	14,0	14	32,00	83	4
5825584	40101400T050	14,0	14	50,00	100	4
5825585	40001600T032	16,0	16	32,00	89	4
5825586	40101600T065	16,0	16	65,00	150	4
5825588	40102000T056	20,0	20	56,00	125	4
6232672	40102000T075	20,0	20	75,00	150	4

GP End Mills • Series D010 • Ball Nose • 4 Flute • Metric DIN 6527







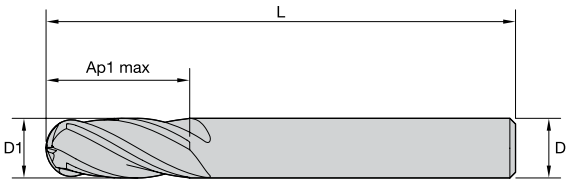


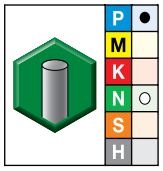
● first choice
○ alternate choice

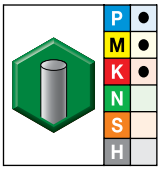
UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5825604	D0100300T008	5825527	D0100300T008	3,0	6	8,00	57	4
5825605	D0100400T011	5825528	D0100400T011	4,0	6	11,00	57	4
–		5825529	D0100500T013	5,0	6	13,00	57	4
5825607	D0100600T013	5825530	D0100600T013	6,0	6	13,00	57	4
5825608	D0100800T019	5825531	D0100800T019	8,0	8	19,00	63	4
5825609	D0101000T022	5825532	D0101000T022	10,0	10	22,00	72	4
5825610	D0101200T026	5825533	D0101200T026	12,0	12	26,00	83	4
5825589	D0101200W026	5825540	D0101200W026	12,0	12	26,00	83	4
5825611	D0101400T026	5825534	D0101400T026	14,0	14	26,00	83	4
5825590	D0101400W026	5825541	D0101400W026	14,0	14	26,00	83	4
5825612	D0101600T032	5825536	D0101600T032	16,0	16	32,00	92	4
–		5825542	D0101600W032	16,0	16	32,00	92	4
5825613	D0101800T032	5825538	D0101800T032	18,0	18	32,00	92	4
–		5825543	D0101800W032	18,0	18	32,00	92	4
5825614	D0102000T038	5825539	D0102000T038	20,0	20	38,00	104	4
5825593	D0102000W038	5825544	D0102000W038	20,0	20	38,00	104	4

GP End Mills • Series 2848 • Ball Nose • 4 Flute • Metric DIN 6528









● first choice
○ alternate choice

UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
–		5825545	28480400T011	4,0	4	11,00	50	4
–		5825546	28480500T013	5,0	5	13,00	50	4
–		5825547	28480600T013	6,0	6	13,00	57	4
5825597	28480800T019	5825548	28480800T019	8,0	8	19,00	63	4
–		5825549	28481000T022	10,0	10	22,00	72	4
–		5825550	28481200T026	12,0	12	26,00	83	4
–		5825551	28481400T026	14,0	14	26,00	83	4
–		5825552	28481600T032	16,0	16	32,00	92	4
–		5825553	28481800T032	18,0	18	32,00	92	4
–		5825554	28482000T038	20,0	20	38,00	104	4

GP End Mills • Series I2S..L I2S..X • Application Data • Uncoated • Inch

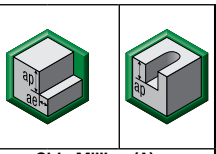




Material Group		Side Milling (A) A ap	A ae	Uncoated Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). frac.	D1 — Diameter 1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	Ap1 max	0.1 x D	390	–	520	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	390	–	520	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	370	–	500	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I2S..S I2S..R • Application Data • Uncoated • Inch





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
								dec.	.0156	.0313	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	0.5 x D	370	–	500	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I2B..L I2B..X • Application Data • Uncoated • Inch





Material Group		Side Milling (A) A ap	A ae	Uncoated Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). frac.	D1 — Diameter 3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	Ap1 max	0.1 x D	390	–	520	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	1.25 x D	0.1 x D	390	–	520	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	1.25 x D	0.1 x D	370	–	500	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I2B..S I2B..R • Application Data • Uncoated • Inch





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
								dec.	.0156	.0313	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	1.25 x D	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	1.25 x D	0.1 x D	0.5 x D	370	–	500	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

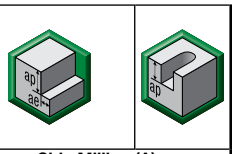
GP End Mills • Series I2S..L I2S..X • Application Data • TiAlN • Inch




Material Group		Side Milling (A) A ap	A ae	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). frac.	D1 — Diameter 1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	490	–	660	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	460	–	620	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	390	–	520	IPT	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	300	–	490	IPT	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	300	–	380	IPT	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	200	–	260	IPT	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	390	–	490	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	360	–	460	IPT	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I2S..S I2S..R I2R... • Application Data • TiAlN • Inch





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
								dec.	.0156	.0313	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	0.5 x D	460	–	620	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	0.5 x D	300	–	490	IPT	.0001	.0002	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	0.5 x D	300	–	380	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	0.5 x D	200	–	260	IPT	.0001	.0001	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	0.5 x D	390	–	490	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	0.5 x D	360	–	460	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I2B..L I2B..X • Application Data • TiAlN • Inch





Material Group		Side Milling (A) A ap	A ae	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). frac.	D1 — Diameter 3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	460	–	620	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	390	–	520	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	300	–	490	IPT	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	300	–	380	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	200	–	260	IPT	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	390	–	490	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	360	–	460	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I2B..S I2B..R • Application Data • TiAlN • Inch





Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																
		A		B	Cutting Speed — vc SFM				D1 — Diameter															
		ap	ae	ap	min		max	frac. dec.	1/64 .0156	1/32 .0313	1/16 .0625	5/64 .0781	3/32 .0938	1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000		
P	0	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	1	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	2	Ap1 max	0.1 x D	0.5 x D	460	–	620	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	3	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		
	4	Ap1 max	0.1 x D	0.5 x D	300	–	490	IPT	.0001	.0002	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039		
M	1	Ap1 max	0.1 x D	0.5 x D	300	–	380	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		
	2	Ap1 max	0.1 x D	0.5 x D	200	–	260	IPT	.0001	.0001	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036		
K	1	Ap1 max	0.1 x D	0.5 x D	390	–	490	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	2	Ap1 max	0.1 x D	0.5 x D	360	–	460	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I3S..L I3S..X • Application Data • Uncoated • Inch




Material Group		Side Milling (A)		Uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A).										
		A		Cutting Speed — vc SFM				D1 — Diameter									
		ap	ae	min		max	frac. dec.	1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000	
P	0	2.0 x D	0.1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	1	2.0 x D	0.1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	2	2.0 x D	0.1 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
N	1	Ap1 max	0.1 x D	650	–	2600	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100	
	2	Ap1 max	0.1 x D	650	–	2000	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080	
	5	Ap1 max	0.1 x D	650	–	2000	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

GP End Mills • Series I3S..S I3S..R • Application Data • Uncoated • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
								dec.	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	2.0 x D	0.1 x D	0.5 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	2.0 x D	0.1 x D	0.5 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	2.0 x D	0.1 x D	0.5 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
N	1	Ap1 max	0.1 x D	0.5 x D	650	–	2600	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100
	2	Ap1 max	0.1 x D	0.5 x D	650	–	2000	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
	5	Ap1 max	0.1 x D	0.5 x D	650	–	2000	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

GP End Mills • Series I3S..L I3S..X • Application Data • TIAIN • Inch





Material Group		Side Milling (A) A ap	A ae	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). frac.	D1 — Diameter 1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	2.0 x D	0.1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	2.0 x D	0.1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	2.0 x D	0.1 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	2.0 x D	0.1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	2.0 x D	0.1 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	2.0 x D	0.1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	2.0 x D	0.1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	2.0 x D	0.1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	2.0 x D	0.1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

GP End Mills • Series I3S..S I3S..R • Application Data • TIAlN • Inch





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac. / dec.	D1 — Diameter 1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	0	2.0 x D	0.1 x D	0.5 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	1	2.0 x D	0.1 x D	0.5 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	2	2.0 x D	0.1 x D	0.5 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	3	2.0 x D	0.1 x D	0.5 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
P	4	2.0 x D	0.1 x D	0.5 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	2.0 x D	0.1 x D	0.5 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
M	2	2.0 x D	0.1 x D	0.5 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	2.0 x D	0.1 x D	0.5 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
K	2	2.0 x D	0.1 x D	0.5 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

GP End Mills • Series I4S..L I4S..X • Application Data • Uncoated • Inch




Material Group		Side Milling (A) A ap	A ae	Uncoated Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). frac. / dec.	D1 — Diameter 3/32 .0938	1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	0	Ap1 max	0.1 x D	390	–	520	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	1	Ap1 max	0.1 x D	390	–	520	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	2	Ap1 max	0.1 x D	370	–	500	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I4S..S I4S..R • Application Data • Uncoated • Inch



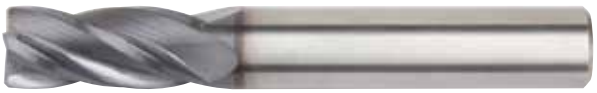


Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac. / dec.	D1 — Diameter 1/16 .0625	5/64 .0781	3/32 .0938	1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	0	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	1	1.25 x D	0.1 x D	0.5 x D	390	–	520	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	2	1.25 x D	0.1 x D	0.5 x D	370	–	500	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
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GP End Mills • Series I4R..S I4S..S I4R..R I4S..R • Application Data • TiAlN • Inch

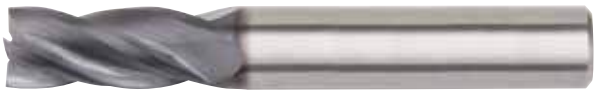




Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.															
		A		B	Cutting Speed — vc SFM				D1 — Diameter														
		ap	ae	ap	min		max	frac.	1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
								dec.	.0156	.0313	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	0.5 x D	460	–	620	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	0.5 x D	300	–	490	IPT	.0001	.0002	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	0.5 x D	300	–	380	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	0.5 x D	200	–	260	IPT	.0001	.0001	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	0.5 x D	390	–	490	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	0.5 x D	360	–	460	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

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Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I4S..L I4S..X • Application Data • TiAlN • Inch

Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A).										
		A		Cutting Speed — vc SFM				D1 — Diameter									
		ap	ae	min		max	frac.	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	460	–	620	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	390	–	520	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	300	–	490	IPT	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	300	–	380	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	200	–	260	IPT	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	390	–	490	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	360	–	460	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I4B..L I4B..X • Application Data • TiAlN • Inch

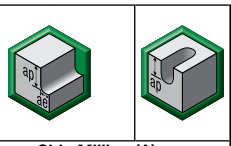




Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A).										
		A		Cutting Speed – vc SFM				D1 – Diameter									
		ap	ae	min		max	frac. dec.	3/32 .0938	1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	1	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	2	Ap1 max	0.1 x D	460	–	620	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	3	Ap1 max	0.1 x D	390	–	520	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
P	4	Ap1 max	0.1 x D	300	–	490	IPT	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	300	–	380	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
M	2	Ap1 max	0.1 x D	200	–	260	IPT	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	390	–	490	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
K	2	Ap1 max	0.1 x D	360	–	460	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series I4B..S I4B..R • Application Data • TiAlN • Inch





Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.															
		A		B	Cutting Speed – vc SFM				D1 – Diameter														
		ap	ae	ap	min		max	frac. dec.	1/64 .0156	1/32 .0313	1/16 .0625	5/64 .0781	3/32 .0938	1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	0	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	1	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	2	Ap1 max	0.1 x D	0.5 x D	460	–	620	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
P	3	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
P	4	Ap1 max	0.1 x D	0.5 x D	300	–	490	IPT	.0001	.0002	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	0.5 x D	300	–	380	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
M	2	Ap1 max	0.1 x D	0.5 x D	200	–	260	IPT	.0001	.0001	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	0.5 x D	390	–	490	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
K	2	Ap1 max	0.1 x D	0.5 x D	360	–	460	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

GP End Mills • Series D002 4002 • Application Data • Uncoated • Metric

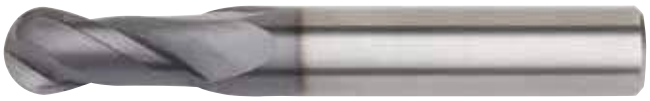




Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter 2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	0,1 x D	0,1 x D	0,5 x D	120	–	160	fz	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	0,1 x D	0,1 x D	0,5 x D	120	–	160	fz	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	0,1 x D	0,1 x D	0,5 x D	112	–	152	fz	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	0,5 x D	400	–	1600	fz	0,020	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	0,5 x D	400	–	1200	fz	0,016	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	0,5 x D	320	–	600	fz	0,014	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series 4011 4021 • Application Data • Uncoated • Metric

Material Group		Side Milling (A) A ap	A ae	Uncoated Cutting Speed — vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). D1 — Diameter 3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions.
For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series D012 2819 4012 4022 • Application Data • Uncoated • Metric



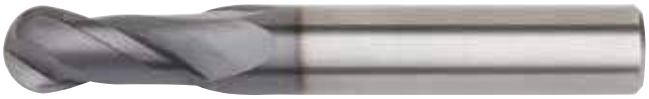

Material Group		Side Milling (A) A ap	A ae	Uncoated Cutting Speed — vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). D1 — Diameter 3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series D001 4001 • Application Data • Uncoated • Metric







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc m/min min	–	max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. mm	D1 — Diameter 1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	0,5 x D	112	–	152	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	0,5 x D	400	–	1600	fz	0,010	0,020	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	0,5 x D	400	–	1200	fz	0,008	0,016	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	0,5 x D	320	–	600	fz	0,007	0,014	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions.
For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series D002 4002 • Application Data • TiAlN • Metric





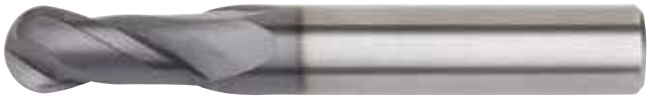


Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc m/min min	–	max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. mm	D1 — Diameter 1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

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Material Group		Side Milling (A) A		TiAlN Cutting Speed – vc m/min			Recommended feed per tooth (fz = mm/th) for side milling (A). D1 – Diameter											
		ap	ae	min		max	mm	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	140	–	190	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	120	–	160	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	90	–	150	fz	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	90	–	115	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	60	–	80	fz	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	120	–	150	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	110	–	140	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions.
For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series D012 4012 • Application Data • TiAlN • Metric



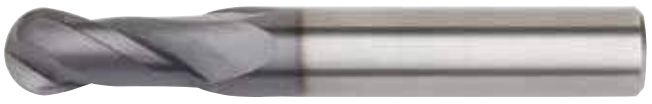


Material Group		Side Milling (A) A		TiAlN Cutting Speed – vc m/min			Recommended feed per tooth (fz = mm/th) for side milling (A). D1 – Diameter											
		ap	ae	min		max	mm	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	140	–	190	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	120	–	160	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	90	–	150	fz	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	90	–	115	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	60	–	80	fz	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	120	–	150	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	110	–	140	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series D001 D011 2838 4001 • Application Data • TiAlN • Metric





Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.												
		A		B	Cutting Speed — vc m/min				D1 — Diameter											
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions.
For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series 4013..S 4013 • Application Data • Uncoated • Metric




Material Group		Side Milling (A)		Uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A).								
		A		Cutting Speed — vc m/min				D1 — Diameter							
		ap	ae	min		max	mm	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

GP End Mills • Series D003..S D013..S D003 D013 4003..S 4003 • Application Data • Uncoated • Metric





Material Group		Side Milling (A) A ap	ae	Uncoated Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz = mm/th) for side milling (A). mm	D1 — Diameter 3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

GP End Mills • Series 4013..S 4013 • Application Data • TiAlN • Metric





Material Group		Side Milling (A) A ap	ae	TiAlN Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz = mm/th) for side milling (A). mm	D1 — Diameter 1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

GP End Mills • Series D003..S D013..S D003 D013 4003..S 4003 • Application Data • TiAlN • Metric



Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.													
		A		B	Cutting Speed — vc m/min				D1 — Diameter												
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

GP End Mills • Series 4004 4014 4024 • Application Data • Uncoated • Metric



Material Group		Side Milling (A) and Slotting (B)			Uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.									
		A		B	Cutting Speed — vc m/min				D1 — Diameter								
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	0,5 x D	112	–	152	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	0,5 x D	400	–	1600	fz	0,010	0,020	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	0,5 x D	400	–	1200	fz	0,008	0,016	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	0,5 x D	320	–	600	fz	0,007	0,014	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series D014 2528 4014 4024 • Application Data • Uncoated • Metric



Material Group		Side Milling (A)		Uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A).							
		A		Cutting Speed — vc m/min				D1 — Diameter						
		ap	ae	min		max	mm	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series D010 2848 4010 • Application Data • Uncoated • Metric





Material Group		Side Milling (A) and Slotting (B)			Uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
P	1	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
P	2	Ap1 max	0,1 x D	0,5 x D	112	–	152	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	0,5 x D	400	–	1600	fz	0,010	0,020	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
N	2	Ap1 max	0,1 x D	0,5 x D	400	–	1200	fz	0,008	0,016	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
N	4	Ap1 max	0,1 x D	0,5 x D	320	–	600	fz	0,007	0,014	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series 4004 4014 4024 • Application Data • TiAlN • Metric





Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.												
		A		B	Cutting Speed — Vc m/min				D1 — Diameter											
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
P	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
P	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
P	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
P	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
M	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
K	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on greater than 12mm diameters.

GP End Mills • Series 4000 4010 • Application Data • TiAlN • Metric





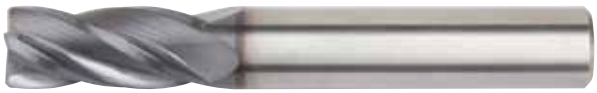


Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.											
		A		B	Cutting Speed – vc m/min				D1 – Diameter										
		ap	ae	ap	min		max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.
Refer to NOVO for slotting application information.

GP End Mills • Series D014 2528 4014 4024 • Application Data • TiAlN • Metric

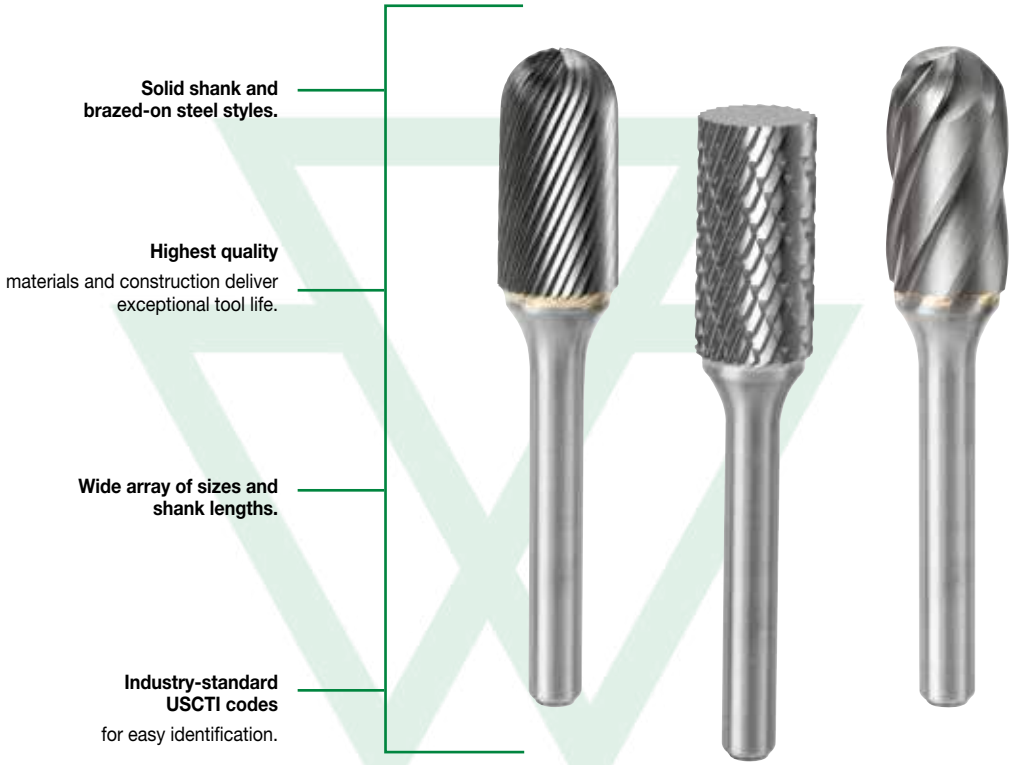




Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A).												
		A		Cutting Speed – vc m/min				D1 – Diameter											
		ap	ae	min		max	mm	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	140	–	190	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	120	–	160	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	90	–	150	fz	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	90	–	115	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	60	–	80	fz	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	120	–	150	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	110	–	140	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions.For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

WIDIA™ carbide burs are manufactured in compliance with USCTI standards and are the highest quality in the industry, delivering excellent performance and safety. Our unique manufacturing process ensures exceptional tool life with the reliability to operate safely at high speeds. WIDIA burs offer a comprehensive portfolio of sizes and shapes for all applications and workpiece materials.



Standard Cut Styles



Standard Cut (Right-Hand Spiral)

The WIDIA standard (right-hand spiral) cut produces a smooth finish for general-purpose use on steel, cast iron, and other ferrous and non-ferrous materials.

Most WIDIA carbide burs are available in the right-hand spiral design.



Master Cut (Double Cut)

The WIDIA exclusive master cut, with its chisel-type cutting edge, is a machine-ground tool built to exacting tolerances of concentricity, size, and shape. This accuracy, when combined with precision grinders, results in smooth-running, fast metal removal, and fine finishes. The right- and left-hand helical flutes combine to produce a chisel-type cutting tooth. This results in faster penetration and stock removal with minimal bounce or chatter.

The master cut design also produces an easy-to-handle granular-type chip in most metals, as opposed to the conventional sliver-type chips.

Throughout its life, the master cut gives faster stock removal and less operator fatigue, and maintains a good finish on the widest possible variety of workpiece materials.

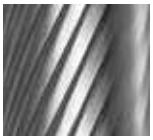


Aluminum Cut

The WIDIA aluminum cut burs are outstanding on soft or non-ferrous type materials. Use the aluminum cut design on aluminum, magnesium, brass, lead, and most plastics.

COARSE-CUT AND FINE-CUT RHS AVAILABLE AS SPECIALS.

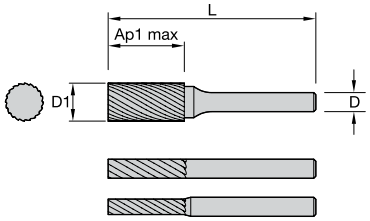
HOW TO SELECT A BUR

APPLICATIONS	MATERIAL	CUT	
Efficient stock removal — deburring, finishing, and cleaning.	Ferrous metals Non-ferrous metals	Double Master Cut	
Heavy stock removal — deburring, milling, cleaning, and machining.	Non-ferrous metal: aluminum alloys Plastics	Aluminum Cut	
Medium stock removal — deburring, milling, cleaning, and finishing.	Non-ferrous metal: aluminum alloys Plastics Hard rubber	Coarse Cut Special Cut Style	
Medium stock removal — deburring, milling, cleaning, and finishing.	Non-hardened steel >45 HRC Hardened steel >45 HRC: stainless steel High-temperature resistant metals: nickel, cobalt, titanium Non-ferrous light metals: brass, copper, and zinc Hardened >45 HRC: cast iron	Single Cut	
Light stock removal — fine deburring and fine finishing.	Hardened steel >45 HRC	Fine Cut Special Cut Style	

Series SA Cylindrical • Single-Cut Burs • Inch



Single Cut

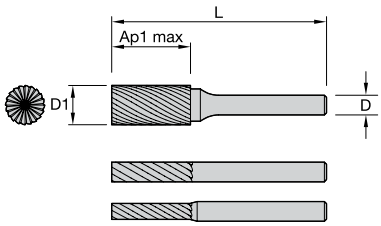


	Single Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SA-42	2736622	M40201	3/32	1/8	7/16	1 1/2	A
SA-43	2736616	M40202	1/8	1/8	9/16	1 1/2	A
SA-1	2736574	M40211	1/4	1/4	5/8	2	C
SA-3	1293725	M40214	3/8	1/4	3/4	2 1/2	C
SA-5	2736544	M40217	1/2	1/4	1	2 3/4	C
SA-6	2736534	M40219	5/8	1/4	1	2 3/4	C

Series SB Cylindrical with End Cut • Single-Cut Burs • Inch



Single Cut

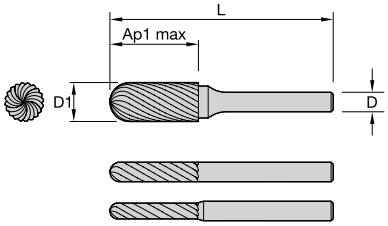


	Single Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SB-41	2736483	M40247	1/16	1/8	1/4	1 1/2	A
SB-3	2736441	M40256	3/8	1/4	3/4	2 1/2	C
SB-5	2736436	M40258	1/2	1/4	1	2 3/4	C

Series SC Cylindrical Ball Nose • Single-Cut Burs • Inch



Single Cut

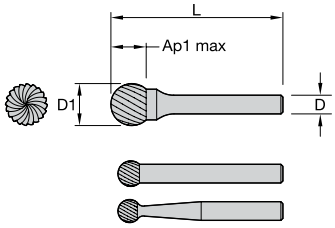


	Single Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SC-42	2736406	M40285	1/8	1/8	9/16	1 1/2	A
SC-1	2736369	M40293	1/4	1/4	5/8	2	C
SC-1L6	3043496	M40294	1/4	1/4	5/8	6 5/8	C
SC-2	2736358	M40295	5/16	1/4	3/4	2 1/2	C
SC-3	2736353	M40296	3/8	1/4	3/4	2 1/2	C
SC-5	2736339	M40299	1/2	1/4	1	2 3/4	C

Series SD Ball • Single-Cut Burs • Inch



Single Cut

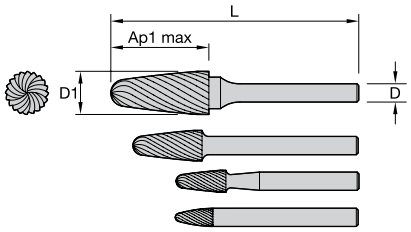


USCTI Number	Single Cut order #	Single Cut catalog #	D1	D	Ap1 max	length L	shank style
SD40	**2730676**	**M40322**	1/16	1/8	1/16	1 1/2	A
SD-41	**2730671**	**M40323**	3/32	1/8	3/32	1 1/2	A
SD-42L2	**3044078**	**M40325**	1/8	1/8	1/8	2	A
SD-11	**3043497**	**M40327**	1/8	1/4	1/8	2	C
SD-53	**2730649**	**M40328**	3/16	1/8	3/16	1 1/2	D
SD-51	**2730639**	**M40330**	1/4	1/8	1/4	1 3/4	B
SD-1	**2730634**	**M40331**	1/4	1/4	1/4	2	C
SD-1L6	**2730629**	**M40332**	1/4	1/4	1/4	6 1/4	C
SD-3	**2730619**	**M40334**	3/8	1/4	3/8	2 5/64	C
SD-3L6	**2730614**	**M40335**	3/8	1/4	3/8	6 3/8	C
SD-5	**2730603**	**M40337**	1/2	1/4	1/2	2 13/64	C
SD-5L6	**2730598**	**M40338**	1/2	1/4	1/2	6 1/2	C
SD-6	**2730593**	**M40339**	5/8	1/4	5/8	2 5/16	C
SD-7	**2730588**	**M40340**	3/4	1/4	3/4	2 7/16	C

Series SF Round Nose Tree • Single-Cut Burs • Inch



Single Cut

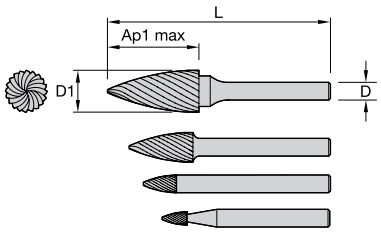


USCTI Number	Single Cut order #	Single Cut catalog #	D1	D	Ap1 max	length L	shank style
SF-41	**2730511**	**M40379**	1/8	1/8	1/4	1 1/2	A
SF-42	**2730506**	**M40380**	1/8	1/8	1/2	1 1/2	A
SF-51	**2730495**	**M40382**	1/4	1/8	1/2	1 3/4	B
SF-3	**2730481**	**M40385**	3/8	1/4	3/4	2 1/2	C

Series SG Pointed Tree • Single-Cut Burs • Inch



Single Cut

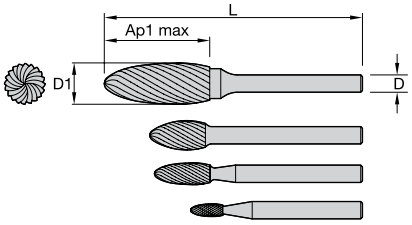


USCTI Number	Single Cut order #	Single Cut catalog #	D1	D	Ap1 max	length L	shank style
SG-43	**3054754**	**M40416**	1/8	1/8	3/8	1 1/2	A
SG-44	**2730385**	**M40417**	1/8	1/8	1/2	1 1/2	A
SG-53	**2730380**	**M40418**	3/16	1/8	1/2	1 1/2	D
SG-1	**2730371**	**M40420**	1/4	1/4	5/8	2	C

Series SH Flame • Single-Cut Burs • Inch



Single Cut

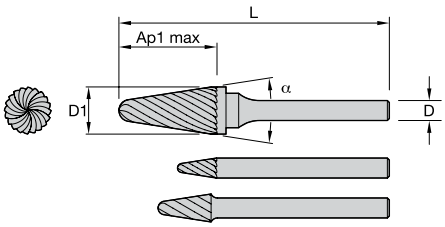


USCTI Number	Single Cut order #	Single Cut catalog #	D1	D	Ap1 max	length L	shank style
SH-41	**2730325**	**M40446**	1/8	1/8	1/4	1 1/2	A
SH-53	**2730320**	**M40447**	3/16	1/8	3/8	1 1/2	D
SH-2	**2730315**	**M40448**	5/16	1/4	3/4	2 1/2	C
SH-5	**2730310**	**M40449**	1/2	1/4	1 1/4	3	C
SH-6	**2730305**	**M40450**	5/8	1/4	1 7/16	3 3/16	C

Series SL Included Angle • Single-Cut Burs • Inch



Single Cut



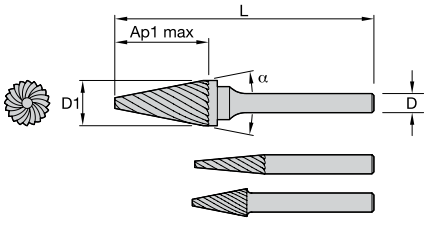
α = KRA

USCTI Number	Single Cut order #	Single Cut catalog #	D1	D	Ap1 max	length L	shank style	KRA
SL-42	**2730290**	**M40462**	1/8	1/8	1/2	1 1/2	A	8
SL-53	**2730285**	**M40463**	3/16	1/8	1/2	1 1/2	D	14

Series SM Pointed Cone • Single-Cut Burs • Inch



Single Cut



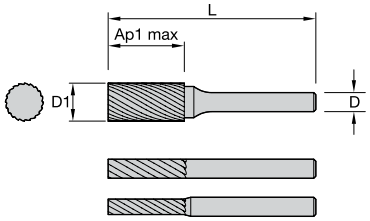
α = KRA

USCTI Number	Single Cut order #	Single Cut catalog #	D1	D	Ap1 max	length L	shank style	KRA
SM-42	**2730202**	**M40486**	1/8	1/8	7/16	1 1/2	A	14
SM-43	**2730196**	**M40487**	1/8	1/8	5/8	1 1/2	A	7
SM-2	**2730174**	**M40491**	1/4	1/4	3/4	2	C	14
SM-5	**2730159**	**M40494**	1/2	1/4	7/8	2 3/4	C	28

Series SA-M Cylindrical • Single-Cut Burs • Metric



Single Cut

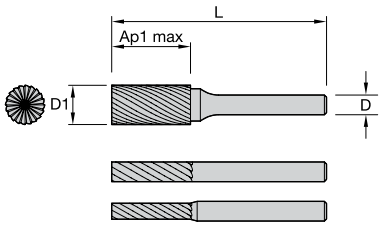


	Single Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SA-43M	2736521	M40224	3,0	3,0	14,3	38,1	A

Series SB-M Cylindrical with End Cut • Single-Cut Burs • Metric



Single Cut

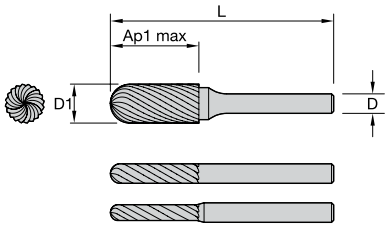


	Single Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SB-1M	2986664	M40268	6,0	6,0	15,9	50,8	C

Series SC-M Cylindrical Ball Nose • Single-Cut Burs • Metric



Single Cut

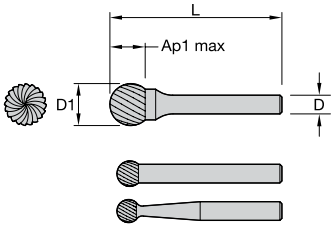


	Single Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SC-42M	2736319	M40304	3,0	3,0	14,3	38,1	A

Series SD-M Ball • Single-Cut Burs • Metric



Single Cut

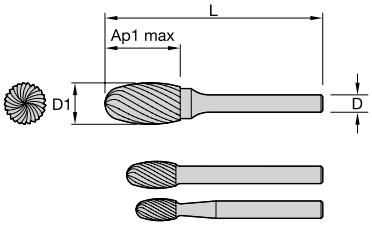


	Single Cut					length	
USCTI Number	order #	catalog #	D1	D	Ap1 max	L	shank style
SD-40M	**1293470**	**M40342**	1,6	3,0	1,6	38,1	A
SD-42M	**2730572**	**M40344**	3,0	3,0	3,0	38,1	A
SD-1M	**2730567**	**M40347**	6,0	6,0	6,0	50,8	C

Series SE-M Egg • Master-Cut Burs • Metric



Master Cut

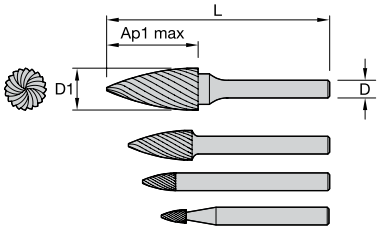


	Master Cut					length	
USCTI Number	order #	catalog #	D1	D	Ap1 max	L	shank style
SE-51M	**2987333**	**M41370**	6,4	3,0	9,5	41,3	B

Series SG-M Pointed Tree • Single-Cut Burs • Metric



Single Cut

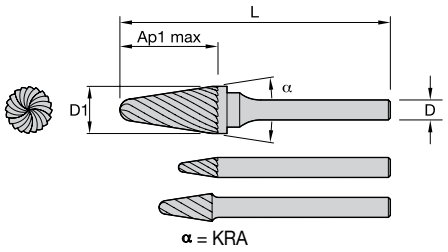


	Single Cut					length	
USCTI Number	order #	catalog #	D1	D	Ap1 max	L	shank style
SG-43M	**2730335**	**M40430**	3,0	3,0	9,5	38,1	A
SG-3M	**2981799**	**M40436**	9,5	6,0	19,1	63,5	C

Series SL-M Included Angle • Single-Cut Burs • Metric



Single Cut

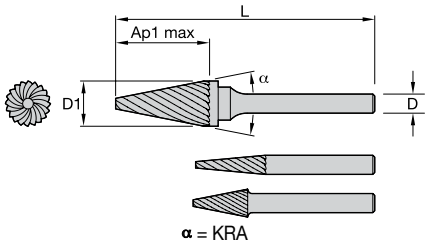


	Single Cut					length		
USCTI Number	order #	catalog #	D1	D	Ap1 max	L	shank style	KRA
SL-42M	**2730232**	**M40474**	3,0	3,0	12,7	38,1	A	8
SL-4M	**2730217**	**M40479**	12,7	6,0	31,8	76,2	C	14

Series SM-M Pointed Cone • Single-Cut Burs • Metric



Single Cut

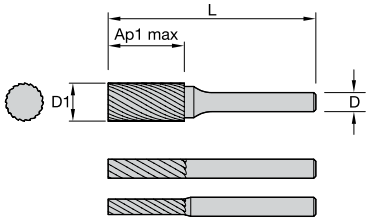


	Single Cut					length		
USCTI Number	order #	catalog #	D1	D	Ap1 max	L	shank style	KRA
SM-42M	**2987352**	**M40497**	3,0	3,0	11,1	38,1	A	14
SM-43M	**2990413**	**M40498**	3,0	3,0	15,9	38,1	A	7

Series SA Cylindrical • Master-Cut Burs • Inch



Master Cut

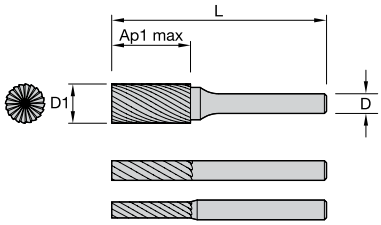


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SA-41	**2735826**	**M41200**	1/16	1/8	1/4	1 1/2	A
SA-42	**2735821**	**M41201**	3/32	1/8	7/16	1 1/2	A
SA-43	**2735816**	**M41202**	1/8	1/8	9/16	1 1/2	A
SA-43L2	**2735811**	**M41203**	1/8	1/8	9/16	2	A
SA-43L3	**2735806**	**M41204**	1/8	1/8	9/16	3	A
SA-11	**2735801**	**M41205**	1/8	1/4	1/2	2	C
SA-14	**2735787**	**M41208**	3/16	1/4	5/8	2	C
SA-51	**2735782**	**M41209**	1/4	1/8	3/16	1 7/16	B
SA-51-2	**2735777**	**M41210**	1/4	1/8	1/2	1 3/4	B
SA-1	**2735772**	**M41211**	1/4	1/4	5/8	2	C
SA-2	**2735763**	**M41213**	5/16	1/4	3/4	2 1/2	C
SA-3	**3063092**	**M41214**	3/8	1/4	3/4	2 1/2	C
SA-5	**2735742**	**M41217**	1/2	1/4	1	2 3/4	C
SA-6	**2735732**	**M41219**	5/8	1/4	1	2 3/4	C
SA-7	**2735727**	**M41220**	3/4	1/4	1	2 3/4	C
SA-9	**2735722**	**M41221**	1	1/4	1	2 3/4	C

Series SB Cylindrical with End Cut • Master-Cut Burs • Inch



Master Cut

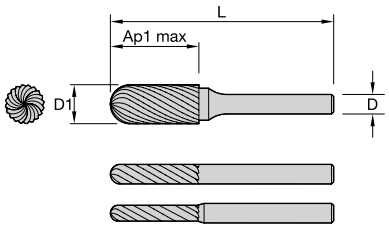


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SB-51	**2735666**	**M41252**	1/4	1/8	3/16	1 7/16	B
SB-51-2	**2735662**	**M41253**	1/4	1/8	1/2	1 3/4	B
SB-1	**2735657**	**M41254**	1/4	1/4	5/8	2	C
SB-2	**3055771**	**M41255**	5/16	1/4	3/4	2 1/2	C
SB-3	**2735646**	**M41256**	3/8	1/4	3/4	2 1/2	C
SB-5	**2735636**	**M41258**	1/2	1/4	1	2 3/4	C
SB-6	**2735631**	**M41259**	5/8	1/4	1	2 3/4	C
SB-7	**2735626**	**M41260**	3/4	1/4	1	2 3/4	C

Series SC Cylindrical Ball Nose • Master-Cut Burs • Inch



Master Cut

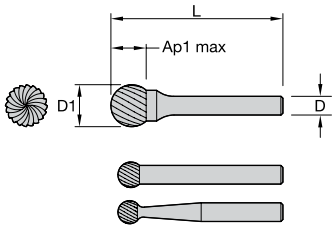


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SC-41	**2735611**	**M41284**	3/32	1/8	7/16	1 1/2	A
SC-42	**2735606**	**M41285**	1/8	1/8	9/16	1 1/2	A
SC-42L3	**2735596**	**M41287**	1/8	1/8	9/16	3	A
SC-11	**2735591**	**M41288**	1/8	1/4	1/2	2	A
SC-53	**2735581**	**M41290**	3/16	1/8	1/2	1 1/2	D
SC-51	**2735571**	**M41292**	1/4	1/8	1/2	1 3/4	B
SC-1	**2735566**	**M41293**	1/4	1/4	5/8	2	C
SC-1L6	**2735561**	**M41294**	1/4	1/4	5/8	6 5/8	C
SC-2	**2735556**	**M41295**	5/16	1/4	3/4	2 1/2	C
SC-3	**2735551**	**M41296**	3/8	1/4	3/4	2 1/2	C
SC-3L6	**2735546**	**M41297**	3/8	1/4	3/4	6 3/4	C
SC-4	**3050641**	**M41298**	7/16	1/4	1	2 3/4	C
SC-5	**2735531**	**M41299**	1/2	1/4	1	2 3/4	C
SC-5L6	**2735526**	**M41300**	1/2	1/4	1	7	C
SC-6	**2735521**	**M41301**	5/8	1/4	1	2 3/4	C
SC-7	**2735516**	**M41302**	3/4	1/4	1	2 3/4	C

Series SD Ball • Master-Cut Burs • Inch



Master Cut

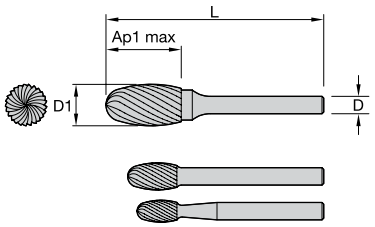


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SD-41	**2729967**	**M41323**	3/32	1/8	3/32	1 1/2	A
SD-42	**2729963**	**M41324**	1/8	1/8	1/8	1 1/2	A
SD-42L3	**2729951**	**M41326**	1/8	1/8	1/8	3	A
SD-11	**2729946**	**M41327**	1/8	1/4	1/8	2	C
SD-53	**2729942**	**M41328**	3/16	1/8	3/16	1 1/2	D
SD-14	**2729936**	**M41329**	3/16	1/4	3/16	2	C
SD-51	**2729930**	**M41330**	1/4	1/8	1/4	1 3/4	B
SD-1	**2729926**	**M41331**	1/4	1/4	1/4	2	C
SD-1L6	**2729920**	**M41332**	1/4	1/4	1/4	6 1/4	C
SD-2	**2729914**	**M41333**	5/16	1/4	5/16	2 1/32	C
SD-3	**2729910**	**M41334**	3/8	1/4	3/8	2 5/64	C
SD-3L6	**2729906**	**M41335**	3/8	1/4	3/8	6 3/8	C
SD-4	**2729901**	**M41336**	7/16	1/4	7/16	2 9/64	C
SD-5	**2729895**	**M41337**	1/2	1/4	1/2	2 13/64	C
SD-5L6	**3046344**	**M41338**	1/2	1/4	1/2	6 1/2	C
SD-7	**2729880**	**M41340**	3/4	1/4	3/4	2 7/16	C
SD-9	**2729873**	**M41341**	1	1/4	1	2 11/16	C

Series SE Egg • Master-Cut Burs • Inch



Master Cut

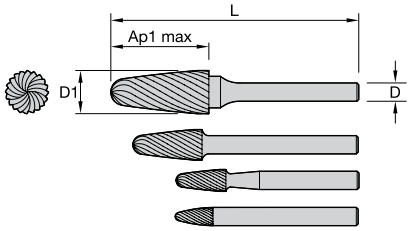


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SE-41	**2729835**	**M41360**	1/8	1/8	7/32	1 1/2	A
SE-53	**2729830**	**M41361**	3/16	1/8	9/32	1 1/2	D
SE-51	**2729825**	**M41362**	1/4	1/8	3/8	1 5/8	B
SE-1	**2729820**	**M41363**	1/4	1/4	3/8	2	C
SE-3	**2729814**	**M41364**	3/8	1/4	5/8	2 3/8	C
SE-5	**2729808**	**M41365**	1/2	1/4	7/8	2 5/8	C
SE-6	**2729803**	**M41366**	5/8	1/4	1	2 3/4	C

Series SF Round Nose Tree • Master-Cut Burs • Inch



Master Cut

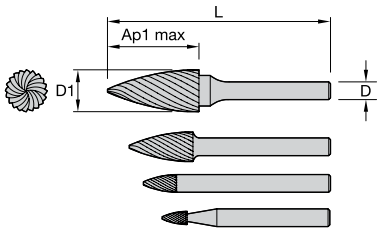


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SF-41	**2729782**	**M41379**	1/8	1/8	1/4	1 1/2	A
SF-42	**2729778**	**M41380**	1/8	1/8	1/2	1 1/2	A
SF-51	**2729768**	**M41382**	1/4	1/8	1/2	1 3/4	B
SF-1	**1750297**	**M41383**	1/4	1/4	5/8	2	C
SF-3	**2729751**	**M41385**	3/8	1/4	3/4	2 1/2	C
SF-3L6	**2729746**	**M41386**	3/8	1/4	3/4	6 3/4	C
SF-13	**2729736**	**M41388**	1/2	1/4	3/4	2 1/2	C
SF-5	**2729731**	**M41389**	1/2	1/4	1	2 3/4	C
SF-5L6	**2729726**	**M41390**	1/2	1/4	1	7	C
SF-6	**2729721**	**M41391**	5/8	1/4	1	2 3/4	C
SF-7	**2729716**	**M41392**	3/4	1/4	1	2 3/4	C
SF-15	**2729711**	**M41393**	3/4	1/4	1 1/2	3 1/4	C
SF-14	**2729706**	**M41394**	3/4	1/4	1 1/4	3	C

Series SG Pointed Tree • Master-Cut Burs • Inch



Master Cut

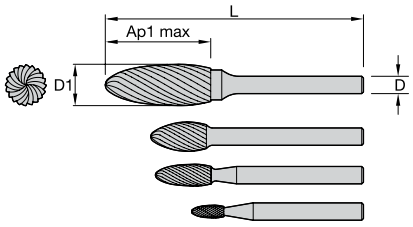


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SG-41	**2729675**	**M41414**	1/8	1/8	1/4	1 1/2	A
SG-42	**2729669**	**M41415**	1/8	1/8	5/16	1 1/2	A
SG-44	**2729660**	**M41417**	1/8	1/8	1/2	1 1/2	A
SG-51	**2729651**	**M41419**	1/4	1/8	1/2	1 3/4	B
SG-1	**2729646**	**M41420**	1/4	1/4	5/8	2	C
SG-3	**2729636**	**M41422**	3/8	1/4	3/4	2 1/2	C
SG-5	**2729626**	**M41424**	1/2	1/4	1	2 3/4	C

Series SH Flame • Master-Cut Burs • Inch



Master Cut

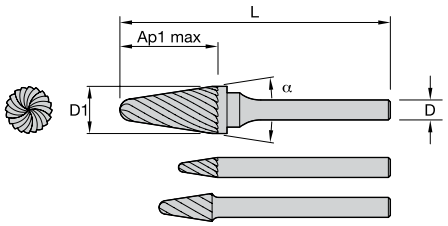


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SH-41	**2729586**	**M41446**	1/8	1/8	1/4	1 1/2	A
SH-2	**2729575**	**M41448**	5/16	1/4	3/4	2 1/2	C
SH-5	**2729570**	**M41449**	1/2	1/4	1 1/4	3	C
SH-7	**2729559**	**M41451**	3/4	1/4	1 5/8	3 3/8	C

Series SL Included Angle • Master-Cut Burs • Inch



Master Cut



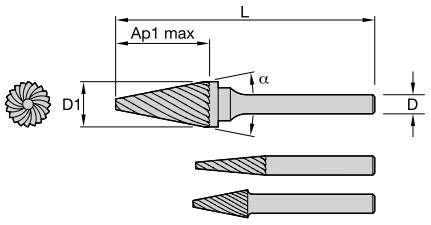
α = KRA

USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style	KRA
SL-41	**3046345**	**M41461**	1/8	1/8	3/8	1 1/2	A	8
SL-42	**2729539**	**M41462**	1/8	1/8	1/2	1 1/2	A	8
SL-1	**2729529**	**M41464**	1/4	1/4	5/8	2	C	14
SL-1L6	**2729523**	**M41465**	1/4	1/4	5/8	6 5/8	C	14
SL-2	**1752788**	**M41466**	5/16	1/4	7/8	2 3/4	C	14
SL-3	**2729513**	**M41467**	3/8	1/4	1 1/16	2 15/16	C	14
SL-4	**2729503**	**M41469**	1/2	1/4	1 1/8	3	C	14
SL-6	**2729493**	**M41471**	5/8	1/4	1 5/16	3 3/16	C	14

Series SM Pointed Cone • Master-Cut Burs • Inch



Master Cut



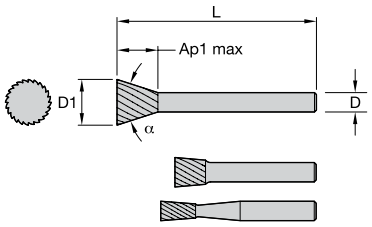
α = KRA

USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style	KRA
SM-41	**2729447**	**M41485**	1/8	1/8	3/8	1 1/2	A	12
SM-42	**2729443**	**M41486**	1/8	1/8	7/16	1 1/2	A	14
SM-43	**2729438**	**M41487**	1/8	1/8	5/8	1 1/2	A	7
SM-53	**2729433**	**M41488**	3/16	1/8	1/2	1 1/2	D	16
SM-51	**3050060**	**M41489**	1/4	1/8	1/2	1 7/8	B	22
SM-1	**2729423**	**M41490**	1/4	1/4	1/2	2	C	22
SM-2	**2729418**	**M41491**	1/4	1/4	3/4	2	C	14
SM-3	**2729413**	**M41492**	1/4	1/4	1	2	C	10
SM-4	**2729407**	**M41493**	3/8	1/4	5/8	2 1/2	C	28
SM-5	**2729402**	**M41494**	1/2	1/4	7/8	2 3/4	C	28
SM-6	**2729397**	**M41495**	5/8	1/4	1	2 7/8	C	31

Series SN Inverted Taper • Master-Cut Burs • Inch



Master Cut



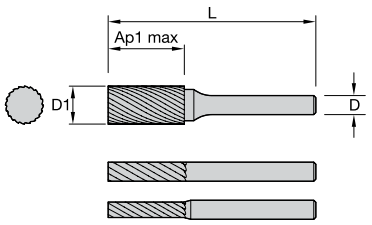
α = KRA

	Master Cut							
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style	KRA
SN-51	**3051758**	**M41512**	1/4	1/8	1/4	1 1/2	B	10
SN-3	**2729351**	**M41514**	1/2	1/4	1/2	2 1/4	C	16

Series SA-M Cylindrical • Master-Cut Burs • Metric



Master Cut

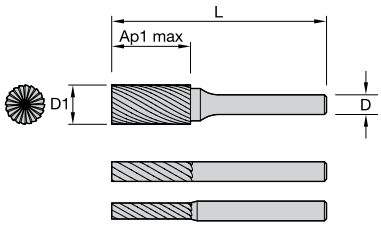


	Master Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SA-41M	**1598896**	**M41222**	1,6	3,0	4,8	38,1	A
SA-42M	**1293458**	**M41223**	2,4	3,0	11,1	38,1	A
SA-43M	**2270852**	**M41224**	3,0	3,0	14,3	38,1	A
SA-1M	**1977519**	**M41229**	6,0	6,0	15,9	50,8	C
SA-51M-2	**1977415**	**M41231**	6,4	3,0	12,7	44,5	B
SA-2M	**2735696**	**M41232**	7,9	6,0	19,1	63,5	C
SA-3M	**1293733**	**M41233**	9,5	6,0	19,1	63,5	C
SA-5M	**2219983**	**M41237**	12,7	6,0	25,4	69,9	C

Series SB-M Cylindrical with End Cut • Master-Cut Burs • Metric



Master Cut

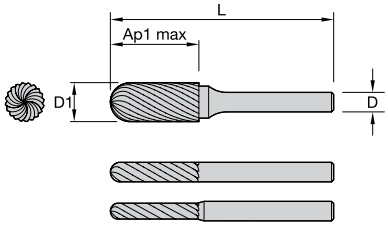


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SB-42M	**2991812**	**M41262**	2,4	3,0	11,1	38,1	A
SB-43M	**2220466**	**M41263**	3,0	3,0	14,3	38,1	A
SB-1M	**2987342**	**M41268**	6,0	6,0	15,9	50,8	C
SB-51M-2	**2987340**	**M41270**	6,4	3,0	6,4	44,5	B
SB-2M	**2987339**	**M41271**	7,9	6,0	19,1	63,5	C
SB-3M	**2987338**	**M41272**	9,5	6,0	19,1	63,5	C
SB-5M	**2987337**	**M41274**	12,7	6,0	25,4	69,9	C

Series SC-M Cylindrical Ball Nose • Master-Cut Burs • Metric



Master Cut

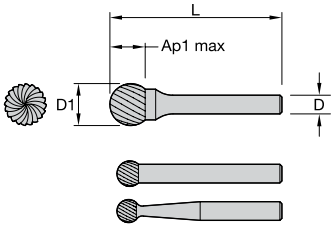


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SC-41M	**2990415**	**M41303**	2,4	3,0	11,1	38,1	A
SC-42M	**1977373**	**M41304**	3,0	3,0	14,3	38,1	A
SC-52M	**2735503**	**M41306**	4,0	3,0	12,7	38,1	D
SC-53M	**2894604**	**M41307**	4,8	3,0	12,7	38,1	D
SC-14M	**2991273**	**M41308**	4,8	6,0	15,9	50,8	C
SC-1M	**1977546**	**M41309**	6,0	6,0	15,9	50,8	C
SC-51M	**2894603**	**M41310**	6,4	3,0	12,7	44,5	B
SC-2M	**2729973**	**M41311**	7,9	6,0	19,1	63,5	C
SC-3M	**1977548**	**M41312**	9,5	6,0	19,1	63,5	C
SC-4M	**2987336**	**M41314**	11,1	6,0	25,4	69,9	C
SC-5M	**1977549**	**M41316**	12,7	6,0	25,4	69,9	C
SC-6M	**2991274**	**M41318**	15,9	6,0	25,4	69,9	C

Series SD-M Ball • Master-Cut Burs • Metric



Master Cut

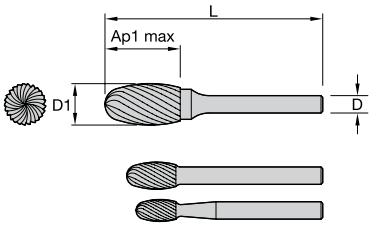


	Master Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SD-41M	**2729868**	**M41343**	2,4	3,0	2,4	38,1	A
SD-42M	**2729863**	**M41344**	3,0	3,0	3,0	38,1	A
SD-53M	**2973335**	**M41345**	4,8	3,0	4,8	38,1	D
SD-14M	**2987335**	**M41346**	4,8	6,0	4,8	50,8	C
SD-1M	**2729860**	**M41347**	6,0	6,0	6,0	50,8	C
SD-51M	**2729855**	**M41348**	6,4	3,0	6,4	38,1	B
SD-2M	**2987334**	**M41349**	7,9	6,0	7,9	51,6	C
SD-3M	**2991276**	**M41350**	9,5	6,0	9,5	52,8	C
SD-5M	**2729850**	**M41352**	12,7	6,0	12,7	56,0	C

Series SE-M Egg • Master-Cut Burs • Metric



Master Cut

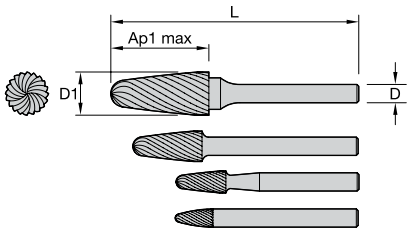


	Master Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SE-3M	**2991277**	**M41371**	9,5	6,0	15,9	60,3	C
SE-5M	**1977570**	**M41373**	12,7	6,0	22,2	66,7	C
SE-5M-2	**3324697**	**M41374**	12,7	8,0	22,2	73,0	C
SE-7M	**2991816**	**M41377**	19,1	6,0	25,4	69,9	C

Series SF-M Round Nose Tree • Master-Cut Burs • Metric



Master Cut

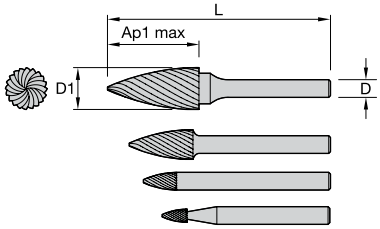


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SF-42M	**1977374**	**M41396**	3,0	3,0	12,7	38,1	A
SF-53M	**2729701**	**M41397**	4,8	3,0	12,7	38,1	D
SF-51M	**1977417**	**M41399**	6,4	3,0	12,7	44,5	B
SF-3M	**3526093**	**M41400**	9,5	6,0	19,1	63,5	C
SF-4M	**1977555**	**M41401**	11,1	6,0	25,4	69,9	C
SF-5M	**1977556**	**M41403**	12,7	6,0	25,4	69,9	C

Series SG-M Pointed Tree • Master-Cut Burs • Metric



Master Cut

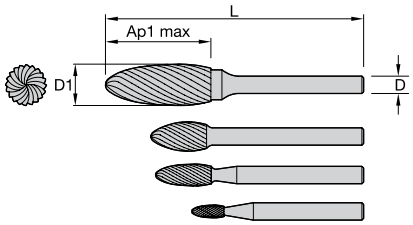


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SG-41M-2	**1293463**	**M41428**	3,0	3,0	6,4	38,1	A
SG-44M	**1534016**	**M41431**	3,0	3,0	12,7	38,1	A
SG-53M	**2894601**	**M41432**	4,8	3,0	12,7	38,1	D
SG-1M	**2987329**	**M41433**	6,0	6,0	15,9	50,8	C
SG-51M	**1293476**	**M41434**	6,4	3,0	12,7	44,5	B
SG-2M	**2987327**	**M41435**	7,9	6,0	19,1	63,5	C
SG-3M	**2987326**	**M41436**	9,5	6,0	19,1	63,5	C
SG-5M	**2729591**	**M41439**	12,7	6,0	25,4	69,9	C

Series SH-M Flame • Master-Cut Burs • Metric



Master Cut

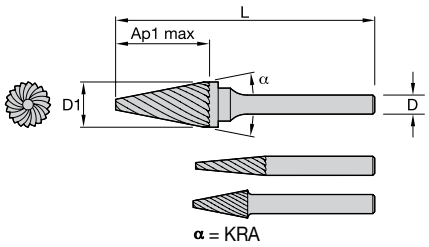


USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length L	shank style
SH-53M	**1977429**	**M41453**	4,8	3,0	9,5	38,1	D
SH-2M	**2991284**	**M41454**	7,9	6,0	19,1	63,5	C
SH-5M	**2987323**	**M41455**	12,7	6,0	31,8	76,2	C
SH-6M	**2987322**	**M41457**	15,9	6,0	36,5	81,0	C

Series SM-M Pointed Cone • Master-Cut Burs • Metric



Master Cut

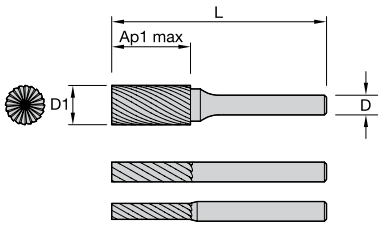


	Master Cut							
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style	KRA
SM-42M	**1977382**	**M41497**	3,0	3,0	11,1	38,1	A	14
SM-43M	**1293468**	**M41498**	3,0	3,0	15,9	38,1	A	7
SM-2M	**1977564**	**M41501**	6,0	6,0	19,1	50,8	C	14
SM-5M	**1977567**	**M41505**	12,7	6,0	22,2	69,9	C	28

Series SB Cylindrical with End Cut • Aluminum-Cut Burs • Inch



Aluminum Cut

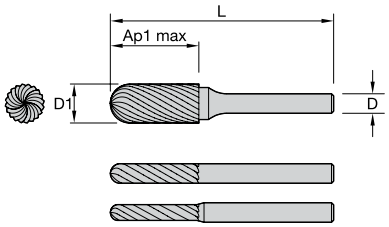


	Aluminum Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SB-1	**2736311**	**M40527**	1/4	1/4	5/8	2	C
SB-3	**2736307**	**M40528**	3/8	1/4	3/4	2 1/2	C
SB-5	**2736300**	**M40529**	1/2	1/4	1	2 3/4	C

Series SC Cylindrical Ball Nose • Aluminum-Cut Burs • Inch



Aluminum Cut

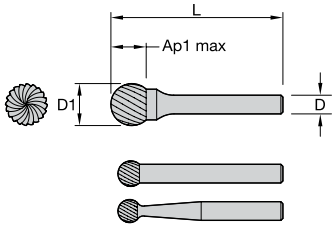


	Aluminum Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SC-5	**2736276**	**M40534**	1/2	1/4	1	2 3/4	C

Series SD Ball • Aluminum-Cut Burs • Inch



Aluminum Cut

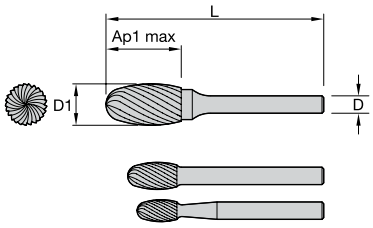


	Aluminum Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SD-3	**2730072**	**M40538**	3/8	1/4	3/8	2 5/64	C
SD-5	**2730067**	**M40539**	1/2	1/4	1/2	2 13/64	C

Series SE Egg • Aluminum-Cut Burs • Inch



Aluminum Cut

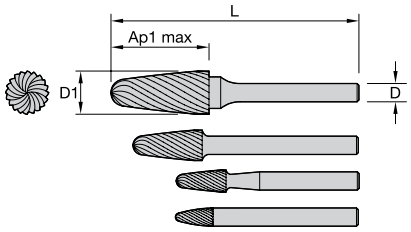


	Aluminum Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SE-5	**2730053**	**M40542**	1/2	1/4	7/8	2 5/8	C

Series SF Round Nose Tree • Aluminum-Cut Burs • Inch



Aluminum Cut

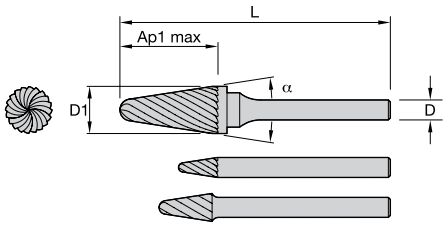


	Aluminum Cut						
USCTI Number	order #	catalog #	D1	D	Ap1 max	length L	shank style
SF-3	**2730037**	**M40545**	3/8	1/4	3/4	2 1/2	C
SF-5	**2730032**	**M40546**	1/2	1/4	1	2 3/4	C
SF-6	**2730027**	**M40547**	5/8	1/4	1	2 3/4	C

Series SL Included Angle • Aluminum-Cut Burs • Inch



Aluminum Cut



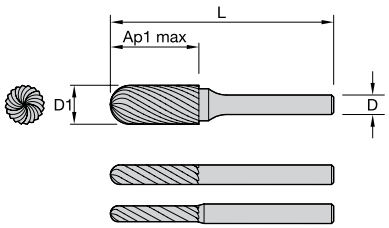
α = KRA

USCTI Number	Aluminum Cut order #	Aluminum Cut catalog #	D1	D	Ap1 max	length L	shank style	KRA
SL-3	**2730022**	**M40548**	3/8	1/4	1 1/16	2 15/16	C	14
SL-4	**2730017**	**M40549**	1/2	1/4	1 1/8	3	C	14

Series SC-M Cylindrical Ball Nose • Aluminum-Cut Burs • Metric



Aluminum Cut

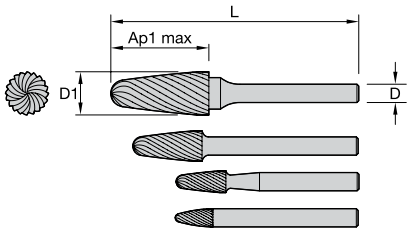


USCTI Number	Aluminum Cut order #	Aluminum Cut catalog #	D1	D	Ap1 max	length L	shank style
SC-5M	**2987349**	**M40561**	12,7	6,0	25,4	69,9	C

Series SF-M Round Nose Tree • Aluminum-Cut Burs • Metric



Aluminum Cut

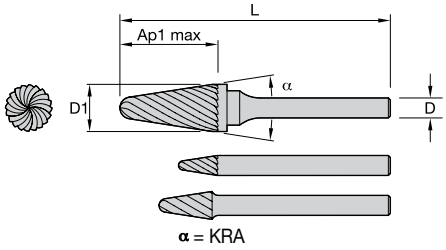


USCTI Number	Aluminum Cut order #	Aluminum Cut catalog #	D1	D	Ap1 max	length L	shank style
SF-5M	**1977630**	**M40578**	12,7	6,0	25,4	69,9	C

Series SL-M Included Angle • Master-Cut Burs • Metric



Master Cut



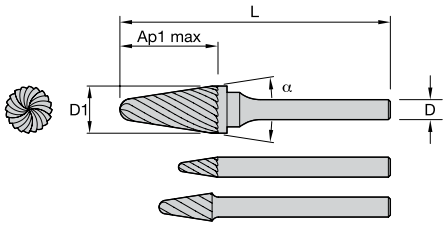
α = KRA

	Master Cut					length		
USCTI Number	order #	catalog #	D1	D	Ap1 max	L	shank style	KRA
SL-42M	**1977385**	**M41474**	3,0	3,0	12,7	38,1	A	8
SL-3M	**1977573**	**M41478**	9,5	6,0	27,0	74,6	C	14
SL-4M	**1293770**	**M41479**	12,7	6,0	31,8	76,2	C	14

Series SL-M Included Angle • Aluminum-Cut Burs • Metric



Aluminum Cut



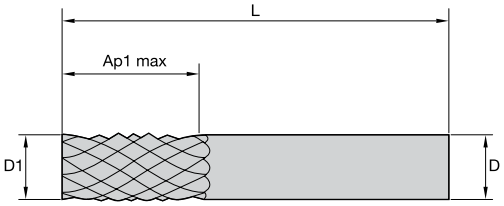
α = KRA

	Aluminum Cut					length		
USCTI Number	order #	catalog #	D1	D	Ap1 max	L	shank style	KRA
SL-3M	**2978948**	**M40582**	9,5	6,0	27,0	74,6	C	14
SL-4M	**2729982**	**M40584**	12,7	6,0	31,8	76,2	C	14

Series IGT Internal Grinding Tool • Burs • Metric



Master Cut

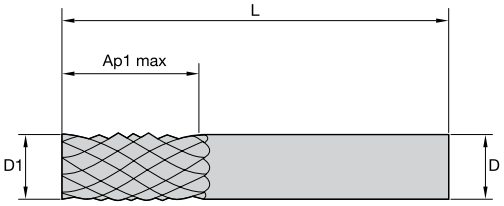


Master Cut					length
order #	catalog #	D1	D	Ap1 max	L
2735459	**M42008**	2,4	3,2	4,0	38,1
2735454	**M42009**	2,8	3,2	4,8	38,1
2735396	**M42022**	4,8	4,8	6,4	50,8
2735432	**M42014**	6,4	6,4	7,9	50,8

Series IGT-EC Internal Grinding Tool • Burs • Metric



Master Cut

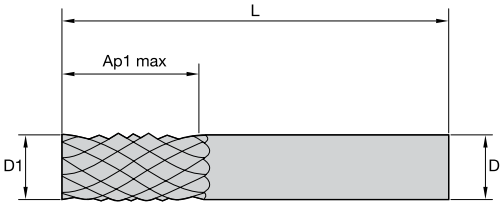


Master Cut					
order #	catalog #	D1	D	Ap1 max	length L
2735391	M42023	1,6	3,2	3,2	38,1
2735381	M42025	2,4	3,2	4,0	38,1
2735371	M42027	3,2	3,2	4,8	38,1
2735320	M42037	4,0	4,8	5,6	50,8
2735310	M42039	4,8	4,8	6,4	50,8
2735361	M42029	5,6	6,4	7,1	50,8
2735352	M42031	6,4	6,4	7,9	50,8
2735346	M42032	7,1	6,4	8,7	63,5
2735341	M42033	7,9	6,4	8,7	63,5
2735331	M42035	9,5	6,4	9,5	63,5

Series CRTF-BE • Burs • Inch



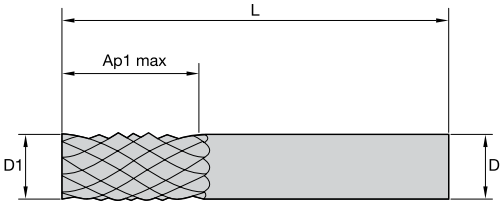
Master Cut



Master Cut					
order #	catalog #	D1	D	Ap1 max	length L
2737535	M34831	1/4	1/4	3/4	2
2737530	M34832	1/4	1/4	3/4	2 1/2
2737521	M34841	3/8	3/8	1	2 1/2
3045679	M34842	1/2	1/2	1	3

Series CRTF-CC • Burs • Inch

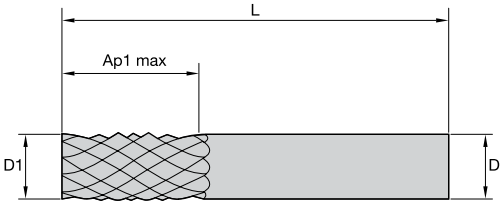

Master Cut



Master Cut					
order #	catalog #	D1	D	Ap1 max	length L
2737583	M34800	1/8	1/8	1/2	1 1/2
2737564	M34810	5/16	5/16	1	2 1/2

Series CRTF-DP • Burs • Inch

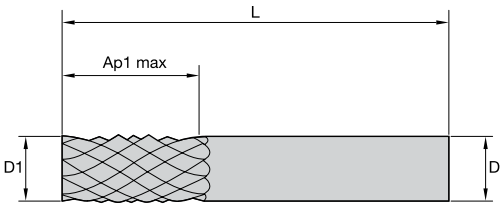

Master Cut



Master Cut					
order #	catalog #	D1	D	Ap1 max	length L
2737511	M34850	1/16	1/8	3/16	1 1/2
2737497	M34860	1/4	1/4	3/4	2
2737492	M34861	1/4	1/4	1	3

Series CRTF-NE • Burs • Inch


Master Cut



Master Cut					
order #	catalog #	D1	D	Ap1 max	length L
2737449	M34890	1/4	1/4	1	3

Series Bur Sets



order number	catalog number	D1	D	quantity	shank style	cut style	includes
2736246	M40588	1/8	1/8	9	A	Master	SA-42, SA-43, SC-41, SC-42, SD-42, SE-41, SF-42, SG-42, SM-43
2736236	M40591	1/4	1/8	9	B	Master	SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51
2736227	M40593	1/4	1/4	8	C	Master	SA-1, SC-1, SD-1, SE-1, SF-1, SG-1, SL-1, SM-2
2736221	M40594	1/2	1/4	8	C	Master	SA-5, SC-5, SD-5, SE-5, SF-5, SG-5, SL-4, SM-5


HANITA™



PRODUCTIVITY

Solid end mills in the Hanita™ portfolio achieve exceptional levels of productivity in complex operations at increased cutting parameters.



DURABILITY

End mills in the Hanita portfolio feature optimized geometries capable of peak performance in high-demand machining strategies.



INNOVATION

Hanita is a brand for innovation enthusiasts who are searching for precision-engineered solid carbide end mill solutions.

Hanita **high-performance solid carbide end mill solutions** are developed for customers who have a passion for performance.

Offering a comprehensive range of standard and custom end mills spanning a broad range of diameters and lengths, all boasting **unparalleled metal removal rates** through **innovative geometries**, Hanita delivers not only the tool for the job but **the experience** to develop a solution for the customer.

Hanita solutions are available through WIDIA™ channel partners.



widia.com

HANITA™

Solid End Milling

Hanita High-Performance Solid Carbide End Mills B120–B370

SEM Selection Table B120–B159

VariMill XTREME B160–B177

VariMill I B178–B200

VariMill II B202–B228

VariMill III ER B230–B239

VariMill Chip Splitter B240–B248

Roughers B249–B266

Finishers B268–B285

ALUFLASH B286–B310

X-Feed B312–B321

Vision Plus B322–B352

HSS End Mills B354–B370

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill™ XTREME™	VariMill XTREME	VariMill XTREME	VariMill XTREME	VariMill XTREME	VariMill XTREME	VariMill XTREME
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		4X0E	4X0E	4X0E	4X0E	4X1E	4X1E	4X1E
Page		B162	B162	B163	B163	B164	B164	B164
Flute		4	4	4	4	4	4	4
Diameter D1		1/8—3/8"	1/2—1"	1/8—3/8"	1/2—1"	5/16"	1/2—1"	5/16"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Long	Long	Long
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		—	—	.015—.030"	.015—.030"	—	—	.015—.030"
Helix Angle		37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	**0**	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○
H	**1**	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill™ XTREME™	VariMill XTREME	VariMill XTREME	VariMill XTREME	VariMill XTREME	VariMill XTREME	VariMill I™
								
UOM		**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**
Series		**4X1E**	**4X4E**	**4X4E**	**4X4E**	**4X6E**	**4X6E**	**4V05**
Page		B165	B165	B165	B166	B167	B167	B180–B182
Flute		4	4	4	4	4	4	4
Diameter D1		1/2—1"	1/8—3/8"	1/8—3/8"	1/2"	3/4—1"	3/4"	1/8—1"
Shank								
Length of Cut		Long	Extended	Extended	Extended	X-Long	X-Long	Regular
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		.015—.030"	—	.015"	.015—.030"	—	.015"	—
Helix Angle		37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	**0**	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○
H	**1**	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill I™	VariMill I	VariMill I	VariMill I	VariMill I	VariMill I	VariMill I
								
UOM		**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**
Series		**4V05**	**4V05**	**4V05**	**4V05**	**4V05**	**4V15**	**4V15**
Page		B180	B180–B182	B180–B182	B180–B181	B181–B182	B180–B182	B180–B182
Flute		4	4	4	4	4	4	4
Diameter D1		1/8—7/16"	1/8—1"	1/2—1 1/4"	1/2—1 1/4"	1/2—1 1/4"	1/4—3/4"	1/4—3/4"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Long	Long
Corner Style								
Chamfer Size		.010—.020"	—	—	.020"	—	—	—
Radius Sizes		—	.015—.090"	—	—	.015—.250"	—	.015—.120"
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	0	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	1							
	2							
	3							
	4							
	5							
S	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○
H	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill I™	VariMill I	VariMill I	VariMill I	VariMill I	VariMill I	VariMill I
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		4V15	4V15	4V15	4V45	4V45	4V45	4V45
Page		B181–B182	B181–B182	B181–B182	B180–B181	B180	B180–B181	B180–B182
Flute		4	4	4	4	4	4	4
Diameter D1		1/2—1"	5/8—1"	1/2—1"	1/8—1/2"	1/8—7/16"	3/16—1/2"	1/2—3/4"
Shank								
Length of Cut		Long	Long	Long	Short	Short	Short	Short
Corner Style								
Chamfer Size		—	.010—.020"	—	—	.010—.020"	—	—
Radius Sizes		—	—	.030—.060"	—	—	.015—.030"	—
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	0	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	1							
	2							
	3							
	4							
	5							
S	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○
H	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill I™	VariMill I	VariMill I	VariMill I	VariMill I	VariMill I	VariMill I
								
UOM		**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**
Series		**4V45**	**4V45**	**4V65**	**4V65**	**4V65**	**4V65**	**4V65**
Page		B180–B182	B180–B182	B181–B182	B181–B182	B181–B182	B181–B182	B181–B182
Flute		4	4	4	4	4	4	4
Diameter D1		1/2—3/4"	1/2—3/4"	5/8—3/4"	5/8—3/4"	1/2—1"	1/2—1"	1/2—1"
Shank								
Length of Cut		Short	Short	Extended	Extended	Extended	Extended	Extended
Corner Style								
Chamfer Size		.010—.020"	—	—	—	—	.010—.020"	—
Radius Sizes		—	.030—.120"	—	.030—.120"	—	—	.030—.060"
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	**0**	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○
H	**1**	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill I™	VariMill I	VariMill I	VariMill I	VariMill I	VariMill I	VariMill I
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		4V0T	4V0T	4VP5	4VP5	4VPT	4VPT	4VN5
Page		B183	B183	B183	B183	B184	B184	B185
Flute		4	4	4	4	4	4	4
Diameter D1		1/2"	1/2—3/4"	1/4—1"	1/4—1"	1/2—3/4"	1/2—3/4"	1/4—3/8"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		—	.020"	—	.016—.020"	—	.020"	.016—.020"
Radius Sizes		—	—	—	—	—	—	—
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	Yes
Materials								
P	**0**	○	○	●	●	○	○	●
	1	○	○	●	●	○	○	●
	2	○	○	●	●	○	○	●
	3	○	○	●	●	○	○	●
	4	○	○	●	●	○	○	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**	○	○	●	●	○	○	●
	2	○	○	●	●	○	○	●
	3	○	○	●	●	○	○	●
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	●	○	○	●	●	○
	2	●	●	○	○	●	●	○
	3	●	●	○	○	●	●	○
	4	●	●	○	○	●	●	○
H	**1**	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill I™	VariMill I	VariMill I	VariMill I	VariMill II™	VariMill II	VariMill II
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		4VN5	4V00	4V00	4VP0	5V0C	5V0C	5V0C
Page		B185	B186	B186	B186	B204–B205	B204–B205	B204–B205
Flute		4	4	4	4	5	5	5
Diameter D1		1/4—1"	1/8—7/16"	1/2—1 1/4"	1/4—1"	3/16—1"	3/16—1"	1/2—1"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		.015—.120"	–	–	–	–	.015—.120"	–
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	No	No	No	No	No	No
Materials								
P	0	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	●	●	●	●	○	○	○
	2	●	●	●	●	○	○	○
	3	●	●	●	●	○	○	○
K	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	1							
	2							
	3							
	4							
	5							
S	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○
H	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill II™	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		5V0C	5VNC	5VNC	5V0S	5V0S	5V0S	5VNS
Page		B204–B205	B206	B206	B207	B207	B207	B208
Flute		5	5	5	5	5	5	5
Diameter D1		1/2—1"	1/4—1"	1/2—1"	3/16—3/4"	3/16—1"	1/2—3/4"	3/8—1"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size								
Radius Sizes		.015—.120"	.015—.030"	.030	—	.015—.120"	.030—.120"	.015—.030"
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	Yes	Yes	No	No	No	No
Materials								
P	0	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
K	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	1							
	2							
	3							
	4							
	5							
S	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○
H	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill II™	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		5V0E	5V0E	5V0E	5V0E	5V0E	5V0E	5VNE
Page		B209–B211	B209–B210	B209–B211	B209–B211	B209–B210	B209–B210	B212–B213
Flute		5	5	5	5	5	5	5
Diameter D1		3/16—1"	3/16—1"	1/2—1 1/4"	1/2—1 1/4"	1/2—1"	1/2—1"	3/8—1 1/4"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		—	.015—.120"	—	.015—.120"	—	.015—.120"	—
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	Yes
Materials								
P	**0**							
	1							
	2							
	3							
	4							
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**							
	2							
	3							
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
H	**1**							
	2							
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill II™	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II	VariMill III™
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		5VNE	5VNE	5VNE	5VNE	5W1S	5W1S	7V0E
Page		B212–B213	B212–B213	B212–B213	B212–B213	B214	B214	B232
Flute		5	5	5	5	5	5	7
Diameter D1		1/4—1"	1/2—1"	1/2—1"	1/2—1"	1/4—1"	1/4—1"	3/8—3/4"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	X-Long	X-Long	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		.015—.120"	.030"	–	.015—.120"	–	.015—.120"	–
Helix Angle		38°	38°	38°	38°	38°	43°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	Yes	Yes	Yes	No	No	No
Materials								
P	**0**					●	●	
	1					●	●	
	2					●	●	
	3					●	●	
	4					●	●	
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**					●	●	
	2					●	●	
	3					●	●	
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
H	**1**					●	●	
	2					●	●	
	3					●	●	
	4					●	●	

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill III™	VariMill III	VariMill III	VariMill III	VariMill III	VariMill III	VariMill III
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		7V0E	7V1E	7V1E	7V1E	7V2E	7V2E	7VNX
Page		B232	B232	B232	B232	B232	B232	B233
Flute		7	7	7	7	7	7	7
Diameter D1		3/8—3/4"	3/8—3/4"	3/8—1"	3/4—1"	3/8"	1/2—1"	3/8—1"
Shank								
Length of Cut		Regular	Long	Long	Long	Extended	Extended	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		.015—.060"	–	.015—.120"	.030—.0120"	.015—.030"	.030—.120"	.015—.120"
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	No
Neck		No	No	No	No	No	No	Yes
Materials								
P	0							
	1							
	2							
	3							
	4							
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	1							
	2							
	3							
N	1							
	2							
	3							
	4							
	5							
S	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
H	1							
	2							
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill III™	VariMill II™	VariMill II	VariMill II	VariMill III	VariMill III	VariMill III
								
UOM		**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**
Series		**7VNX**	**570T**	**571T**	**572T**	**770T**	**771T**	**772T**
Page		B233	B242	B242	B242	B243	B243	B244
Flute		7	5	5	5	7	7	7
Diameter D1		3/4—1"	1/2—1"	1/2—1"	1/2—1"	1/2—1"	1/2—1"	1/2—1"
Shank								
Length of Cut		Regular	Regular	Long	Extended	Regular	Long	Extended
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		.030—.120"	.030"	.030"	.030"	.030—.120"	.030—.120"	.030—.120"
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		No	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	No	No	No	No	No	No
Materials								
P	**0**		●	●	●	○	○	○
	1		●	●	●	○	○	○
	2		●	●	●	○	○	○
	3		●	●	●	○	○	○
	4		●	●	●	○	○	○
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**							
	2							
	3							
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	○	○	○	●	●	●
	2	●	○	○	○	●	●	●
	3	●	○	○	○	●	●	●
	4	●	○	○	○	●	●	●
H	**1**							
	2							
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill III™	Roughers	Roughers	Roughers	Roughers	Roughers	Roughers
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		773T	4S0R	4S0R	4M4R	4M4R	4M0R	4M0R
Page		B244	B250	B250	B250	B250	B250	B250
Flute		7	3 - 4	3 - 4 - 5	3 - 4	4 - 6	4	4 - 6
Diameter D1		1/2—1"	1/4—5/16"	1/4—1"	1/4—3/8"	1/2—1"	1/4—3/8"	1/2—1"
Shank								
Length of Cut		X-Long	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		—	.012"	.012—.020"	—	—	—	—
Radius Sizes		.030—.120"	—	—	.030"	.050"	.030"	.050"
Helix Angle		38°	20°	20°	40°	40°	40°	40°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	0	○	●	●	●	●	●	●
	1	○	●	●	●	●	●	●
	2	○	●	●	●	●	●	●
	3	○	●	●	●	●	●	●
	4	○	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	●	○	○	○	○	○	○
	2	●	○	○	○	○	○	○
	3	●	○	○	○	○	○	○
K	1		●	●	●	●	●	●
	2		●	●	●	●	●	●
	3		●	●	●	●	●	●
N	1							
	2							
	3							
	4							
	5							
S	1	●	○	○	○	○	○	○
	2	●	○	○	○	○	○	○
	3	●	○	○	○	○	○	○
	4	●	○	○	○	○	○	○
H	1		○	○	○	○	○	○
	2		○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Roughers	Roughers	Roughers	Roughers	Roughers	Roughers	Roughers
								
UOM		**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**
Series		**4QN3**	**4Q43**	**4Q43**	**4Q05**	**4Q03**	**4Q03**	**4U50**
Page		B251	B251	B251	B251	B251	B251	B252
Flute		3	3	3	3	3	3	4 - 6
Diameter D1		1/2—1"	3/16"	3/8—3/4"	1"	3/16"	1/4—1"	1/4—1"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Short
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		.020—.030"	.010"	.020—.030"	.030"	.010"	.020—.030"	.030—.050"
Helix Angle		35°	35°	35°	35°	35°	35°	45°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	No	No	No	No	No	No
Materials								
P	**0**	●	●	●	●	●	●	
	1	●	●	●	●	●	●	
	2	●	●	●	●	●	●	
	3	●	●	●	●	●	●	
	4	●	●	●	●	●	●	
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	○	○	○	○	○	○	●
	2	○	○	○	○	○	○	●
	3	○	○	○	○	○	○	●
K	**1**	●	●	●	●	●	●	
	2	●	●	●	●	●	●	
	3	●	●	●	●	●	●	
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	○	○	○	○	○	○	●
	2	○	○	○	○	○	○	●
	3	○	○	○	○	○	○	●
	4	○	○	○	○	○	○	●
H	**1**	○	○	○	○	○	○	
	2	○	○	○	○	○	○	
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Roughers	Roughers	Finishers	Finishers	Finishers	Finishers	Finishers
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		4U80	4U80	4S07	4S67	4S47	4S27	4S17
Page		B252	B252	B270	–	–	–	–
Flute		4 - 6	4 - 6	6	6	6	6	6
Diameter D1		1/4–1"	1/2–1"	1/4–1"	1"	1/4–3/4"	3/4–1"	1/4–1"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size								
Radius Sizes		.030–.050"	.030–.050"	–	–	–	–	–
Helix Angle		45°	45°	45°	45°	45°	45°	45°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	0			•	•	•	•	•
	1			•	•	•	•	•
	2			•	•	•	•	•
	3			•	•	•	•	•
	4			•	•	•	•	•
	5	•	•	•	•	•	•	•
	6	•	•	•	•	•	•	•
M	1	•	•	•	•	•	•	•
	2	•	•	•	•	•	•	•
	3	•	•	•	•	•	•	•
K	1			•	•	•	•	•
	2			•	•	•	•	•
	3			•	•	•	•	•
N	1							
	2							
	3							
	4							
	5							
S	1	•	•	•	•	•	•	•
	2	•	•	•	•	•	•	•
	3	•	•	•	•	•	•	•
	4	•	•	•	•	•	•	•
H	1			•	•	•	•	•
	2			•	•	•	•	•
	3			•	•	•	•	•
	4			•	•	•	•	•

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Finishers	Finishers	Finishers	Finishers	Finishers	Finishers	Finishers
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		4S07	4C43	4C03	4C45	4C15	4C05	4S0F
Page		B270	B271	B271	–	B271	B271	B272
Flute		6	3	3	5	5	5	8
Diameter D1		1/4–3/4"	3/16–1/4"	1/8–1/2"	1/4–1/2"	1/4–1"	1/8–3/4"	3/4"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		–	.010–.030"	.010–.030"	–	–	–	–
Helix Angle		45°	45°	45°	45°	45°	45°	45°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	0	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	1							
	2							
	3							
	4							
	5							
S	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
H	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●

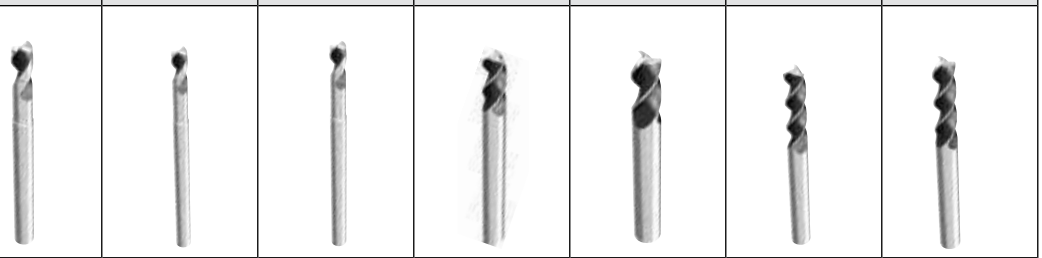
Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		ALUFLASH™	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH
								
UOM		**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**
Series		**2A09**	**2A09**	**2A19**	**2A19**	**2AN9**	**2AN9**	**2AL9**
Page		B288	B288	B289	B289	B290	B290	B293
Flute		2	2	2	2	2	2	2
Diameter D1		1/8—1"	1/8—1"	1/8—1/2"	1/8—1/2"	1/8—1"	1/8—1"	1/4—1"
Shank								
Length of Cut		Regular	Regular	Long	Long	Regular	Regular	Long
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		—	.015—.020"	—	.015—.030"	—	.015—.060"	—
Helix Angle		33°	33°	33°	33°	33°	33°	33°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	Yes	Yes	Yes
Materials								
P	**0**							
	1							
	2							
	3							
	4							
	5							
	6							
M	**1**							
	2							
	3							
K	**1**							
	2							
	3							
N	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
S	**1**							
	2							
	3							
	4							
H	**1**							
	2							
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		ALUFLASH™	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH
								
UOM		**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**
Series		**2AL9**	**2AF9**	**2AF9**	**3A09**	**3A09**	**3A19**	**3A19**
Page		B293	B292	B292	B293	B293	B294	B294
Flute		2	2	2	3	3	3	3
Diameter D1		3/16—1"	1/8—1"	1/8—1"	3/16—1"	3/16—1"	3/16—1"	3/16—1"
Shank								
Length of Cut		Long	Extended	Extended	Regular	Regular	Long	Long
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		.015—.060"	—	.015—.060"	—	.015—.250"	—	.015—.250"
Helix Angle		33°	33°	33°	37° / 39°	37° / 39°	37° / 39°	37° / 39°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	Yes	Yes	No	No	No	No
Materials								
P	**0**							
	1							
	2							
	3							
	4							
	5							
	6							
M	**1**							
	2							
	3							
K	**1**							
	2							
	3							
N	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
S	**1**							
	2							
	3							
	4							
H	**1**							
	2							
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		ALUFLASH™	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		3A29	3A29	3AN9	3AN9	3AF9	3AF9	3AL9
Page		B295	B295	B296	B296	B297	B297	B298
Flute		3	3	3	3	3	3	3
Diameter D1		1/4—1"	1/4—1"	3/16—1"	3/16—1"	3/16—1"	3/16—1"	3/16—1"
Shank								
Length of Cut		Extended	Extended	Regular	Regular	Long	Long	Extended
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		—	.015—.120"	—	.015—.060"	—	.015—.060"	—
Helix Angle		37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	Yes	Yes	Yes	Yes	Yes
Materials								
P	**0**							
	1							
	2							
	3							
	4							
	5							
	6							
M	**1**							
	2							
	3							
K	**1**							
	2							
	3							
N	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
S	**1**							
	2							
	3							
	4							
H	**1**							
	2							
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		ALUFLASH™	X-Feed™	X-Feed	X-Feed	Vision Plus™	Vision Plus	Vision Plus
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		3AL9	7FN6	7FNS	7FN7	7S05	7S15	7S25
Page		B298	B314	B314	B316	B324	B324	B324
Flute		3	6	6	6	4	4 - 5 - 6	4 - 5 - 6
Diameter D1		3/16—1"	1/4—3/4"	1/4—1"	3/8—3/4"	1/4—1/2"	1/4—3/4"	5/16—1"
Shank								
Length of Cut		Extended	Regular	Regular	Regular	Regular	Long	Extended
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		.015—.060"	–	–	–	–	–	–
Helix Angle		37° / 39°	20°	20°	20°	50°	50°	50°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	Yes	Yes	Yes	No	No	No
Materials								
P	**0**		●					
	1		●					
	2		●					
	3		●					
	4		●					
	5		●	●				
	6		●	●				
M	**1**			●				
	2			●				
	3			●				
K	**1**							
	2							
	3							
N	**1**	●						
	2	●						
	3	●						
	4	●						
	5	●						
S	**1**			●				
	2			●				
	3			●				
	4			●				
H	**1**		●		●	●	●	●
	2		●		●	●	●	●
	3				●	●	●	●
	4				●	●	●	●

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Vision Plus™	Vision Plus	HSS Roughers	HSS Roughers	HSS Roughers	HSS Roughers	HSS Roughers
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		7S7R	7S5F	6A0R	6T0R	6T1R	6T3R	6ANR
Page		B325	B325	B356	B356	B356	B356	B357
Flute		4 - 6	4	3	4 - 5 - 6	4 - 5 - 6	4 - 5 - 6	3
Diameter D1		3/8—3/4"	1/8—1/2"	1/2—1 1/4"	1/2—1 1/2"	1/2—1 1/4"	3/4—1 1/2"	1/2—1"
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Long	Extended	Regular
Corner Style								
Chamfer Size				.014—.020"	.035—.060"	.035—.060"	.050—.060"	.015—.020"
Radius Sizes		.030—.050"						
Helix Angle		45°	15°	35°	35°	35°	35°	35°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	Yes
Materials								
P	**0**							
	1							
	2							
	3							
	4							
	5							
	6							
M	**1**							
	2							
	3							
K	**1**							
	2							
	3							
N	**1**			•				•
	2			•				•
	3			•				•
	4			•				•
	5			•				•
S	**1**				•	•	•	
	2				•	•	•	
	3				•	•	•	
	4				•	•	•	
H	**1**	•	•					
	2	•	•					
	3	•	•					
	4	•	•					

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		HSS Roughers	HSS ER Rougher	WavCut I™	WavCut I	WavCut I	WavCut I	WavCut I
								
UOM		Inch	Inch	Inch	Inch	Inch	Inch	Inch
Series		6TNR	620E	620W	621W	622W	623W	625W
Page		B357	B358	B359	B359	B359	B359	B359
Flute		4 - 5 - 6	6	4 - 6	4	6	4 - 6	6
Diameter D1		5/8—1 1/4"	1 1/4—2"	3/4—1 1/4"	1—1 1/2"	1 1/4"	1—1 1/4"	2"
Shank								
Length of Cut		Regular	Regular	Regular	Extended	Regular	Long	Regular
Corner Style								
Chamfer Size		.050—.060"		.040"	.040"	.040"	.040"	.040"
Radius Sizes			.060—.120"					
Helix Angle		35°	38°	35°	35°	35°	35°	35°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	No	No	No	No	No	No
Materials								
P	0							
	1							
	2							
	3							
	4							
	5							
	6							
M	1		•	•	•	•	•	•
	2		•	•	•	•	•	•
	3		•	•	•	•	•	•
K	1							
	2							
	3							
N	1							
	2							
	3							
	4							
	5							
S	1	•	•	•	•	•	•	•
	2	•	•	•	•	•	•	•
	3	•	•	•	•	•	•	•
	4	•	•	•	•	•	•	•
H	1							
	2							
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		WavCut II™	WavCut II	WavCut II	WavCut II	WavCut II	WavCut II	WavCut II
								
UOM		**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**	**Inch**
Series		**620V**	**621V**	**622V**	**623V**	**620V**	**621V**	**622V**
Page		B360	B360	B360	B360	B360	B360	B360
Flute		4 - 6		6	4 - 6	6	6	6
Diameter D1		3/4—1 1/4"	1 1/4—1 1/2"	1 1/4"	1 1/4"	1"	1—1 1/2"	1 1/4—1 1/2"
Shank								
Length of Cut		Regular	Long	Extended	Short	Regular	Long	Extended
Corner Style								
Chamfer Size		.040"	.040"	.040"	.040"			
Radius Sizes						.060"	.060"	.060"
Helix Angle		35°	35°	35°	35°	35°	35°	35°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	**0**							
	1							
	2							
	3							
	4							
	5							
	6							
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**							
	2							
	3							
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
H	**1**							
	2							
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio					
		WavCut II™	HSS Finishers	HSS Finishers	HSS Finishers	HSS Finishers	HSS Finishers
							
UOM		Inch	Inch	Inch	Inch	Inch	Inch
Series		625V	3415	3417	3427	3437	3457
Page		B360	B363	B363	B363	B363	B363
Flute		6	4	6	6	6	6
Diameter D1		2"	1/2–1"	1–1 1/4"	1–1 1/2"	1–1 1/4"	2"
Shank							
Length of Cut		Short	Regular	Long	Regular	Long	Regular
Corner Style							
Chamfer Size		–	–	–	–	–	–
Radius Sizes		.060"	–	–	–	–	–
Helix Angle		35°	35°	35°	35°	35°	35°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No
Materials							
P	**0**						
	1						
	2						
	3						
	4						
	5						
	6						
M	**1**	●					
	2	●					
	3	●					
K	**1**						
	2						
	3						
N	**1**						
	2						
	3						
	4						
	5						
S	**1**	●	●	●	●	●	●
	2	●	●	●	●	●	●
	3	●	●	●	●	●	●
	4	●	●	●	●	●	●
H	**1**						
	2						
	3						
	4						

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill™ XTREME™	VariMill XTREME	VariMill XTREME	VariMill XTREME	VariMill XTREME	VariMill XTREME	VariMill XTREME
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**4X0E**	**4X0E**	**4X0E**	**4XNE**	**4XNE**	**4XNE**	**4XNE**
Page		B167	B168	B168	B169	B168	B170	B171
Flute		4	4	4	4	4	4	4
Diameter D1		3—25mm	4—12mm	25mm	4—20mm	16mm	4—20mm	16mm
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		—	0,10—0,30mm	—	—	0,30mm	0,10—0,30mm	—
Radius Sizes		0,20—3,00mm	—	1,00mm	—	—	—	0,20—5,00mm
Helix Angle		37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	Yes	Yes	Yes	Yes
Materials								
P	0	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	1							
	2							
	3							
	4							
	5							
S	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○
H	1	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill™ XTREME™	VariMill I™	VariMill I	VariMill I	VariMill I	VariMill I	VariMill I
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**4XNE**	**4777**	**4777**	**4777**	**4777**	**4717**	**4727**
Page		B171	B187–B188	B187–B188	B187–B188	B187–B188	B189	B189
Flute		4	4	4	4	4	4	4
Diameter D1		12–20mm	4–20mm	4–25mm	4–25mm	4–25mm	6–20mm	12–20mm
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Long	Extended
Corner Style								
Chamfer Size		–	–	0,40–0,50mm	–	0,40–0,50mm	0,40–0,50mm	0,50mm
Radius Sizes		1,00mm	–	–	0,20–5,00mm	–	–	–
Helix Angle		37° / 39°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	No	No	No	No	No	No
Materials								
P	**0**	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	○	○	○	○	○	○
	2	●	○	○	○	○	○	○
	3	●	○	○	○	○	○	○
K	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○
H	**1**	○	○	○	○	○	○	○
	2	○	○	○	○	○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill I™	VariMill I	VariMill I	VariMill I	VariMill I	VariMill II™	VariMill II
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**4778**	**47N7**	**47N7**	**47N6**	**47N0**	**5777**	**5777**
Page		B190	B191	B191	B192	B192	B215	B215
Flute		4	4	4	4	4	5	5
Diameter D1		4—25mm	4—20mm	6—20mm	6—20mm	5—20mm	4—20mm	4—25mm
Shank								
Length of Cut		Regular	Regular	Regular	Extended	Regular	Regular	Regular
Corner Style								
Chamfer Size		—	—	0,40—0,50mm	0,40—0,50mm	—	—	—
Radius Sizes		0,20—0,30mm	0,40—5,00mm	—	—	—	—	0,25—5,00mm
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	No	No
Neck		No	Yes	Yes	Yes	Yes	No	No
Materials								
P	**0**	○	●	●	●	●	●	●
	1	○	●	●	●	●	●	●
	2	○	●	●	●	●	●	●
	3	○	●	●	●	●	●	●
	4	○	●	●	●	●	●	●
	5	○	●	●	●	●	●	●
	6	○	●	●	●	●	●	●
M	**1**	●	○	○	○	○	○	○
	2	●	○	○	○	○	○	○
	3	●	○	○	○	○	○	○
K	**1**		●	●	●	●	●	●
	2		●	●	●	●	●	●
	3		●	●	●	●	●	●
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	○	○	○	○	○	○
	2	●	○	○	○	○	○	○
	3	●	○	○	○	○	○	○
	4	●	○	○	○	○	○	○
H	**1**		○	○	○	○	○	○
	2		○	○	○	○	○	○
	3							
	4							

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● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill II™	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**5777**	**577C**	**577C**	**577C**	**57N8**	**57N8**	**57N8**
Page		B215	B216	B216	B216	B217	B217	B217
Flute		5	5	5	5	5	5	5
Diameter D1		16,00mm	4—20mm	4—25mm	4—25mm	6—16mm	6—25mm	16—20mm
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		0,75mm	–	0,25—5,00mm	0,25—0,75mm	–	0,5—5,00mm	0,5—3,00mm
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		No	Yes	Yes	Yes	No	No	No
Neck		No	No	No	No	Yes	Yes	Yes
Materials								
P	**0**	●	●	●	●	○	○	○
	1	●	●	●	●	○	○	○
	2	●	●	●	●	○	○	○
	3	●	●	●	●	○	○	○
	4	●	●	●	●	○	○	○
	5	●	●	●	●	○	○	○
	6	●	●	●	●	○	○	○
M	**1**	○	○	○	○	●	●	●
	2	○	○	○	○	●	●	●
	3	○	○	○	○	●	●	●
K	**1**	●	●	●	●			
	2	●	●	●	●			
	3	●	●	●	●			
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	○	○	○	○	●	●	●
	2	○	○	○	○	●	●	●
	3	○	○	○	○	●	●	●
	4	○	○	○	○	●	●	●
H	**1**	○	○	○	○			
	2	○	○	○	○			
	3							
	4							

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● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill II™	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**57NC**	**57NC**	**57NC**	**577E**	**577E**	**577E**	**577E**
Page		B218	B218	B218	B219	B219	B219	B219
Flute		5	5	5	5	5	5	5
Diameter D1		6—25mm	6—25mm	6—25mm	10mm	12—20mm	16—20mm	16—25mm
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		—	0,25—4,00mm	0,50—3,00mm	—	0,75mm	—	0,75mm
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	Yes	Yes	No	No	No	No
Materials								
P	**0**	○	○	○				
	1	○	○	○				
	2	○	○	○				
	3	○	○	○				
	4	○	○	○				
	5	○	○	○	●	●	●	●
	6	○	○	○	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**							
	2							
	3							
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
H	**1**							
	2							
	3							
	4							

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● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill II™	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II	VariMill II
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**57NE**	**57NE**	**57NE**	**57NE**	**57NE**	**5718**	**5718**
Page		B220	B220	B220	B220	B220	B221	B221
Flute		5	5	5	5	5	5	5
Diameter D1		10mm	10mm	10—20mm	12—25mm	12—25mm	6—25mm	6—25mm
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	X-Long	X-Long
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		—	0,50—2,00mm	0,50—4,00mm	—	0,50—4,00mm	—	0,5—4,00mm
Helix Angle		38°	38°	38°	38°	38°	43°	43°
Center Cutting		Yes	Yes	Yes	Yes	Yes	No	No
Neck		Yes	Yes	Yes	Yes	Yes	No	No
Materials								
P	**0**						●	●
	1						●	●
	2						●	●
	3						●	●
	4						●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**						●	●
	2						●	●
	3						●	●
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
H	**1**						●	●
	2						●	●
	3						●	●
	4						●	●

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● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill III™	VariMill III	VariMill III	VariMill III	VariMill III	VariMill III	VariMill III
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**771E**	**771E**	**772E**	**772E**	**772E**	**772E**	**77NE**
Page		B233	B233	B233	B233	B233	B233	B234
Flute		7	7	7	7	7	7	7
Diameter D1		10—20mm	10—20mm	10—20mm	10—20mm	12—20mm	12—20mm	10—20mm
Shank								
Length of Cut		Regular	Regular	X-Long	X-Long	X-Long	X-Long	Regular
Corner Style								
Chamfer Size		0,5mm	—	0,5mm	—	0,5mm	—	0,5mm
Radius Sizes		—	0,5mm	—	0,5mm	—	0,5mm	—
Helix Angle		38°	38°	38°	38°	38°	38°	38°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	Yes
Materials								
P	**0**							
	1							
	2							
	3							
	4							
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
K	**1**							
	2							
	3							
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
H	**1**							
	2							
	3							
	4							

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● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		VariMill III™	Roughers	Roughers	Roughers	Roughers	Roughers	Roughers
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**77NE**	**4906**	**4906**	**4976**	**49N6**	**4U50**	**4U80**
Page		B234	B253	B253	B253	B254	B255	B255
Flute		7	3 - 4	3 - 4 - 5	3 - 4	3 - 5	4 - 6	4 - 6
Diameter D1		10—20mm	4—20mm	4—25mm	4—20mm	6—20mm	6—25mm	6—25mm
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Short	Regular
Corner Style								
Chamfer Size		—	0,30—0,50mm	0,30—0,50mm	0,30—0,50mm	0,30—0,50mm	—	—
Radius Sizes		0,5mm	—	—	—	—	0,30—1,00mm	0,30—1,00mm
Helix Angle		38°	30°	30°	30°	30°	45°	45°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	No	No	No	Yes	Yes	No
Materials								
P	**0**		●	●	●	●		
	1		●	●	●	●		
	2		●	●	●	●		
	3		●	●	●	●		
	4		●	●	●	●		
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	**1**	●	○	○	○	○	●	●
	2	●	○	○	○	○	●	●
	3	●	○	○	○	○	●	●
K	**1**		●	●	●	●		
	2		●	●	●	●		
	3		●	●	●	●		
N	**1**							
	2							
	3							
	4							
	5							
S	**1**	●	○	○	○	○	●	●
	2	●	○	○	○	○	●	●
	3	●	○	○	○	○	●	●
	4	●	○	○	○	○	●	●
H	**1**		○	○	○	○		
	2		○	○	○	○		
	3							
	4							

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● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Roughers	Roughers	Roughers	Roughers	Roughers	Roughers	Roughers
								
UOM		Metric	Metric	Metric	Metric	Metric	Metric	Metric
Series		4U80	4U40	4U70	4U70	DQ13	DQ13	49H6
Page		B255	B256	B256	B256	B257	B257	B257
Flute		4 - 6	4	4 - 6	4 - 6	3	3	4
Diameter D1		6—16mm	8mm	6—20mm	6—16mm	3—4mm	3—18mm	10—16mm
Shank								
Length of Cut		Regular	Short	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		—	—	0,50—1,00mm	0,30—0,60mm	—	—	—
Radius Sizes		0,30—0,50mm	0,75mm	—	—	0,25mm	0,25—0,45mm	0,50mm
Helix Angle		45°	45°	45°	45°	30°	30°	30°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	Yes	No	No	No	No	No
Materials								
P	0					●	●	●
	1					●	●	●
	2					●	●	●
	3					●	●	●
	4					●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	●	●	●	●	○	○	○
	2	●	●	●	●	○	○	○
	3	●	●	●	●	○	○	○
K	1					●	●	●
	2					●	●	●
	3					●	●	●
N	1							
	2							
	3							
	4							
	5							
S	1	●	●	●	●	○	○	○
	2	●	●	●	●	○	○	○
	3	●	●	●	●	○	○	○
	4	●	●	●	●	○	○	○
H	1					○	○	○
	2					○	○	○
	3							
	4							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Roughers	Finishers	Finisher	Finisher	Finisher	Finisher	Finisher
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**4940**	**DC03**	**4603**	**D503**	**D513**	**D507**	**D517**
Page		B258	B272	B273	B274	B274	B275	B274
Flute		4 - 6	3	3	3	3	6	6
Diameter D1		6—16mm	3—12mm	3—16mm	2—12mm	3—10mm	6—20mm	6—20mm
Shank								
Length of Cut		Short	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		0,75—1,00mm	0,25—0,45mm	–	–	–	–	–
Helix Angle		45°	35°	60°	45°	45°	45°	45°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	No
Materials								
P	0	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	5	●	●	●	●	●	●	●
	6	●	●	●	●	●	●	●
M	1	○	●	●	●	●	●	●
	2	○	●	●	●	●	●	●
	3	○	●	●	●	●	●	●
K	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	3	●	●	●	●	●	●	●
N	1							
	2							
	3							
	4							
	5							
S	1	○	●	●	●	●	●	●
	2	○	●	●	●	●	●	●
	3	○	●	●	●	●	●	●
	4	○	●	●	●	●	●	●
H	1	○	●	●	●	●	●	●
	2	○	●	●	●	●	●	●
	3		●	●	●	●	●	●
	4		●	●	●	●	●	●

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● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Finisher	Finisher	ALUFLASH™	ALUFLASH	ALUFLASH	ALUFLASH	ALUFLASH
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**4503 JJ**	**4001 JJ**	**2A09**	**2A09**	**3A09**	**3A09**	**3AN9**
Page		B276	B277	B299	B299	B300	B300	B300
Flute		3	2	2	2	3	3	3
Diameter D1		1—20mm	1—16mm	1—20mm	1—20mm	3mm	3—4mm	4—20mm
Shank								
Length of Cut		Regular	Regular	Regular	Regular	Regular	Regular	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		–	–	–	0,20—1,00mm	–	0,20—0,50mm	–
Helix Angle		45°	30°	37° / 39°	37° / 39°	37° / 39°	37° / 39°	37° / 39°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	Yes	No	No	No	No	Yes
Materials								
P	**0**	●	●					
	1	●	●					
	2	●	●					
	3	●	●					
	4	●	●					
	5	●	●					
	6	●	●					
M	**1**	●	●					
	2	●	●					
	3	●	●					
K	**1**	●	●					
	2	●	●					
	3	●	●					
N	**1**			●	●	●	●	●
	2			●	●	●	●	●
	3			●	●	●	●	●
	4			●	●	●	●	●
	5			●	●	●	●	●
S	**1**	●	●					
	2	●	●					
	3	●	●					
	4	●	●					
H	**1**	●	●					
	2	●	●					
	3	●	●					
	4	●	●					

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● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		ALUFLASH™	ALUFLASH	ALUFLASH	X-Feed™	X-Feed	X-Feed	X-Feed
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**3AN9**	**3AP9**	**3AP9**	**70N6**	**71N6**	**70NS**	**70N7**
Page		B301	B302	B302	B316	B316	B317	B317
Flute		3	3	3	6	6	6	6
Diameter D1		4—20mm	12mm	4—20mm	6—12mm	6—20mm	6—25mm	6—20mm
Shank								
Length of Cut		Regular	Long	Long	Long	Regular	Regular	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		0,20—5,00mm	–	0,20—4,00mm	–	–	–	–
Helix Angle		37° / 39°	37° / 39°	37° / 39°	20°	20°	20°	20°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Materials								
P	**0**				•	•		
	1				•	•		
	2				•	•		
	3				•	•		
	4				•	•		
	5						•	
	6						•	
M	**1**						•	
	2						•	
	3						•	
K	**1**							
	2							
	3							
N	**1**	•	•	•				
	2	•	•	•				
	3	•	•	•				
	4	•	•	•				
	5	•	•	•				
S	**1**						•	
	2						•	
	3				•	•	•	
	4				•	•	•	
H	**1**							•
	2							•
	3							•
	4							•

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Vision Plus™	Vision Plus	Vision Plus	Vision Plus	Vision Plus	Vision Plus	Vision Plus
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**7505**	**7515**	**7525**	**7545**	**7585**	**7595**	**75N2**
Page		B326	B326	B326	B326	B327	B327	B328
Flute		4	4 - 6	4 - 5 - 6	4	4	4	3
Diameter D1		3—12mm	6—25mm	6—25mm	3—16mm	6—16mm	3—20mm	3—6mm
Shank								
Length of Cut		Regular	Long	Extended	Short	Short	Long	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		–	–	–	–	0,25—1,00mm	0,25—2,00mm	0,30—1,00mm
Helix Angle		50°	50°	50°	50°	50°	50°	30°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	No	No	No	No	Yes
Materials								
P	**0**							
	1							
	2							
	3							
	4							
	5							
	6							
M	**1**							
	2							
	3							
K	**1**							
	2							
	3							
N	**1**							
	2							
	3							
	4							
	5							
S	**1**							
	2							
	3							
	4							
H	**1**	•	•	•	•	•	•	•
	2	•	•	•	•	•	•	•
	3	•	•	•	•	•	•	•
	4	•	•	•	•	•	•	•

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Vision Plus™	Vision Plus	Vision Plus	Vision Plus	Vision Plus	Vision Plus	Vision Plus
								
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**75N5**	**7670**	**D518**	**D618**	**7050**	**7060**	**7061**
Page		B328	B329	B329	B330	B330	B330	B331
Flute		4	6	4 - 6 - 8	4 - 6	4	4	2
Diameter D1		3—20mm	16mm	4—25mm	3—20mm	2—16mm	6—10mm	1—8mm
Shank								
Length of Cut		Regular	Short	Regular	Long	Regular	Regualr	Regular
Corner Style								
Chamfer Size		–	–	–	–	–	–	–
Radius Sizes		0,25—2,00mm	1mm	–	–	–	–	–
Helix Angle		50°	45°	50°	50°	15°	15°	15°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	Yes	No	No	No	No	No
Materials								
P	**0**							
	1							
	2							
	3							
	4							
	5							
	6							
M	**1**							
	2							
	3							
K	**1**							
	2							
	3							
N	**1**							
	2							
	3							
	4							
	5							
S	**1**							
	2							
	3							
	4							
H	**1**	•	•	•	•	•	•	•
	2	•	•	•	•	•	•	•
	3	•	•	•	•	•	•	•
	4	•	•	•	•	•	•	•

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio						
		Vision Plus™	Vision Plus	Vision Plus	Vision Plus Micro	Vision Plus Micro	Vision Plus Micro	Vision Plus Micro
								
UOM		Metric	Metric	Metric	Metric	Metric	Metric	Metric
Series		7150	7151	70N1	7N02	7N12	7N22	7N01
Page		B331	B332	B332	B333	B333	B333	B335
Flute		4	2	2	2	2	2	2
Diameter D1		3—12mm	1—12mm	1—12mm	0,3—2mm	1—4mm	0,4—3,05mm	0,3—6mm
Shank								
Length of Cut		Regular	Regular	—	Regular	Long	Extended	Regular
Corner Style								
Chamfer Size		—	—	—	—	—	—	—
Radius Sizes		—	—	—	—	—	—	—
Helix Angle		15°	15°	30°	30°	30°	30°	30°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Neck		No	No	Yes	Yes	Yes	Yes	Yes
Materials								
P	0							
	1							
	2							
	3							
	4							
	5							
	6							
M	1							
	2							
	3							
K	1							
	2							
	3							
N	1							
	2							
	3							
	4							
	5							
S	1							
	2							
	3							
	4							
H	1	•	•	•	•	•	•	•
	2	•	•	•	•	•	•	•
	3	•	•	•	•	•	•	•
	4	•	•	•	•	•	•	•

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● first choice
○ alternate choice

		Hanita Solid End Milling Portfolio					
		Vision Plus™ Micro	HSS Roughers	HSS Roughers	WavCut I™	WavCut I	WavCut I
							
UOM		**Metric**	**Metric**	**Metric**	**Metric**	**Metric**	**Metric**
Series		**7N21**	**60N6**	**6LN6**	**660W**	**661W**	**664W**
Page		B333	–	B333	B362	B362	B362
Flute		2	4–5	4–5	5–6	6–8	5–6
Diameter D1		0,5—3mm	6—30mm	12—25mm	25—50mm	25—50mm	25—50mm
Shank							
Length of Cut		Regular	Regular	Regular	Regular	Long	Short
Corner Style							
Chamfer Size		–	0,25—0,50mm	0,35—0,5mm	1mm	1mm	1mm
Radius Sizes		–	–	–	–	–	–
Helix Angle		30°	30°	30°	35°	35°	35°
Center Cutting		Yes	Yes	Yes	Yes	Yes	Yes
Neck		Yes	No	Yes	No	No	No
Materials							
P	**0**		●	●			
	1		●	●			
	2		●	●			
	3		●	●			
	4		●	●			
	5		●	●			
	6		●	●			
M	**1**		●	●	●	●	●
	2		●	●	●	●	●
	3		●	●	●	●	●
K	**1**		●	●			
	2		●	●			
	3		●	●			
N	**1**						
	2						
	3						
	4						
	5						
S	**1**		●	●	●	●	●
	2		●	●	●	●	●
	3		●	●	●	●	●
	4		●	●	●	●	●
H	**1**	●					
	2	●					
	3	●					
	4	●					

VariMill™ XTREME™

High-Performance Solid End Milling

VariMill XTREME is for CNC machining companies seeking a versatile solution capable of machining a broad range of materials while ensuring a high productivity output to reduce manufacturing costs through aggressive machining conditions.

Built-in features to enable aggressive versatility.

Twisted End Face to improve edge stability, which enables aggressive ramping angles and helical capability.

Non-Linear Chip Gashes for improved chip evacuation, enabling the ramping function and z-axis machining.

Asymmetrical Divided Flute and Variable Helix Angle for reduced vibrations.

Parabolic Core for increased tool stability and reduced deflection and risk of breakage.



VariMill XTREME will dominate the shop floor through productive output due to its versatile offering and ability to machine a broad range of materials in aggressive cutting conditions.

AGGRESSIVE

Exceeds expectations in aggressive cutting parameters.

PRODUCTIVE

Improved chip evacuation and increased edge/corner strength to reduce any risk of breakage while pushing the cutting parameters to the limit.

VERSATILE

Capable of machining a broad range of materials (steel, stainless steel, cast iron, super alloys), provides high-performance and tool life in a variety of operations including ramping, slotting, plunging, drilling, helical interpolation, and dynamic milling.

AGGRESSIVE VERSATILITY

PRODUCT

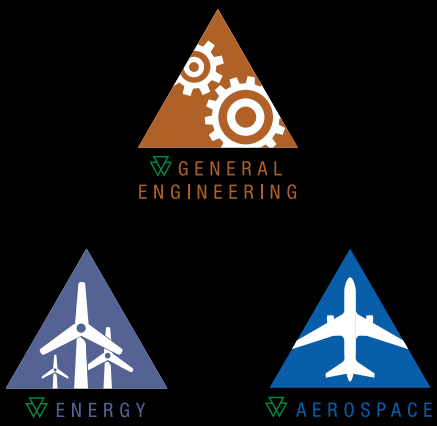
SOLID CARBIDE END MILL

GRADE	FLUTE
WS15PE	4

DIAMETER RANGE

INCH	METRIC
1/8"–1"	3–25mm

INDUSTRY



APPLICATIONS

MATERIALS





SIDE MILLING



SLOTTING



HELICAL INTERPOLATION



RAMPING



DYNAMIC MILLING



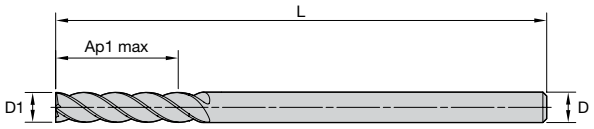
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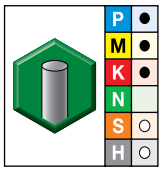


DRILLING

VariMill XTREME • Series 4X0E • Square End • 4 Flute • Cylindrical Shank • Inch







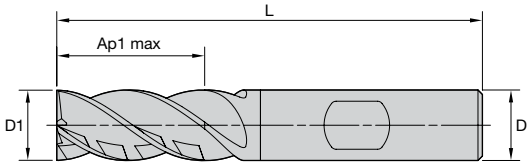
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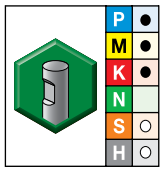
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
6827746	4X0EE03001SZT	1/8	1/8	1/2	2	4
6827750	4X0EE05000SZT	3/16	3/16	5/8	2 1/4	4
6828405	4X0EE07002SZT	1/4	1/4	3/4	2 1/2	4
6828410	4X0EE08003SZT	5/16	5/16	3/4	2 1/2	4
6828609	4X0EE10004SZT	3/8	3/8	7/8	2 1/2	4

VariMill XTREME • Series 4X0E • Square End • 4 Flute • Weldon® Shank • Inch







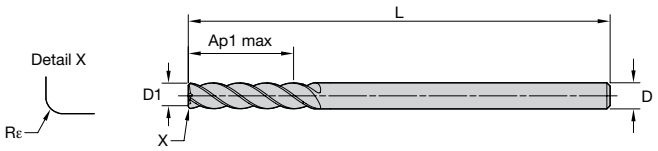
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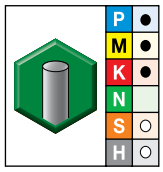
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
6828775	4X0EE13005SZW	1/2	1/2	1	3	4
6828777	4X0EE13015SZW	1/2	1/2	1 1/4	3 1/4	4
6828974	4X0EE16006SZW	5/8	5/8	1 1/4	3 1/2	4
6828977	4X0EE19007SZW	3/4	3/4	1 1/2	4	4
6829167	4X0EE25008SZW	1	1	1 1/2	4 1/2	4

VariMill XTREME • Series 4X0E • Radiused • 4 Flute • Cylindrical Shank • Inch







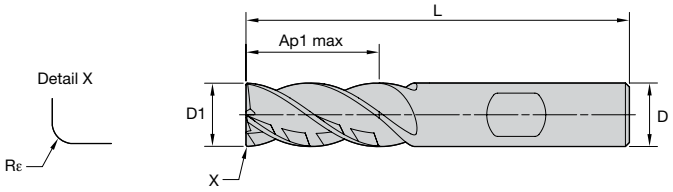
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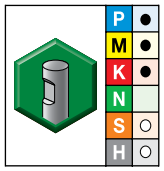
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6827747	4X0EE03001RAT	1/8	1/8	1/2	2	.015	4
6828401	4X0EE05000RAT	3/16	3/16	5/8	2 1/4	.015	4
6828402	4X0EE05000RBT	3/16	3/16	5/8	2 1/4	.030	4
6828406	4X0EE07002RAT	1/4	1/4	3/4	2 1/2	.015	4
6828407	4X0EE07002RBT	1/4	1/4	3/4	2 1/2	.030	4
6828601	4X0EE08003RAT	5/16	5/16	3/4	2 1/2	.015	4
6828603	4X0EE08003RBT	5/16	5/16	3/4	2 1/2	.030	4
6828610	4X0EE10004RAT	3/8	3/8	7/8	2 1/2	.015	4
6828771	4X0EE10004RBT	3/8	3/8	7/8	2 1/2	.030	4

VariMill XTREME • Series 4X0E • Radiused • 4 Flute • Weldon® Shank • Inch







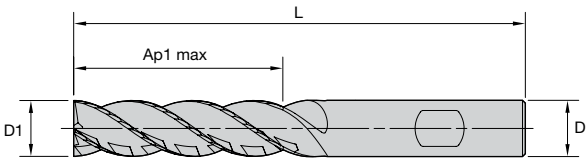
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○ alternate choice

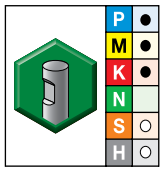
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6828776	4X0EE13005RAW	1/2	1/2	1	3	.015	4
6828778	4X0EE13015RAW	1/2	1/2	1 1/4	3 1/4	.015	4
6828779	4X0EE13015RBW	1/2	1/2	1 1/4	3 1/4	.030	4
6828780	4X0EE13015RCW	1/2	1/2	1 1/4	3 1/4	.060	4
6828971	4X0EE13015REW	1/2	1/2	1 1/4	3 1/4	.120	4
6828975	4X0EE16006RAW	5/8	5/8	1 1/4	3 1/2	.015	4
6828978	4X0EE19007RAW	3/4	3/4	1 1/2	4	.015	4
6828979	4X0EE19007RBW	3/4	3/4	1 1/2	4	.030	4
6829168	4X0EE25008RAW	1	1	1 1/2	4 1/2	.015	4
6829169	4X0EE25008RBW	1	1	1 1/2	4 1/2	.030	4

VariMill XTREME • Series 4X1E • Square End • 4 Flute • Weldon® Shank • Inch







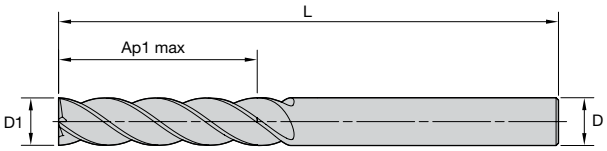
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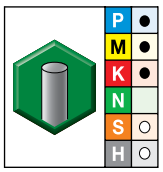
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
6828972	4X1EE13005SZW	1/2	1/2	2	4	4
6828976	4X1EE16006SZW	5/8	5/8	2 1/4	5	4
6828980	4X1EE19007SZW	3/4	3/4	2 1/4	5	4
6829311	4X1EE25008SZW	1	1	2 1/4	5	4

VariMill XTREME • Series 4X1E • Square End • 4 Flute • Cylindrical Shank • Inch







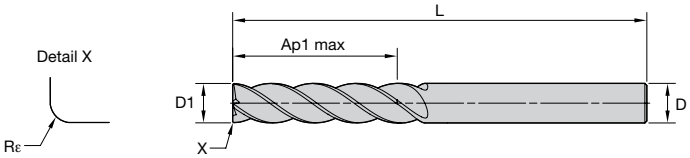
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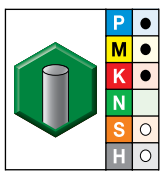
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
6828604	4X1EE08003SZT	5/16	5/16	1.25	3 1/4	4

VariMill XTREME • Series 4X1E • Radiused • 4 Flute • Cylindrical Shank • Inch







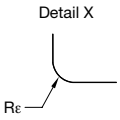
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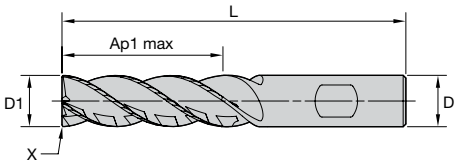
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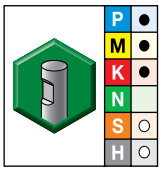
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6828605	4X1EE08003RAT	5/16	5/16	1.25	3 1/4	.015	4
6828606	4X1EE08003RBT	5/16	5/16	1.25	3 1/4	.030	4

VariMill XTREME • Series 4X1E • Radiused • 4 Flute • Weldon® Shank • Inch









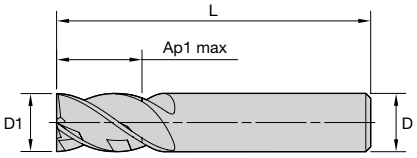
● first choice
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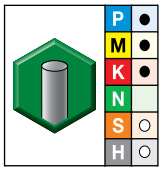
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6828973	4X1EE13005RBW	1/2	1/2	2	4	.030	4
6829161	4X1EE19007RAW	3/4	3/4	2 1/4	5	.015	4
6829164	4X1EE19007RBW	3/4	3/4	2 1/4	5	.030	4
6829312	4X1EE25008RAW	1	1	2 1/4	5	.015	4
6829313	4X1EE25008RBW	1	1	2 1/4	5	.030	4

VariMill XTREME • Series 4X4E • Square End • 4 Flute • Cylindrical Shank • Inch







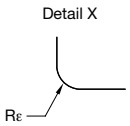
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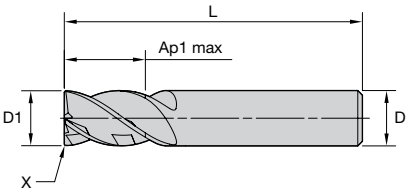
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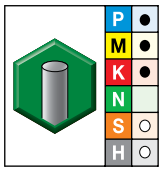
order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
6827744	4X4EE03001SZT	1/8	1/8	1/4	1 1/2	4
6827748	4X4EE05000SZT	3/16	3/16	5/16	1 1/2	4
6828403	4X4EE07002SZT	1/4	1/4	3/8	2	4
6828408	4X4EE08003SZT	5/16	5/16	1/2	2	4
6828607	4X4EE10004SZT	3/8	3/8	1/2	2	4

VariMill XTREME • Series 4X4E • Radiused • 4 Flute • Cylindrical Shank • Inch









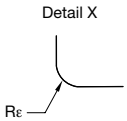
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○ alternate choice

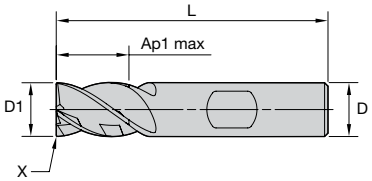
WS15PE

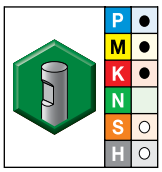
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6827745	4X4EE03001RAT	1/8	1/8	1/4	1 1/2	.015	4
6827749	4X4EE05000RAT	3/16	3/16	5/16	1 1/2	.015	4
6828404	4X4EE07002RAT	1/4	1/4	3/8	2	.015	4
6828409	4X4EE08003RAT	5/16	5/16	1/2	2	.015	4
6828608	4X4EE10004RAT	3/8	3/8	1/2	2	.015	4

VariMill XTREME • Series 4X4E • Radiused • 4 Flute • Weldon® Shank • Inch









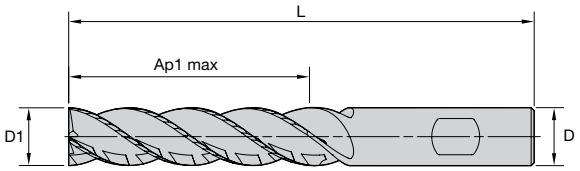
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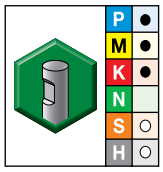
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6828773	4X4EE13005RAW	1/2	1/2	5/8	2 1/2	.015	4
6828774	4X4EE13005RBW	1/2	1/2	5/8	2 1/2	.030	4
6828772	4X4EE13005SZW	1/2	1/2	5/8	2 1/2	—	4

VariMill XTREME • Series 4X6E • Square End • 4 Flute • Weldon® Shank • Inch







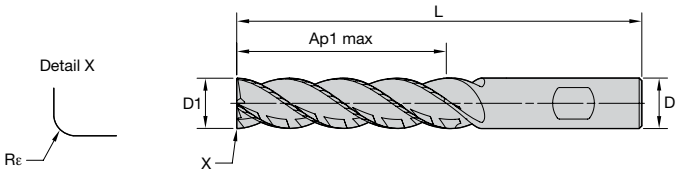
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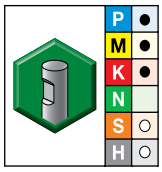
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order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
6829165	4X6EE19007SZW	3/4	3/4	3	6	4
6829170	4X6EE25018SZW	1	1	2	5	4

VariMill XTREME • Series 4X6E • Radiused • 4 Flute • Weldon Shank • Inch







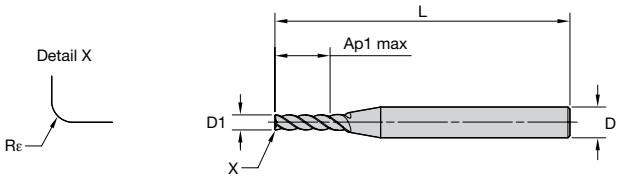
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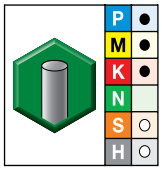
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6829166	4X6EE19007RAW	3/4	3/4	3	6	.015	4

VariMill XTREME • Series 4X0E • Radiused • 4 Flute • Cylindrical Shank • Metric







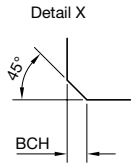
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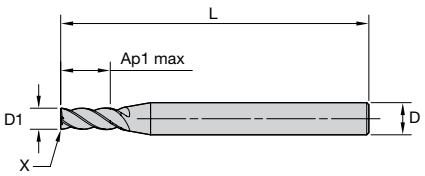
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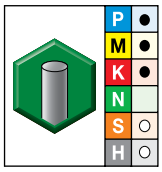
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6829314	4X0EM03002RAT	3,0	6	9,50	57	0,20	4
6830480	4X0EM25008RKT	25,0	25	50,00	121	1,50	4
6830671	4X0EM25008RPT	25,0	25	50,00	121	3,00	4

VariMill XTREME • Series 4X0E • Chamfered • 4 Flute • Cylindrical Shank • Metric









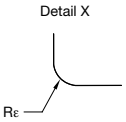
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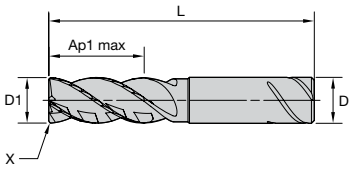
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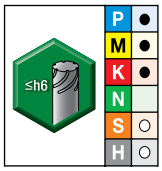
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
6829315	4X0EM04002CST	4,0	6	8,00	57	0,10	4
6829320	4X0EM05002CST	5,0	6	10,00	57	0,10	4
6829695	4X0EM06002CST	6,0	6	12,00	57	0,10	4
6829881	4X0EM08003CAT	8,0	8	16,00	63	0,20	4
6829888	4X0EM10004CAT	10,0	10	20,00	72	0,20	4
6830075	4X0EM12005CCT	12,0	12	24,00	83	0,30	4

VariMill XTREME • Series 4X0E • Radiused • 4 Flute • Safe-Lock™ Shank • Metric









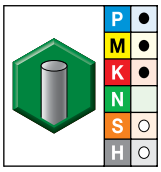
● first choice
○ alternate choice

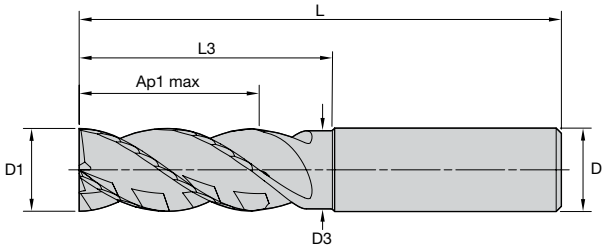
WS15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6830479	4X0EM25018RJV	25,0	25	50,00	135	1,00	4

VariMill XTREME • Series 4XNE • Square End • 4 Flute • Necked • Cylindrical Shank • Metric







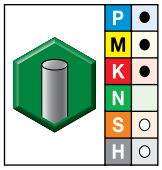
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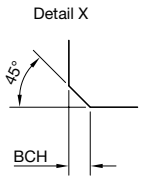
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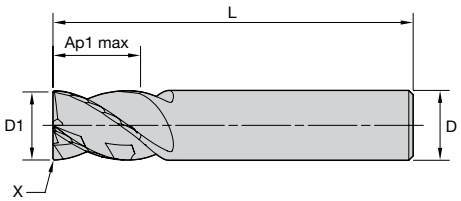
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	ZU
6829316	4XNEM04002SZT	4,0	6	3,76	8,00	12,00	57	4
6829691	4XNEM05002SZT	5,0	6	4,70	10,00	15,00	57	4
6829696	4XNEM06002SZT	6,0	6	5,64	12,00	18,00	57	4
6829882	4XNEM08003SZT	8,0	8	7,52	16,00	24,00	63	4
6829889	4XNEM10004SZT	10,0	10	9,40	20,00	30,00	72	4
6830076	4XNEM12005SZT	12,0	12	11,28	24,00	36,00	83	4
6830284	4XNEM16006SZT	16,0	16	15,04	32,00	48,00	92	4
6830472	4XNEM20007SZT	20,0	20	18,80	40,00	60,00	115	4

VariMill XTREME • Series 4XNE • Chamfered • 4 Flute • Cylindrical Shank • Metric









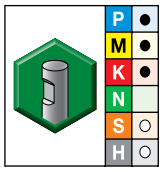
● first choice
○ alternate choice

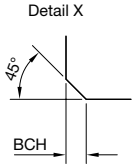
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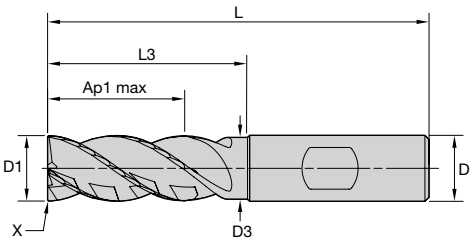
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
6830283	4X0EM16006CCT	16,0	16	18,00	82	0,30	4

VariMill XTREME • Series 4XNE • Chamfered • 4 Flute • Necked • Weldon® Shank • Metric









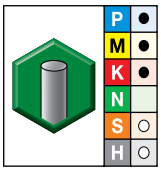
● first choice
○ alternate choice

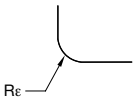
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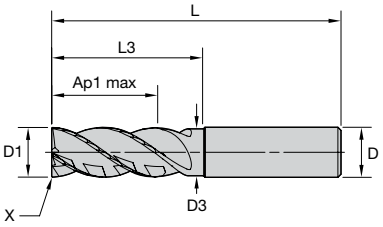
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	BCH	ZU
6829319	4XNEM04002CSW	4,0	6	3,76	12,00	16,00	57	0,10	4
6829694	4XNEM05002CSW	5,0	6	4,70	13,00	18,00	57	0,10	4
6829700	4XNEM06002CSW	6,0	6	5,64	13,00	21,00	57	0,10	4
6829887	4XNEM08003CAW	8,0	8	7,52	16,00	27,00	63	0,20	4
6830074	4XNEM10004CAW	10,0	10	9,40	22,00	32,00	72	0,20	4
6830282	4XNEM12005CCW	12,0	12	11,28	26,00	36,00	83	0,30	4
6830285	4XNEM16006CCW	16,0	16	15,04	32,00	48,00	92	0,30	4
6830473	4XNEM20007CCW	20,0	20	18,80	40,00	60,00	115	0,30	4

VariMill XTREME • Series 4XNE • Radiused • 4 Flute • Necked • Cylindrical Shank • Metric









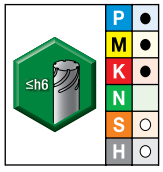
● first choice
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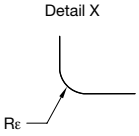
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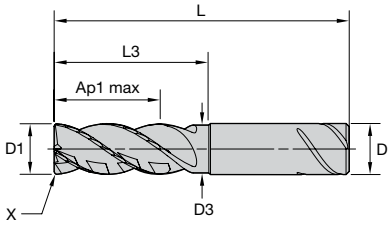
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
6829317	4XNEM04002RAT	4,0	6	3,76	8,00	12,00	57	0,20	4
6829318	4XNEM04002RET	4,0	6	3,76	8,00	12,00	57	0,50	4
6829692	4XNEM05002RAT	5,0	6	4,70	10,00	15,00	57	0,20	4
6829693	4XNEM05002RET	5,0	6	4,70	10,00	15,00	57	0,50	4
6829697	4XNEM06002RAT	6,0	6	5,64	12,00	18,00	57	0,20	4
6829698	4XNEM06002RET	6,0	6	5,64	12,00	18,00	57	0,50	4
6829699	4XNEM06002RJT	6,0	6	5,64	12,00	18,00	57	1,00	4
6829883	4XNEM08003RAT	8,0	8	7,52	16,00	24,00	63	0,20	4
6829884	4XNEM08003RET	8,0	8	7,52	16,00	24,00	63	0,50	4
6829885	4XNEM08003RJT	8,0	8	7,52	16,00	24,00	63	1,00	4
6829886	4XNEM08003RKT	8,0	8	7,52	16,00	24,00	63	1,50	4
6829890	4XNEM10004RCT	10,0	10	9,40	20,00	30,00	72	0,30	4
6830071	4XNEM10004RET	10,0	10	9,40	20,00	30,00	72	0,50	4
6830072	4XNEM10004RJT	10,0	10	9,40	20,00	30,00	72	1,00	4
6830073	4XNEM10004RKT	10,0	10	9,40	20,00	30,00	72	1,50	4
6830077	4XNEM12005RET	12,0	12	11,28	24,00	36,00	83	0,50	4
6830079	4XNEM12005RKT	12,0	12	11,28	24,00	36,00	83	1,50	4
6830080	4XNEM12005RMT	12,0	12	11,28	24,00	36,00	83	2,00	4
6830281	4XNEM12005RPT	12,0	12	11,28	24,00	36,00	83	3,00	4
6830286	4XNEM16006RET	16,0	16	15,04	32,00	48,00	92	0,50	4
6830288	4XNEM16006RKT	16,0	16	15,04	32,00	48,00	92	1,50	4
6830289	4XNEM16006RPT	16,0	16	15,04	32,00	48,00	92	3,00	4
6830471	4XNEM16006RQT	16,0	16	15,04	32,00	48,00	92	4,00	4
6830474	4XNEM20007RET	20,0	20	18,80	40,00	60,00	115	0,50	4
6830476	4XNEM20007RKT	20,0	20	18,80	40,00	60,00	115	1,50	4
6830477	4XNEM20007RPT	20,0	20	18,80	40,00	60,00	115	3,00	4
6830478	4XNEM20007RRT	20,0	20	18,80	40,00	60,00	115	5,00	4

VariMill XTREME • Series 4XNE • Radiused • 4 Flute • Necked • Safe-Lock™ Shank • Metric







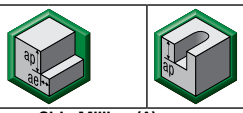


● first choice
○ alternate choice

WS15PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
6830078	4XNEM12005RJV	12,0	12	11,28	24,00	36,00	83	1,00	4
6830287	4XNEM16006RJV	16,0	16	15,04	32,00	48,00	92	1,00	4
6830475	4XNEM20007RJV	20,0	20	18,80	40,00	60,00	115	1,00	4

VariMill XTREME • Side Milling and Slotting • Application Data • WS15PE • Inch

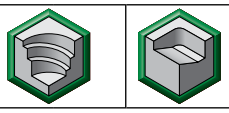


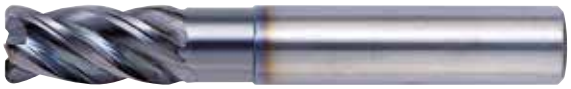


Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — vc m/min min	Start	max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter in	1/8	5/32	3/16	1/4	9/32	5/16	3/8	1/2	5/8	3/4	1
P	0	1.5 x D1	0.5 x D1	1.25 x D1	490	580	660	IPT	.0009	.0012	.0016	.0019	.0022	.0026	.0031	.0036	.0044	.0049	.0054
	1	1.5 x D1	0.5 x D1	1.25 x D1	490	580	660	IPT	.0009	.0012	.0016	.0019	.0022	.0026	.0031	.0036	.0044	.0049	.0054
	2	1.5 x D1	0.5 x D1	1.25 x D1	460	540	620	IPT	.0009	.0012	.0016	.0019	.0022	.0026	.0031	.0036	.0044	.0049	.0054
	3	1.5 x D1	0.5 x D1	1.25 x D1	390	450	520	IPT	.0007	.0010	.0013	.0016	.0019	.0022	.0026	.0030	.0038	.0044	.0049
	4	1.5 x D1	0.5 x D1	1.25 x D1	300	400	490	IPT	.0007	.0009	.0012	.0014	.0017	.0019	.0023	.0027	.0033	.0038	.0042
	5	1.5 x D1	0.5 x D1	1.25 x D1	200	260	330	IPT	.0006	.0008	.0011	.0013	.0015	.0017	.0021	.0024	.0030	.0035	.0039
	6	1.5 x D1	0.5 x D1	1.25 x D1	160	200	250	IPT	.0005	.0007	.0009	.0011	.0013	.0015	.0017	.0020	.0025	.0028	.0031
M	1	1.5 x D1	0.5 x D1	1.25 x D1	300	340	380	IPT	.0007	.0010	.0013	.0016	.0019	.0022	.0026	.0030	.0038	.0044	.0049
	2	1.5 x D1	0.5 x D1	1.25 x D1	200	230	260	IPT	.0006	.0008	.0011	.0013	.0015	.0017	.0021	.0024	.0030	.0035	.0039
	3	1.5 x D1	0.5 x D1	1.0 x D1	200	210	230	IPT	.0005	.0007	.0009	.0011	.0013	.0015	.0017	.0020	.0025	.0028	.0031
K	1	1.5 x D1	0.5 x D1	1.0 x D1	390	440	490	IPT	.0009	.0012	.0016	.0019	.0022	.0026	.0031	.0036	.0044	.0049	.0054
	2	1.5 x D1	0.5 x D1	1.0 x D1	360	410	460	IPT	.0007	.0010	.0013	.0016	.0019	.0022	.0026	.0030	.0038	.0044	.0049
	3	1.5 x D1	0.5 x D1	1.0 x D1	360	390	430	IPT	.0006	.0008	.0011	.0013	.0015	.0017	.0021	.0024	.0030	.0035	.0039
S	1	1.5 x D1	0.5 x D1	0.75 x D1	160	230	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D1	0.5 x D1	0.75 x D1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	.0026
	3	1.5 x D1	0.5 x D1	0.5 x D1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	.0026
	4	1.5 x D1	0.5 x D1	1.25 x D1	160	180	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033	.0036
H	1	1.5 x D1	0.5 x D1	1.0 x D1	260	360	460	IPT	.0007	.0009	.0012	.0014	.0017	.0019	.0023	.0027	.0033	.0038	.0042
	2	1.5 x D1	0.5 x D1	1.0 x D1	230	310	390	IPT	.0005	.0007	.0009	.0011	.0013	.0015	.0017	.0020	.0025	.0028	.0031

NOTE: See page B177 for more information on VARIMILL™ XTREME™ adjustment factors for feed calculations.

VariMill XTREME • Ramping • Application Data • WS15PE • Inch





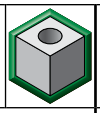
Material Group		Helical Interpo-lation/ Ramping 0°–15° Max Depth	WS15PE Cutting Speed — vc m/min min	Start	max	Recommended feed per tooth (fz = ipt) for helical interpolation and ramping — fz x 2 Diameter — D1 [Ømin – Ømax] mm min–max	1/8 .144–.238	5/32 .180–.297	3/16 .216–.356	1/4 .288–.475	9/32 .323–.534	5/16 .359–.594	3/8 .431–.713	1/2 .575–.950	5/8 .719–1.188	3/4 .863–1.425	1 1.150–1.900
P	0	1.25 x D1	490	580	660	IPT	.0009	.0012	.0016	.0019	.0023	.0026	.0031	.0036	.0044	.0049	.0054
	1	1.25 x D1	490	580	660	IPT	.0009	.0012	.0016	.0019	.0023	.0026	.0031	.0036	.0044	.0049	.0054
	2	1.25 x D1	460	540	620	IPT	.0009	.0012	.0016	.0019	.0023	.0026	.0031	.0036	.0044	.0049	.0054
	3	1.25 x D1	390	450	520	IPT	.0007	.0010	.0013	.0016	.0019	.0022	.0026	.0030	.0038	.0044	.0049
	4	1.25 x D1	300	400	490	IPT	.0007	.0009	.0012	.0014	.0017	.0019	.0023	.0027	.0033	.0038	.0042
	5	1.25 x D1	200	260	330	IPT	.0006	.0008	.0011	.0013	.0015	.0017	.0021	.0024	.0030	.0035	.0039
	6	1.25 x D1	160	200	250	IPT	.0005	.0007	.0009	.0011	.0013	.0015	.0017	.0020	.0025	.0028	.0031
M	1	1.25 x D1	300	340	380	IPT	.0007	.0010	.0013	.0016	.0019	.0022	.0026	.0030	.0038	.0044	.0049
	2	1.25 x D1	200	230	260	IPT	.0006	.0008	.0011	.0013	.0015	.0017	.0021	.0024	.0030	.0035	.0039
	3	1.0 x D1	200	210	230	IPT	.0005	.0007	.0009	.0011	.0013	.0015	.0017	.0020	.0025	.0028	.0031
K	1	1.0 x D1	390	440	490	IPT	.0009	.0012	.0016	.0019	.0023	.0026	.0031	.0036	.0044	.0049	.0054
	2	1.0 x D1	360	410	460	IPT	.0007	.0010	.0013	.0016	.0019	.0022	.0026	.0030	.0038	.0044	.0049
	3	1.0 x D1	360	390	430	IPT	.0006	.0008	.0011	.0013	.0015	.0017	.0021	.0024	.0030	.0035	.0039
S	1	0.75 x D1	160	230	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	2	0.75 x D1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	.0026
	3	0.5 x D1	80	105	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	.0026
	4	1.25 x D1	160	180	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033	.0036
H	1	1.0 x D1	260	360	460	IPT	.0007	.0009	.0012	.0014	.0017	.0019	.0023	.0027	.0033	.0038	.0042
	2	1.0 x D1	230	310	390	IPT	.0005	.0007	.0009	.0011	.0013	.0015	.0017	.0020	.0025	.0028	.0031

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Material Group		Helical Interpolation/ Ramping 15°–30°	WS15PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = ipt) for helical interpolation and ramping — fz x 2 Diameter — D1 [Ømin – Ømax]											
		Max Depth	min	Start	max	mm min–max	1/8 .144–.238	5/32 .180–.297	3/16 .216–.356	1/4 .288–.475	9/32 .323–.534	5/16 .359–.594	3/8 .431–.713	1/2 .575–.950	5/8 .719–1.188	3/4 .863–1.425	1 1.150–1.900
P	0	1.25 x D1	490	530	580	IPT	.0007	.0009	.0012	.0014	.0017	.0020	.0023	.0027	.0033	.0037	.0041
	1	1.25 x D1	490	530	580	IPT	.0007	.0009	.0012	.0014	.0017	.0020	.0023	.0027	.0033	.0037	.0041
	2	1.25 x D1	460	500	540	IPT	.0007	.0009	.0012	.0014	.0017	.0020	.0023	.0027	.0033	.0037	.0041
	3	1.25 x D1	390	420	450	IPT	.0005	.0008	.0010	.0012	.0014	.0017	.0020	.0023	.0029	.0033	.0037
	4	1.25 x D1	300	350	400	IPT	.0005	.0007	.0009	.0011	.0013	.0014	.0017	.0020	.0025	.0029	.0032
	5	1.25 x D1	200	235	260	IPT	.0005	.0006	.0008	.0010	.0011	.0013	.0016	.0018	.0023	.0026	.0029
	6	1.25 x D1	160	180	200	IPT	.0004	.0005	.0007	.0008	.0010	.0011	.0013	.0015	.0019	.0021	.0023
M	1	1.25 x D1	300	320	340	IPT	.0005	.0008	.0010	.0012	.0014	.0017	.0020	.0023	.0029	.0033	.0037
	2	1.25 x D1	200	215	230	IPT	.0005	.0006	.0008	.0010	.0011	.0013	.0016	.0018	.0023	.0026	.0029
	3	1.0 x D1	200	105	210	IPT	.0004	.0005	.0007	.0008	.0010	.0011	.0013	.0015	.0019	.0021	.0023
K	1	1.0 x D1	390	415	440	IPT	.0007	.0009	.0012	.0014	.0017	.0020	.0023	.0027	.0033	.0037	.0041
	2	1.0 x D1	360	380	410	IPT	.0005	.0008	.0010	.0012	.0014	.0017	.0020	.0023	.0029	.0033	.0037
	3	1.0 x D1	360	375	390	IPT	.0005	.0006	.0008	.0010	.0011	.0013	.0016	.0018	.0023	.0026	.0029
S	1	0.75 x D1	160	190	230	IPT	.0005	.0008	.0010	.0012	.0014	.0017	.0020	.0023	.0029	.0033	.0037
	2	0.75 x D1	80	90	100	IPT	.0003	.0005	.0005	.0006	.0008	.0008	.0011	.0012	.0015	.0017	.002
	3	0.5 x D1	80	90	100	IPT	.0003	.0005	.0005	.0006	.0008	.0008	.0011	.0012	.0015	.0017	.002
	4	1.25 x D1	160	170	180	IPT	.0004	.0005	.0007	.0008	.0011	.0012	.0014	.0017	.0021	.0024	.0027
H	1	1.0 x D1	260	310	360	IPT	.0005	.0007	.0009	.0011	.0013	.0014	.0017	.0020	.0025	.0029	.0032
	2	1.0 x D1	230	270	310	IPT	.0004	.0005	.0007	.0008	.0010	.0011	.0013	.0015	.0019	.0021	.0023

Material Group		Helical Interpolation/ Ramping 30°–45°	WS15PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = ipt) for helical interpolation and ramping — fz x 2 Diameter — D1 [Ømin – Ømax]											
		Max Depth	min	Start	max	mm min–max	1/8 .144–.238	5/32 .180–.297	3/16 .216–.356	1/4 .288–.475	9/32 .323–.534	5/16 .359–.594	3/8 .431–.713	1/2 .575–.950	5/8 .719–1.188	3/4 .863–1.425	1 1.150–1.900
P	0	1.25 x D1	420	450	495	IPT	.0005	.0007	.0010	.0011	.0014	.0016	.0019	.0022	.0026	.0029	.0032
	1	1.25 x D1	420	450	495	IPT	.0005	.0007	.0010	.0011	.0014	.0016	.0019	.0022	.0026	.0029	.0032
	2	1.25 x D1	420	450	495	IPT	.0005	.0007	.0010	.0011	.0014	.0016	.0019	.0022	.0026	.0029	.0032
	3	1.25 x D1	315	345	360	IPT	.0004	.0006	.0008	.0010	.0011	.0013	.0016	.0018	.0023	.0026	.0029
	4	1.25 x D1	270	300	330	IPT	.0004	.0005	.0007	.0008	.0010	.0011	.0014	.0016	.0020	.0023	.0025
	5	1.25 x D1	210	225	240	IPT	.0004	.0005	.0007	.0008	.0009	.0010	.0013	.0014	.0018	.0021	.0023
	6	1.25 x D1	165	180	195	IPT	.0003	.0004	.0005	.0007	.0008	.0009	.0010	.0012	.0015	.0017	.0019
M	1	1.25 x D1	225	255	270	IPT	.0004	.0006	.0008	.0010	.0011	.0013	.0016	.0018	.0023	.0026	.0029
	2	1.25 x D1	150	165	180	IPT	.0004	.0005	.0007	.0008	.0009	.0010	.0013	.0014	.0018	.0021	.0023
	3	1.0 x D1	135	150	165	IPT	.0003	.0004	.0005	.0007	.0008	.0009	.0010	.0012	.0015	.0017	.0019
K	1	1.0 x D1	330	360	390	IPT	.0005	.0007	.0010	.0011	.0014	.0016	.0019	.0022	.0026	.0029	.0032
	2	1.0 x D1	300	330	360	IPT	.0004	.0006	.0008	.0010	.0011	.0013	.0016	.0018	.0023	.0026	.0029
	3	1.0 x D1	270	300	330	IPT	.0004	.0005	.0007	.0008	.0009	.0010	.0013	.0014	.0018	.0021	.0023
S	1	0.75 x D1	240	255	270	IPT	.0004	.0006	.0008	.0010	.0011	.0013	.0016	.0018	.0023	.0026	.0029
	2	0.75 x D1	60	75	84	IPT	.0002	.0004	.0004	.0005	.0006	.0007	.0008	.0010	.0012	.0014	.0016
	3	0.5 x D1	60	75	84	IPT	.0002	.0004	.0004	.0005	.0006	.0007	.0008	.0010	.0012	.0014	.0016
	4	1.25 x D1	105	120	135	IPT	.0003	.0004	.0005	.0007	.0008	.0010	.0011	.0013	.0017	.0019	.0022
H	1	1.0 x D1	225	240	255	IPT	.0004	.0005	.0007	.0008	.0010	.0011	.0014	.0016	.0020	.0023	.0025
	2	1.0 x D1	195	210	225	IPT	.0003	.0004	.0005	.0007	.0008	.0009	.0010	.0012	.0015	.0017	.0019

VariMill XTREME • Plunging/Drilling • Application Data • WS15PE • Inch


Material Group		Plunging/Drilling			WS15PE Cutting Speed — vc m/min			Recommended feed per revolution (fn =mm/rev) for plunging and drilling — D1 — Diameter											
		Max Depth	Applicable	Coolant	min	Start	max	in	1/8	5/32	3/16	1/4	9/32	5/16	3/8	1/2	5/8	3/4	1
P	0	1.5 x D	●	Preferred	420	450	495	IPR	.0013	.0016	.0450	.0022	.0024	.0026	.0031	.0037	.0047	.0063	.0071
	1	1.5 x D	●	Required	420	450	495	IPR	.0013	.0016	.0450	.0022	.0024	.0026	.0031	.0037	.0047	.0063	.0071
	2	1.5 x D	●	Required	420	450	495	IPR	.0013	.0016	.0450	.0022	.0024	.0026	.0031	.0037	.0047	.0063	.0071
	3	1 x D	●	Required	315	345	360	IPR	.0008	.0011	.0330	.0016	.0018	.0020	.0024	.0028	.0039	.0049	.0059
	4	1 x D	●	Required	270	300	330	IPR	.0008	.0011	.0330	.0016	.0018	.0020	.0024	.0028	.0039	.0049	.0059
	5	0.5 x D	●	Required	210	225	240	IPR	.0006	.0007	.0200	.0010	.0012	.0014	.0016	.0020	.0026	.0033	.0039
	6	0.5 x D	●	Required	165	180	195	IPR	.0006	.0007	.0200	.0010	.0012	.0014	.0016	.0020	.0026	.0033	.0039
M	1	0.75 x D	●	Required	225	255	270	IPR	.0008	.0011	.0330	.0016	.0018	.0020	.0024	.0028	.00239	.0049	.0059
	2	0.5 x D	●	Required	150	165	180	IPR	.0006	.0007	.0200	.0010	.0012	.0014	.0016	.0020	.0026	.0033	.0039
	3	0.5 x D	●	Required	135	150	165	IPR	.0006	.0007	.0200	.0010	.0012	.0014	.0016	.0020	.0026	.0033	.0039
K	1	1.5 x D	●	Preferred	330	360	390	IPR	.0013	.0016	.0450	.0022	.0024	.0026	.0031	.0037	.0047	.0063	.0071
	2	1 x D	●	Required	300	330	360	IPR	.0008	.0011	.0330	.0016	.0018	.0020	.0024	.0028	.0039	.0049	.0059
	3	1 x D	●	Required	270	300	330	IPR	.0008	.0011	.0330	.0016	.0018	.0020	.0024	.0028	.0039	.0049	.0059
S	1	0.3 x D	○	Required	240	255	270	IPR	.0008	.0011	.0330	.0016	.0018	.0020	.0024	.0028	.0039	.0049	.0059
	2	0.1 x D	○	Required	60	75	84	IPR	.0004	.0005	.0150	.0007	.0008	.0009	.0011	.0013	.0018	.0024	.0028
	3	0.1 x D	○	Required	60	75	84	IPR	.0004	.0005	.0150	.0007	.0008	.0009	.0011	.0013	.0018	.0024	.0028
	4	0.2 x D	○	Required	105	120	135	IPR	.0006	.0007	.0200	.0010	.0012	.0014	.0016	.0020	.0026	.0033	.0039
H	1	0.3 x D	○	Required	225	240	255	IPR	.0008	.0011	.0330	.0016	.0018	.0020	.0024	.0028	.0039	.0049	.0059
	2	0.2 x D	○	Required	195	210	225	IPR	.0006	.0007	.0200	.0010	.0012	.0014	.0016	.0020	.0026	.0033	.0039

VariMill XTREME • Side Milling and Slotting • Application Data • WS15PE • Metric







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. — D1 — Diameter											
					min	Start	max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	1,5 x D1	0,5 x D1	1,25 x D1	150	175	200	fz	0,023	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	1	1,5 x D1	0,5 x D1	1,25 x D1	150	175	200	fz	0,023	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	2	1,5 x D1	0,5 x D1	1,25 x D1	140	165	190	fz	0,023	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	3	1,5 x D1	0,5 x D1	1,25 x D1	120	140	160	fz	0,019	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	4	1,5 x D1	0,5 x D1	1,25 x D1	90	120	150	fz	0,018	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
	5	1,5 x D1	0,5 x D1	1,25 x D1	60	80	100	fz	0,016	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
	6	1,5 x D1	0,5 x D1	1,25 x D1	50	65	75	fz	0,013	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078
M	1	1,5 x D1	0,5 x D1	1,25 x D1	90	100	115	fz	0,019	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	2	1,5 x D1	0,5 x D1	1,25 x D1	60	70	80	fz	0,016	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
	3	1,5 x D1	0,5 x D1	1,0 x D1	60	65	70	fz	0,013	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078
K	1	1,5 x D1	0,5 x D1	1,0 x D1	120	135	150	fz	0,023	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	2	1,5 x D1	0,5 x D1	1,0 x D1	110	125	140	fz	0,019	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	3	1,5 x D1	0,5 x D1	1,0 x D1	110	120	130	fz	0,016	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
S	1	1,5 x D1	0,5 x D1	0,75 x D1	50	70	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D1	0,5 x D1	0,75 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	1,5 x D1	0,5 x D1	0,5 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	1,5 x D1	0,5 x D1	1,25 x D1	50	55	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	1,5 x D1	0,5 x D1	1,0 x D1	80	110	140	fz	0,018	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
	2	1,5 x D1	0,5 x D1	1,0 x D1	70	90	120	fz	0,013	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078

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Material Group		Helical Interpolation/ Ramping 0°–15°	WS15PE			Recommended feed per tooth (fz = mm/z) for helical interpolation and ramping — fz x 2											
			Cutting Speed — vc m/min			Diameter — D1 [Ømin – Ømax]											
		Max Depth	min	Start	max	mm min–max	3,0 3,5–5.7	4,0 4,6–7,6	5,0 5,8–9,5	6,0 6,9–11,4	8,0 9,2–15,2	10,0 11,5–19,0	12,0 13,8–22,8	14,0 16,1–26,6	16,0 18,4–30,4	18,0 20,7–34,2	20,0 23,0–38,0	25,0 28,8–47,5
P	0	1,25 x D1	150	175	200	fz	0,023	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	1	1,25 x D1	150	175	200	fz	0,023	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	2	1,25 x D1	140	165	190	fz	0,023	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	3	1,25 x D1	120	140	160	fz	0,019	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	4	1,25 x D1	90	120	150	fz	0,018	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
	5	1,25 x D1	60	80	100	fz	0,016	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
	6	1,25 x D1	50	65	75	fz	0,013	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078
M	1	1,25 x D1	90	100	115	fz	0,019	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	2	1,25 x D1	60	70	80	fz	0,016	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
	3	1,0 x D1	60	65	70	fz	0,013	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078
K	1	1,0 x D1	120	135	150	fz	0,023	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	2	1,0 x D1	110	125	140	fz	0,019	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	3	1,0 x D1	110	120	130	fz	0,016	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
S	1	0,75 x D1	50	70	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	0,75 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	0,5 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	1,25 x D1	50	55	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	1,0 x D1	80	110	140	fz	0,018	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
	2	1,0 x D1	70	90	120	fz	0,013	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078

Material Group		Helical Interpolation/ Ramping 15°–30°	WS15PE			Recommended feed per tooth (fz = mm/z) for helical interpolation and ramping — fz x 2											
			Cutting Speed — vc m/min			Diameter — D1 [Ømin – Ømax]											
		Max Depth	min	Start	max	mm min–max	3,0 3,5–5.7	4,0 4,6–7,6	5,0 5,8–9,5	6,0 6,9–11,4	8,0 9,2–15,2	10,0 11,5–19,0	12,0 13,8–22,8	14,0 16,1–26,6	16,0 18,4–30,4	18,0 20,7–34,2	20,0 23,0–38,0	25,0 28,8–47,5
P	0	1,25 x D1	150	165	175	fz	0,017	0,023	0,030	0,036	0,050	0,059	0,068	0,076	0,083	0,089	0,094	0,102
	1	1,25 x D1	150	165	175	fz	0,017	0,023	0,030	0,036	0,050	0,059	0,068	0,076	0,083	0,089	0,094	0,102
	2	1,25 x D1	140	155	165	fz	0,017	0,023	0,030	0,036	0,050	0,059	0,068	0,076	0,083	0,089	0,094	0,102
	3	1,25 x D1	120	130	140	fz	0,014	0,019	0,025	0,030	0,041	0,050	0,058	0,065	0,072	0,078	0,083	0,094
	4	1,25 x D1	90	105	120	fz	0,013	0,018	0,022	0,027	0,037	0,045	0,051	0,058	0,063	0,068	0,073	0,080
	5	1,25 x D1	60	70	80	fz	0,012	0,016	0,020	0,024	0,033	0,040	0,046	0,052	0,058	0,062	0,067	0,075
	6	1,25 x D1	50	55	65	fz	0,010	0,013	0,017	0,020	0,028	0,033	0,038	0,043	0,047	0,050	0,053	0,059
M	1	1,25 x D1	90	95	100	fz	0,014	0,019	0,025	0,030	0,041	0,050	0,058	0,065	0,072	0,078	0,083	0,094
	2	1,25 x D1	60	65	70	fz	0,012	0,016	0,020	0,024	0,033	0,040	0,046	0,052	0,058	0,062	0,067	0,075
	3	1,0 x D1	60	62	65	fz	0,010	0,013	0,017	0,020	0,028	0,033	0,038	0,043	0,047	0,050	0,053	0,059
K	1	1,0 x D1	120	130	135	fz	0,017	0,023	0,030	0,036	0,050	0,059	0,068	0,076	0,083	0,089	0,094	0,102
	2	1,0 x D1	110	120	125	fz	0,014	0,019	0,025	0,030	0,041	0,050	0,058	0,065	0,072	0,078	0,083	0,094
	3	1,0 x D1	110	115	120	fz	0,012	0,016	0,020	0,024	0,033	0,040	0,046	0,052	0,058	0,062	0,067	0,075
S	1	0,75 x D1	50	60	70	fz	0,014	0,019	0,025	0,030	0,041	0,050	0,058	0,065	0,072	0,078	0,083	0,094
	2	0,75 x D1	25	27	30	fz	0,008	0,010	0,013	0,016	0,022	0,026	0,031	0,035	0,038	0,042	0,045	0,051
	3	0,5 x D1	25	27	30	fz	0,008	0,010	0,013	0,016	0,022	0,026	0,031	0,035	0,038	0,042	0,045	0,051
	4	1,25 x D1	50	52	55	fz	0,009	0,013	0,017	0,021	0,030	0,037	0,043	0,048	0,053	0,057	0,061	0,069
H	1	1,0 x D1	80	95	110	fz	0,013	0,018	0,022	0,027	0,037	0,045	0,051	0,058	0,063	0,068	0,073	0,080
	2	1,0 x D1	70	80	90	fz	0,010	0,013	0,017	0,020	0,028	0,033	0,038	0,043	0,047	0,050	0,053	0,059

VariMill XTREME • Ramping • Application Data • WS15PE • Metric

Material Group		Helical Interpolation/ Ramping 30°–45°	WS15PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/z) for helical interpolation and ramping — fz x 2 Diameter — D1 [Ømin – Ømax]											
		Max Depth	min	Start	max	mm min–max	3,0 3,5–5.7	4,0 4,6–7,6	5,0 5,8–9,5	6,0 6,9–11,4	8,0 9,2–15,2	10,0 11,5–19,0	12,0 13,8–22,8	14,0 16,1–26,6	16,0 18,4–30,4	18,0 20,7–34,2	20,0 23,0–38,0	25,0 28,8–47,5
P	0	1,25 x D1	140	150	165	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,055	0,061	0,067	0,071	0,075	0,082
	1	1,25 x D1	140	150	165	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,055	0,061	0,067	0,071	0,075	0,082
	2	1,25 x D1	140	150	165	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,055	0,061	0,067	0,071	0,075	0,082
	3	1,25 x D1	105	115	120	fz	0,011	0,015	0,020	0,024	0,033	0,040	0,046	0,052	0,058	0,062	0,067	0,075
	4	1,25 x D1	90	100	110	fz	0,011	0,014	0,018	0,022	0,030	0,036	0,041	0,046	0,051	0,055	0,058	0,064
	5	1,25 x D1	70	75	80	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,053	0,060
	6	1,25 x D1	55	60	65	fz	0,008	0,011	0,013	0,016	0,022	0,027	0,031	0,034	0,038	0,040	0,043	0,047
M	1	1,25 x D1	75	85	90	fz	0,011	0,015	0,020	0,024	0,033	0,040	0,046	0,052	0,058	0,062	0,067	0,075
	2	1,25 x D1	50	55	60	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,053	0,060
	3	1,0 x D1	45	50	55	fz	0,008	0,011	0,013	0,016	0,022	0,027	0,031	0,034	0,038	0,040	0,043	0,047
K	1	1,0 x D1	110	120	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,055	0,061	0,067	0,071	0,075	0,082
	2	1,0 x D1	100	110	120	fz	0,011	0,015	0,020	0,024	0,033	0,040	0,046	0,052	0,058	0,062	0,067	0,075
	3	1,0 x D1	90	100	110	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,053	0,060
S	1	0,75 x D1	80	85	90	fz	0,011	0,015	0,020	0,024	0,033	0,040	0,046	0,052	0,058	0,062	0,067	0,075
	2	0,75 x D1	20	25	28	fz	0,006	0,008	0,011	0,013	0,017	0,021	0,025	0,028	0,031	0,033	0,036	0,040
	3	0,5 x D1	20	25	28	fz	0,006	0,008	0,011	0,013	0,017	0,021	0,025	0,028	0,031	0,033	0,036	0,040
	4	1,25 x D1	35	40	45	fz	0,008	0,010	0,014	0,017	0,024	0,029	0,034	0,038	0,042	0,046	0,049	0,055
H	1	1,0 x D1	75	80	85	fz	0,011	0,014	0,018	0,022	0,030	0,036	0,041	0,046	0,051	0,055	0,058	0,064
	2	1,0 x D1	65	70	75	fz	0,008	0,011	0,013	0,016	0,022	0,027	0,031	0,034	0,038	0,040	0,043	0,047

VariMill XTREME • Plunging/Drilling • Application Data • WS15PE • Metric

Material Group		Plunging/Drilling			WS15PE Cutting Speed — vc m/min			Recommended feed per revolution (fn =mm/rev) for plunging and drilling D1 — Diameter											
		Max Depth	Applicable	Coolant	min	Start	max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	1,5 x D	●	Preferred	140	150	165	fn	0,033	0,040	0,045	0,055	0,065	0,080	0,095	0,110	0,120	0,140	0,160	0,180
	1	1,5 x D	●	Required	140	150	165	fn	0,033	0,040	0,045	0,055	0,065	0,080	0,095	0,110	0,120	0,140	0,160	0,180
	2	1,5 x D	●	Required	140	150	165	fn	0,033	0,040	0,045	0,055	0,065	0,080	0,095	0,110	0,120	0,140	0,160	0,180
	3	1 x D	●	Required	105	115	120	fn	0,020	0,028	0,033	0,040	0,050	0,060	0,070	0,085	0,100	0,110	0,125	0,150
	4	1 x D	●	Required	90	100	110	fn	0,020	0,028	0,033	0,040	0,050	0,060	0,070	0,085	0,100	0,110	0,125	0,150
	5	0,5 x D	●	Required	70	75	80	fn	0,014	0,018	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,075	0,085	0,100
	6	0,5 x D	●	Required	55	60	65	fn	0,014	0,018	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,075	0,085	0,100
M	1	0,75 x D	●	Required	75	85	90	fn	0,020	0,028	0,033	0,040	0,050	0,060	0,070	0,085	0,100	0,110	0,125	0,150
	2	0,5 x D	●	Required	50	55	60	fn	0,014	0,018	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,075	0,085	0,100
	3	0,5 x D	●	Required	45	50	55	fn	0,014	0,018	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,075	0,085	0,100
K	1	1,5 x D	●	Preferred	110	120	130	fn	0,033	0,040	0,045	0,055	0,065	0,080	0,095	0,110	0,120	0,140	0,160	0,180
	2	1 x D	●	Required	100	110	120	fn	0,020	0,028	0,033	0,040	0,050	0,060	0,070	0,085	0,100	0,110	0,125	0,150
	3	1 x D	●	Required	90	100	110	fn	0,020	0,028	0,033	0,040	0,050	0,060	0,070	0,085	0,100	0,110	0,125	0,150
S	1	0,3 x D	○	Required	80	85	90	fn	0,020	0,028	0,033	0,040	0,050	0,060	0,070	0,085	0,100	0,110	0,125	0,150
	2	0,1 x D	○	Required	20	25	28	fn	0,010	0,012	0,015	0,018	0,022	0,028	0,033	0,040	0,045	0,050	0,060	0,070
	3	0,1 x D	○	Required	20	25	28	fn	0,010	0,012	0,015	0,018	0,022	0,028	0,033	0,040	0,045	0,050	0,060	0,070
	4	0,2 x D	○	Required	35	40	45	fn	0,014	0,018	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,075	0,085	0,100
H	1	0,3 x D	○	Required	75	80	85	fn	0,020	0,028	0,033	0,040	0,050	0,060	0,070	0,085	0,100	0,110	0,125	0,150
	2	0,2 x D	○	Required	65	70	75	fn	0,014	0,018	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,075	0,085	0,100

VariMill XTREME • Adjustment Factor Table for Feed Calculation

To calculate application-specific cutting data, please use Kv coefficient table to the right for adaptation of cutting speed and KFz for feed, respectively.

*Vc new = Vc * Kv*
*Fz new = IPT * KFz*

Calculation example:
Application: D = 20mm; M2 material group;
Ae = 2mm
Cutting data recommendation: Vc = 80 m/min;
Fz = 0,089 mm/th
Adjustment coefficients: Ae = 2mm equals 10,0%;
Kv = 1,35; KFz = 1,7

Final cutting data recommendation:
*Vc new = 80 * 1,35 = 108 m/min*
*Fz new = 0,089 * 1,7 = 0,15 mm/min*

Inch

	Ae/D	2%	4%	5%	8%	10%	20%	30%	40%	50%
Speed factor	Kv	2	1.5	1.45	1.4	1.35	1.25	1.2	1	1
Feed factor	KFz	2.4	2.3	2.2	2	1.7	1.25	1.02	1	1

Metric

	Ae/D	2%	4%	5%	8%	10%	20%	30%	40%	50%
Speed factor	Kv	2	1,5	1,45	1,4	1,35	1,25	1,2	1	1
Feed factor	KFz	2,4	2,3	2,2	2	1,7	1,25	1,02	1	1

VariMill I™

High-Performance Solid End Milling

The VariMill I end mill family is for CNC machine shops looking for an all-around tool with a wide standard product range capable of machining multiple materials, covering configurations from a long length-of-cut through a ball nose profile for 3D machining applications.

Features and Benefits

Unequal flute spacing to cut harmonics and reduce the development of vibrations during cutting.

Center cutting for improved ramping capabilities and plunging.

38° helix angle to provide the best combination between a roughing and a finishing tool.

Unique core design to offer maximum room for chip evacuation while keeping the tool design stable.



VariMill I offers plunging, slotting, and profiling at the highest possible feed rates for a wide range of materials. It is designed to provide maximum metal removal rates (MRR) and to achieve superior surface conditions. A wide range of diameters and corner configurations, such as chamfer, radii, and sharp edges, are available from stock.

STABLE

Unequal flute spacing design to ensure low vibrations and high cutting stability.

EASY

With its advanced geometry, machinist will be able to apply VariMill I with confidence.

VERSATILE

Roughing and finishing operations in one single tool with the capability to work on multiple materials.

CHATTER-FREE VERSATILITY

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
WP15PE WS15PE TiAlN	4

DIAMETER RANGE

INCH	METRIC
1/8–1-1/4"	4–25mm

INDUSTRY









APPLICATIONS

MATERIALS





SIDE MILLING



RAMPING



HELICAL INTERPOLATION



SLOTTING



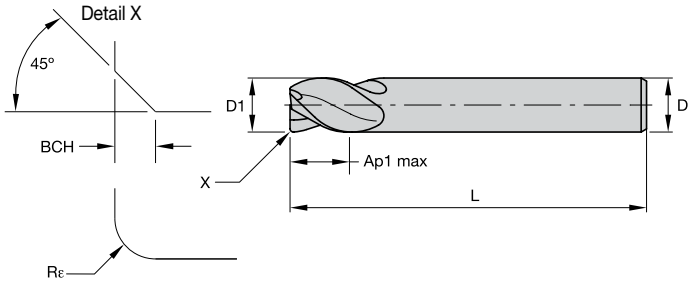
DYNAMIC MILLING

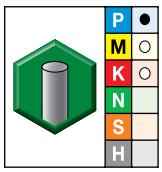


PLUNGING

VariMill I • Series 4V05 • Square End • 4 Flute • Inch







WP15PE

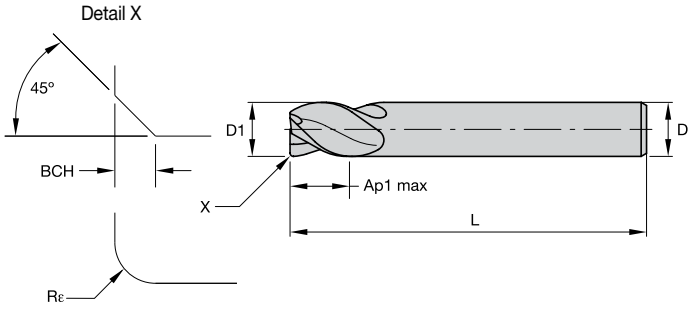
● first choice
○ alternate choice

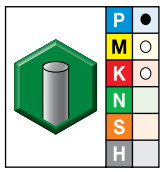
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH	ZU
5576590	4V4503001NT	1/8	1/8	1/4	1 1/2	–	.010	4
5576591	4V4503001ST	1/8	1/8	1/4	1 1/2	–	–	4
5576530	4V0503001AT	1/8	1/8	1/2	2	.015	–	4
5576346	4V0503001ST	1/8	1/8	1/2	2	–	–	4
5576345	4V0503001NT	1/8	1/8	1/2	2	–	.010	4
6571628	4V4505000AT	3/16	3/16	5/16	1 1/2	.015	–	4
5576592	4V4505000NT	3/16	3/16	5/16	1 1/2	–	.010	4
5576593	4V4505000ST	3/16	3/16	5/16	1 1/2	–	–	4
5576531	4V0505000AT	3/16	3/16	5/8	2 1/4	.015	–	4
5576532	4V0505000BT	3/16	3/16	5/8	2 1/4	.030	–	4
5576347	4V0505000NT	3/16	3/16	5/8	2 1/4	–	.010	4
5576348	4V0505000ST	3/16	3/16	5/8	2 1/4	–	–	4
5576610	4V4507002BT	1/4	1/4	3/8	2	.030	–	4
5576595	4V4507002NT	1/4	1/4	3/8	2	–	.016	4
5576596	4V4507002ST	1/4	1/4	3/8	2	–	–	4
5576533	4V0507002AT	1/4	1/4	3/4	2 1/2	.015	–	4
5576534	4V0507002BT	1/4	1/4	3/4	2 1/2	.030	–	4
5576535	4V0507002CT	1/4	1/4	3/4	2 1/2	.060	–	4
5576349	4V0507002NT	1/4	1/4	3/4	2 1/2	–	.016	4
5576510	4V0507002ST	1/4	1/4	3/4	2 1/2	–	–	4
5576577	4V1507002AT	1/4	1/4	1 1/4	3 1/4	.015	–	4
5576579	4V1507002BT	1/4	1/4	1 1/4	3 1/4	.030	–	4
5576566	4V1507002ST	1/4	1/4	1 1/4	3 1/4	–	–	4
5576611	4V4508003BT	5/16	5/16	1/2	2	.030	–	4
5576597	4V4508003NT	5/16	5/16	1/2	2	–	.016	4
5576598	4V4508003ST	5/16	5/16	1/2	2	–	–	4
5576536	4V0508003AT	5/16	5/16	3/4	2 1/2	.015	–	4
5576537	4V0508003BT	5/16	5/16	3/4	2 1/2	.030	–	4
5576538	4V0508003CT	5/16	5/16	3/4	2 1/2	.060	–	4
5576512	4V0508003ST	5/16	5/16	3/4	2 1/2	–	–	4
5576511	4V0508003NT	5/16	5/16	3/4	2 1/2	–	.016	4
5576580	4V1508003BT	5/16	5/16	1 1/4	3 1/4	.030	–	4
5576567	4V1508003ST	5/16	5/16	1 1/4	3 1/4	–	–	4
5576612	4V4510004BT	3/8	3/8	1/2	2	.030	–	4
5576599	4V4510004NT	3/8	3/8	1/2	2	–	.020	4
5576600	4V4510004ST	3/8	3/8	1/2	2	–	–	4
5576539	4V0510004AT	3/8	3/8	7/8	2 1/2	.015	–	4
5576540	4V0510004BT	3/8	3/8	7/8	2 1/2	.030	–	4
5576542	4V0510004CT	3/8	3/8	7/8	2 1/2	.060	–	4
5576543	4V0510004DT	3/8	3/8	7/8	2 1/2	.090	–	4
5576513	4V0510004NT	3/8	3/8	7/8	2 1/2	–	.020	4
5576514	4V0510004ST	3/8	3/8	7/8	2 1/2	–	–	4
5576581	4V1510004BT	3/8	3/8	1 1/2	4	.030	–	4
5576582	4V1510004CT	3/8	3/8	1 1/2	4	.060	–	4
5576568	4V1510004ST	3/8	3/8	1 1/2	4	–	–	4
5576601	4V451101ANT	7/16	7/16	5/8	2 1/2	–	.020	4
5576602	4V451101AST	7/16	7/16	5/8	2 1/2	–	–	4
5576515	4V051101ANT	7/16	7/16	7/8	2 1/2	–	.020	4
5576516	4V051101AST	7/16	7/16	7/8	2 1/2	–	–	4
5576569	4V151100AST	7/16	7/16	2	4	–	–	4
6522632	4V4513005BT	1/2	1/2	5/8	2 1/2	.030	–	4
5576613	4V4513005BW	1/2	1/2	5/8	2 1/2	.030	–	4
5576614	4V4513005CW	1/2	1/2	5/8	2 1/2	.060	–	4
5576604	4V4513005NW	1/2	1/2	5/8	2 1/2	–	.020	4
6522623	4V4513005ST	1/2	1/2	5/8	2 1/2	–	–	4
5576605	4V4513005SW	1/2	1/2	5/8	2 1/2	–	–	4

VariMill I • Series 4V05 • Square End • 4 Flute • Inch

(continued)







WP15PE

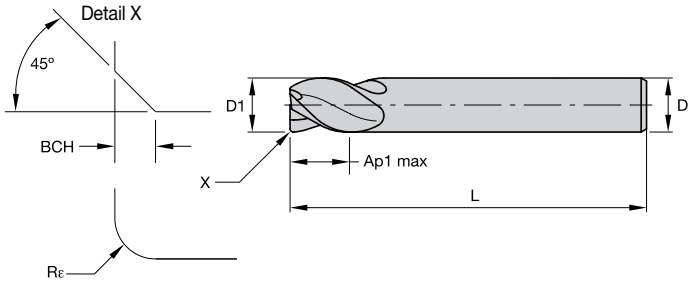
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○ alternate choice

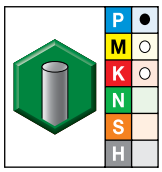
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5576518	4V0513005SW	1/2	1/2	1	3	–	–	4
5576517	4V0513005NW	1/2	1/2	1	3	–	.020	4
5576544	4V0513015AW	1/2	1/2	1 1/4	3	.015	–	4
5576545	4V0513015BW	1/2	1/2	1 1/4	3	.030	–	4
6522633	4V0513015BT	1/2	1/2	1 1/4	3	.030	–	4
5576546	4V0513015CW	1/2	1/2	1 1/4	3	.060	–	4
6522638	4V0513015CT	1/2	1/2	1 1/4	3	.060	–	4
5576547	4V0513015DW	1/2	1/2	1 1/4	3	.090	–	4
6522653	4V0513015ET	1/2	1/2	1 1/4	3	.120	–	4
5576548	4V0513015EW	1/2	1/2	1 1/4	3	.120	–	4
6522624	4V0513015ST	1/2	1/2	1 1/4	3	–	–	4
5576520	4V0513015SW	1/2	1/2	1 1/4	3	–	–	4
5576519	4V0513015NW	1/2	1/2	1 1/4	3	–	.020	4
5576636	4V6513015BW	1/2	1/2	1 1/2	4	.030	–	4
5576637	4V6513015CW	1/2	1/2	1 1/2	4	.060	–	4
5576621	4V6513015NW	1/2	1/2	1 1/2	4	–	.020	4
5576622	4V6513015SW	1/2	1/2	1 1/2	4	–	–	4
5576583	4V1513005BW	1/2	1/2	2	4	.030	–	4
5576584	4V1513005CW	1/2	1/2	2	4	.060	–	4
5576570	4V1513005SW	1/2	1/2	2	4	–	–	4
5576638	4V6513025BW	1/2	1/2	2 1/4	4 1/2	.030	–	4
5576639	4V6513025CW	1/2	1/2	2 1/4	4 1/2	.060	–	4
5576623	4V6513025SW	1/2	1/2	2 1/4	4 1/2	–	–	4
5576615	4V4516006CW	5/8	5/8	3/4	3	.060	–	4
5576617	4V4516006EW	5/8	5/8	3/4	3	.120	–	4
5576606	4V4516006NW	5/8	5/8	3/4	3	–	.020	4
5576607	4V4516006SW	5/8	5/8	3/4	3	–	–	4
5576549	4V0516006BW	5/8	5/8	1 1/4	3 1/2	.030	–	4
5576550	4V0516006CW	5/8	5/8	1 1/4	3 1/2	.060	–	4
5576552	4V0516006EW	5/8	5/8	1 1/4	3 1/2	.120	–	4
6522625	4V0516006ST	5/8	5/8	1 1/4	3 1/2	–	–	4
5576521	4V0516006NW	5/8	5/8	1 1/4	3 1/2	–	.020	4
5576528	4V0516006SW	5/8	5/8	1 1/4	3 1/2	–	–	4
6522634	4V6516016BT	5/8	5/8	1 5/8	4 1/8	.030	–	4
6522639	4V6516016CT	5/8	5/8	1 5/8	4 1/8	.060	–	4
5576650	4V6516016CW	5/8	5/8	1 5/8	4 1/8	.060	–	4
6522654	4V6516016ET	5/8	5/8	1 5/8	4 1/8	.120	–	4
5576624	4V6516016NW	5/8	5/8	1 5/8	4 1/8	–	.020	4
6522626	4V6516016ST	5/8	5/8	1 5/8	4 1/8	–	–	4
5576625	4V6516016SW	5/8	5/8	1 5/8	4 1/8	–	–	4
5576585	4V1516006CW	5/8	5/8	2 1/4	5	.060	–	4
5576571	4V1516006NW	5/8	5/8	2 1/4	5	–	.020	4
5576572	4V1516006SW	5/8	5/8	2 1/4	5	–	–	4
5576618	4V4519007BW	3/4	3/4	7/8	3 1/2	.030	–	4
5576619	4V4519007CW	3/4	3/4	7/8	3 1/2	.060	–	4
5576620	4V4519007EW	3/4	3/4	7/8	3 1/2	.120	–	4
5576608	4V4519007NW	3/4	3/4	7/8	3 1/2	–	.020	4
5576609	4V4519007SW	3/4	3/4	7/8	3 1/2	–	–	4
5576553	4V0519007BW	3/4	3/4	1 1/2	4	.030	–	4
5576554	4V0519007CW	3/4	3/4	1 1/2	4	.060	–	4
5576555	4V0519007DW	3/4	3/4	1 1/2	4	.090	–	4
5576557	4V0519007EW	3/4	3/4	1 1/2	4	.120	–	4
5576522	4V0519007NW	3/4	3/4	1 1/2	4	–	.020	4
5576529	4V0519007SW	3/4	3/4	1 1/2	4	–	–	4
6522635	4V6519017BT	3/4	3/4	1 5/8	4	.030	–	4
6522640	4V6519017CT	3/4	3/4	1 5/8	4	.060	–	4

VariMill I • Series 4V05 • Square End • 4 Flute • Inch

(continued)







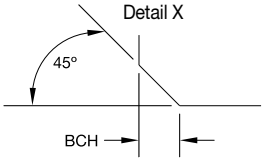
WP15PE

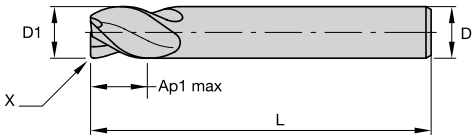
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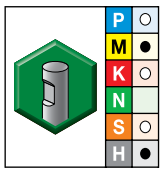
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6522655	4V6519017ET	3/4	3/4	1 5/8	4	.120	–	4
5576630	4V6519017NW	3/4	3/4	1 5/8	4	–	.020	4
6522627	4V6519017ST	3/4	3/4	1 5/8	4	–	–	4
5576631	4V6519017SW	3/4	3/4	1 5/8	4	–	–	4
6522636	4V1519007BT	3/4	3/4	2 1/4	5	.030	–	4
5576586	4V1519007BW	3/4	3/4	2 1/4	5	.030	–	4
6522651	4V1519007CT	3/4	3/4	2 1/4	5	.060	–	4
5576587	4V1519007CW	3/4	3/4	2 1/4	5	.060	–	4
6522656	4V1519007ET	3/4	3/4	2 1/4	5	.120	–	4
6522628	4V1519007ST	3/4	3/4	2 1/4	5	–	–	4
5576574	4V1519007SW	3/4	3/4	2 1/4	5	–	–	4
5576573	4V1519007NW	3/4	3/4	2 1/4	5	–	.020	4
5576651	4V6519007BW	3/4	3/4	3	6	.030	–	4
5576626	4V6519007NW	3/4	3/4	3	6	–	.020	4
6522629	4V6519007ST	3/4	3/4	3	6	–	–	4
5576627	4V6519007SW	3/4	3/4	3	6	–	–	4
6522637	4V0525008BT	1	1	1 1/2	4	.030	–	4
5576558	4V0525008BW	1	1	1 1/2	4	.030	–	4
5576560	4V0525008CW	1	1	1 1/2	4	.060	–	4
6522652	4V0525008CT	1	1	1 1/2	4	.060	–	4
5576561	4V0525008DW	1	1	1 1/2	4	.090	–	4
6522657	4V0525008ET	1	1	1 1/2	4	.120	–	4
5576563	4V0525008FW	1	1	1 1/2	4	.250	–	4
6522630	4V0525008ST	1	1	1 1/2	4	–	–	4
5576525	4V0525008SW	1	1	1 1/2	4	–	–	4
5576523	4V0525008NW	1	1	1 1/2	4	–	.020	4
5576632	4V6525018NW	1	1	2	5	–	.020	4
5576633	4V6525018SW	1	1	2	5	–	–	4
5576588	4V1525008BW	1	1	2 1/4	5	.030	–	4
5576589	4V1525008CW	1	1	2 1/4	5	.060	–	4
5576527	4V0532009SW	1 1/4	1 1/4	2 1/4	5	–	–	4
5576526	4V0532009NW	1 1/4	1 1/4	2 1/4	5	–	.020	4
5576576	4V1525008SW	1	1	2 1/4	5	–	–	4
5576575	4V1525008NW	1	1	2 1/4	5	–	.020	4
6522631	4V2525008ST	1	1	3	6	–	–	4
5576653	4V6525028BW	1	1	4	7	.030	–	4
5576654	4V6525028CW	1	1	4	7	.060	–	4
5576634	4V6525028NW	1	1	4	7	–	.020	4
5576635	4V6525028SW	1	1	4	7	–	–	4

VariMill I • Series 4V0T • Square End • 4 Flute • Inch









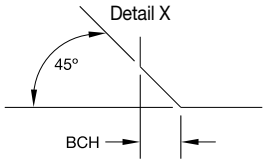
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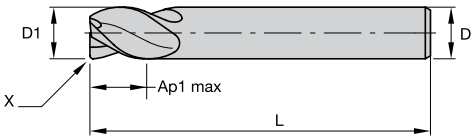
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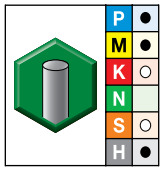
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2831994	TM4V0T13015S	1/2	1/2	1 1/4	3	–	4
2832003	TM4V0T13015	1/2	1/2	1 1/4	3	.020	4
2831974	TM4V0T19007	3/4	3/4	1 1/2	4	.020	4

VariMill I • Series 4VP5 • Square End • Extended Reach • 4 Flute • Inch









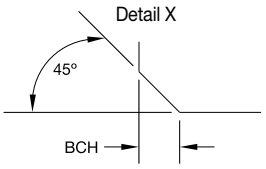
TiAlN-LT

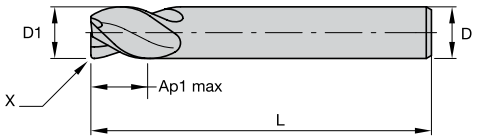
● first choice
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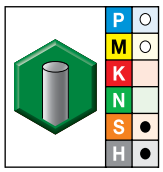
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
2837046	TF4VP507012S	1/4	1/4	3/8	4	–	4
2837055	TF4VP507012	1/4	1/4	3/8	4	.016	4
2837032	TF4VP510014S	3/8	3/8	1/2	4	–	4
2837038	TF4VP510014	3/8	3/8	1/2	4	.020	4
2837017	TF4VP513005S	1/2	1/2	5/8	5	–	4
2837025	TF4VP513005	1/2	1/2	5/8	5	.020	4
2837002	TF4VP513015S	1/2	1/2	5/8	6	–	4
2837007	TF4VP513015	1/2	1/2	5/8	6	.020	4
2836992	TF4VP516006	5/8	5/8	3/4	5	.020	4
2836977	TF4VP516016	5/8	5/8	3/4	6	.020	4
2836956	TF4VP516026	5/8	5/8	3/4	7	.020	4
2836936	TF4VP519007S	3/4	3/4	1	5	–	4
2836946	TF4VP519007	3/4	3/4	1	5	.020	4
2836921	TF4VP519017S	3/4	3/4	1	6	–	4
2836930	TF4VP519017	3/4	3/4	1	6	.020	4
2836907	TF4VP519027S	3/4	3/4	1	7	–	4
2836916	TF4VP519027	3/4	3/4	1	7	.020	4
2836887	TF4VP525018	1	1	1 1/8	6	.020	4
2836863	TF4VP525028S	1	1	1 1/8	7	–	4
2836872	TF4VP525028	1	1	1 1/8	7	.020	4

VariMill I • Series 4VPT • Square End • Extended Reach • 4 Flute • Inch









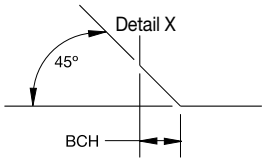
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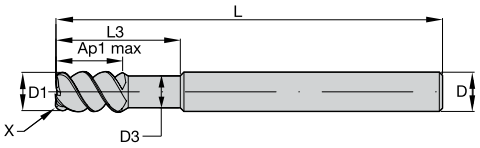
● first choice
○ alternate choice

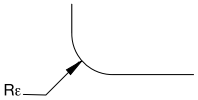
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2831913	TM4VPT13005S	1/2	1/2	5/8	5	–	4
2831918	TM4VPT13005	1/2	1/2	5/8	5	.020	4
2831901	TM4VPT13015S	1/2	1/2	5/8	6	–	4
2831907	TM4VPT13015	1/2	1/2	5/8	6	.020	4
2831865	TM4VPT19017	3/4	3/4	1	6	.020	4
2988603	TM4VPT19027S	3/4	3/4	1	7	–	4

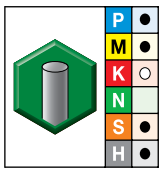
VariMill I • Series 4VN5 • Square End • Extended Reach and Neck • 4 Flute • Inch

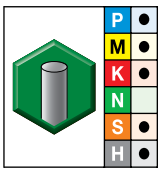










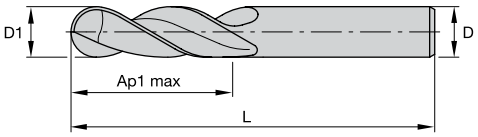


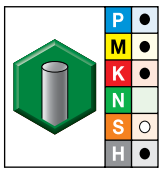
● first choice
○ alternate choice

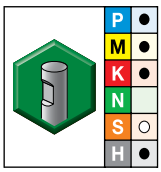
TiAlN-LT		TiAlN-LW					length of cut		length			
order #	catalog #	order #	catalog #	D1	D	D3	Ap1 max	L3	L	Rε	BCH	ZU
3738940	TF4VN507012A	–		1/4	1/4	.24	3/8	1 1/4	4	.015	–	4
3738941	TF4VN507012B	–		1/4	1/4	.24	3/8	1 1/4	4	.030	–	4
2837188	TF4VN507012	–		1/4	1/4	.24	3/8	1 1/4	4	–	.016	4
3738973	TF4VN510014B	–		3/8	3/8	.35	1/2	1 7/8	4	.030	–	4
3738974	TF4VN510014C	–		3/8	3/8	.35	1/2	1 7/8	4	.060	–	4
2837182	TF4VN510014	–		3/8	3/8	.35	1/2	1 7/8	4	–	.020	4
–		3738975	TF4VN513005B	1/2	1/2	.47	5/8	2 1/4	4	.030	–	4
6522611	TF4VN513005BT	–		1/2	1/2	.47	5/8	2 1/4	4	.030	–	4
–		3738976	TF4VN513005C	1/2	1/2	.47	5/8	2 1/4	4	.060	–	4
6522612	TF4VN513005CT	–		1/2	1/2	.47	5/8	2 1/4	4	.060	–	4
–		3738977	TF4VN513005E	1/2	1/2	.47	5/8	2 1/4	4	.120	–	4
6522613	TF4VN513005ET	–		1/2	1/2	.47	5/8	2 1/4	4	.120	–	4
–		2837178	TF4VN513005	1/2	1/2	.47	5/8	2 1/4	4	–	.020	4
–		3738979	TF4VN516006E	5/8	5/8	.59	3/4	2 1/4	4 1/8	.120	–	4
–		2837171	TF4VN516006	5/8	5/8	.59	3/4	2 1/4	4 1/8	–	.020	4
–		2837160	TF4VN516016	5/8	5/8	.59	3/4	3 1/8	5	–	.020	4
–		2837154	TF4VN519007	3/4	3/4	.71	1	2 1/4	4 1/4	–	.020	4
–		3738980	TF4VN519017B	3/4	3/4	.71	1	3 1/4	5 1/4	.030	–	4
6522614	TF4VN519017BT	–		3/4	3/4	.71	1	3 1/4	5 1/4	.030	–	4
–		3738981	TF4VN519017C	3/4	3/4	.71	1	3 1/4	5 1/4	.060	–	4
6522615	TF4VN519017CT	–		3/4	3/4	.71	1	3 1/4	5 1/4	.060	–	4
–		3738982	TF4VN519017E	3/4	3/4	.71	1	3 1/4	5 1/4	.120	–	4
6522616	TF4VN519017ET	–		3/4	3/4	.71	1	3 1/4	5 1/4	.120	–	4
–		2837146	TF4VN519017	3/4	3/4	.71	1	3 1/4	5 1/4	–	.020	4
–		2837125	TF4VN525008	1	1	.94	1 1/8	2 1/4	4 1/2	–	.020	4
–		3738993	TF4VN525018B	1	1	.94	1 1/8	3 1/4	5 1/2	.030	–	4
6522617	TF4VN525018BT	–		1	1	.94	1 1/8	3 1/4	5 1/2	.030	–	4
6522618	TF4VN525018CT	–		1	1	.94	1 1/8	3 1/4	5 1/2	.060	–	4
–		3738995	TF4VN525018E	1	1	.94	1 1/8	3 1/4	5 1/2	.120	–	4
6522619	TF4VN525018ET	–		1	1	.94	1 1/8	3 1/4	5 1/2	.120	–	4
–		2837117	TF4VN525018	1	1	.94	1 1/8	3 1/4	5 1/2	–	.020	4
6522620	TF4VN525028BT	–		1	1	.94	1 1/8	4 1/4	6 1/2	.030	–	4
–		2837110	TF4VN525028	1	1	.94	1 1/8	4 1/4	6 1/2	–	.020	4

VariMill I • Series 4V00 • Ball Nose • 4 Flute • Inch







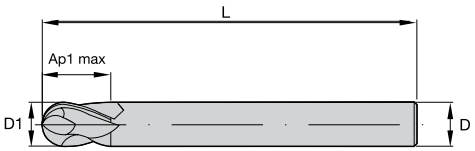


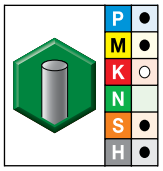
● first choice
○ alternate choice

WP15PE order #	WP15PE catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
5576655	4V0003001XT		–	1/8	1/8	1/2	2	4
5576656	4V0005000XT		–	3/16	3/16	5/8	2 1/4	4
5576658	4V0007002XT		–	1/4	1/4	3/4	2 1/2	4
5576659	4V0008003XT		–	5/16	5/16	3/4	2 1/2	4
5576660	4V0010004XT		–	3/8	3/8	7/8	2 1/2	4
5576661	4V001101AXT		–	7/16	7/16	7/8	2 1/2	4
–		5576662	4V0013005XW	1/2	1/2	1	3	4
–		5576663	4V0013015XW	1/2	1/2	1 1/4	3	4
–		5576664	4V0016006XW	5/8	5/8	1 1/4	3 1/2	4
–		5576665	4V0019007XW	3/4	3/4	1 1/2	4	4
–		5576666	4V0025008XW	1	1	1 1/2	4	4
–		5576667	4V0032009XW	1 1/4	1 1/4	2 1/4	5	4

VariMill I • Series 4VP0 • Ball Nose • Extended Reach • 4 Flute • Inch





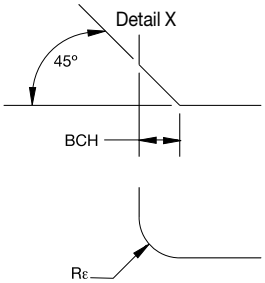


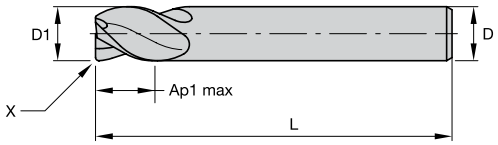
● first choice
○ alternate choice

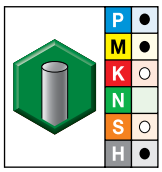
TiAlN-LT order #	TiAlN-LT catalog #	D1	D	length of cut Ap1 max	length L	ZU
2837105	TF4VP007012	1/4	1/4	3/8	4	4
3018276	TF4VP010014	3/8	3/8	1/2	4	4
2837088	TF4VP013005	1/2	1/2	5/8	5	4
2837081	TF4VP016016	5/8	5/8	3/4	6	4
2837073	TF4VP019017	3/4	3/4	1	6	4
2837061	TF4VP025018	1	1	1 1/8	6	4

VariMill I • Series 4777 • Square End • 4 Flute • Metric









WP15PE

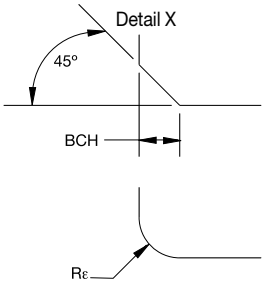
● first choice
○ alternate choice

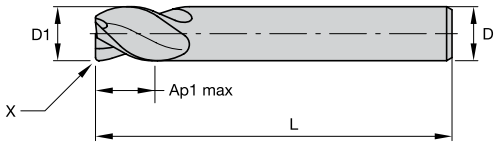
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH	ZU
5576753	477704001T	4,0	6	12,00	55	0,20	–	4
5576751	477704002T	4,0	6	12,00	55	–	0,40	4
5576754	4777040Z2T	4,0	6	12,00	55	–	–	4
5576755	477705002T	5,0	6	13,00	57	–	0,40	4
5576757	477705012T	5,0	6	13,00	57	0,20	–	4
5576758	4777050Z2T	5,0	6	13,00	57	–	–	4
5576759	477706002T	6,0	6	13,00	57	–	0,40	4
5576760	477706002W	6,0	6	13,00	57	–	0,40	4
5576761	477706012T	6,0	6	13,00	57	0,20	–	4
6471861	4777060R2TE	6,0	6	13,00	57	0,50	–	4
6471862	4777060R2TJ	6,0	6	13,00	57	1,00	–	4
5576762	4777060Z2T	6,0	6	13,00	57	–	–	4
5576763	477707003T	7,0	8	16,00	63	–	0,40	4
5576765	477707013T	7,0	8	16,00	63	0,20	–	4
5576766	4777070Z3T	7,0	8	16,00	63	–	–	4
5576767	477708003T	8,0	8	16,00	63	–	0,40	4
5576768	477708003W	8,0	8	16,00	63	–	0,40	4
5576769	477708013T	8,0	8	16,00	63	0,20	–	4
6471863	4777080R3TE	8,0	8	16,00	63	0,50	–	4
6471864	4777080R3TJ	8,0	8	16,00	63	1,00	–	4
6471865	4777080R3TK	8,0	8	16,00	63	1,50	–	4
6471866	4777080R3TM	8,0	8	16,00	63	2,00	–	4
5576770	4777080Z3T	8,0	8	16,00	63	–	–	4
5576771	477709004T	9,0	10	19,00	72	–	0,50	4
5576773	477709014T	9,0	10	19,00	72	0,20	–	4
5576774	4777090Z4T	9,0	10	19,00	72	–	–	4
5576775	477710004T	10,0	10	22,00	72	–	0,50	4
5576776	477710004W	10,0	10	22,00	72	–	0,50	4
5576777	477710024T	10,0	10	22,00	72	0,30	–	4
6471867	4777100R4TE	10,0	10	22,00	72	0,50	–	4
6471868	4777100R4TJ	10,0	10	22,00	72	1,00	–	4
6471869	4777100R4TK	10,0	10	22,00	72	1,50	–	4
6471870	4777100R4TM	10,0	10	22,00	72	2,00	–	4
6471871	4777100R4TN	10,0	10	22,00	72	2,50	–	4
5576778	4777100Z4T	10,0	10	22,00	72	–	–	4
5576779	4777110Z5T	11,0	12	26,00	83	–	–	4
5576790	477712005T	12,0	12	26,00	83	–	0,50	4
5576791	477712005W	12,0	12	26,00	83	–	0,50	4
5576792	477712025T	12,0	12	26,00	83	0,30	–	4
6471872	4777120R5TE	12,0	12	26,00	83	0,50	–	4
6471873	4777120R5TJ	12,0	12	26,00	83	1,00	–	4
6471874	4777120R5TK	12,0	12	26,00	83	1,50	–	4
6471875	4777120R5TM	12,0	12	26,00	83	2,00	–	4
6471876	4777120R5TN	12,0	12	26,00	83	2,50	–	4
6471877	4777120R5TP	12,0	12	26,00	83	3,00	–	4
5576793	4777120Z5T	12,0	12	26,00	83	–	–	4
5576795	477714014W	14,0	14	26,00	83	–	0,50	4
5576794	477714015T	14,0	14	26,00	83	–	0,50	4
5576796	477716006T	16,0	16	32,00	92	–	0,50	4
5576797	477716006W	16,0	16	32,00	92	–	0,50	4
5576798	477716026T	16,0	16	32,00	92	0,30	–	4
6471878	4777160R6TJ	16,0	16	32,00	92	1,00	–	4

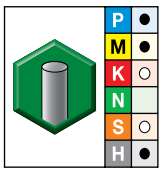
VariMill I • Series 4777 • Square End • 4 Flute • Metric

(continued)









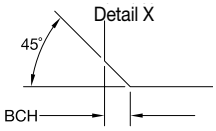
● first choice
○ alternate choice

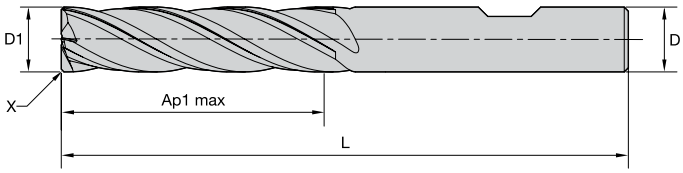
WP15PE

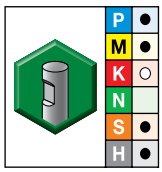
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH	ZU
6471879	4777160R6TM	16,0	16	32,00	92	2,00	–	4
6471880	4777160R6TP	16,0	16	32,00	92	3,00	–	4
6471891	4777160R6TQ	16,0	16	32,00	92	4,00	–	4
5576799	4777160Z6T	16,0	16	32,00	92	–	–	4
5576810	477718018T	18,0	18	32,00	92	–	0,50	4
5576812	477720007T	20,0	20	38,00	104	–	0,50	4
5576813	477720007W	20,0	20	38,00	104	–	0,50	4
5576814	47772002T	20,0	20	38,00	104	0,30	–	4
6471892	4777200R7TP	20,0	20	38,00	104	3,00	–	4
5576816	477725008T	25,0	25	45,00	121	–	0,50	4
5576817	477725008W	25,0	25	45,00	121	–	0,50	4
6471893	4777250R8TR	25,0	25	45,00	121	5,00	–	4

VariMill I • Series 4717 • Square End • Long Length • 4 Flute • Metric









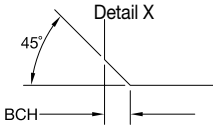
● first choice
○ alternate choice

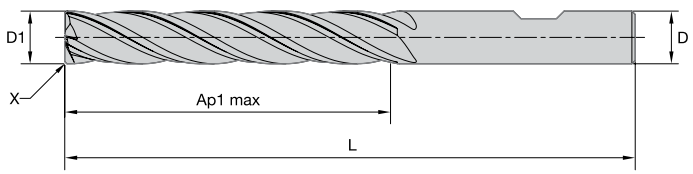
TiAlN-LW

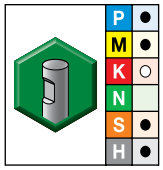
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
3641112	471706002LW	6,0	6	32,00	76	0,40	4
3641113	471708003LW	8,0	8	32,00	87	0,40	4
3641114	471710004LW	10,0	10	38,00	89	0,50	4
3641115	471712005LW	12,0	12	51,00	100	0,50	4
3641116	471716006LW	16,0	16	57,00	125	0,50	4
3641117	471720007LW	20,0	20	57,00	125	0,50	4

VariMill I • Series 4727 • Square End • Extended Length • 4 Flute • Metric









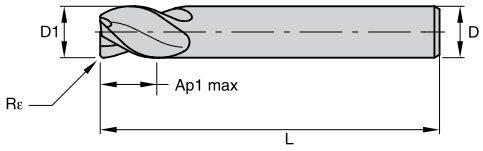
● first choice
○ alternate choice

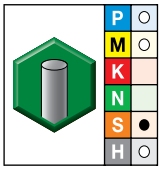
TiAlN-LW

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
3641118	472712005LW	12,0	12	76,00	125	0,50	4
3641119	472716006LW	16,0	16	76,00	150	0,50	4
3641120	472720007LW	20,0	20	102,00	175	0,50	4

VariMill I • Series 4778 • Square End • 4 Flute • Metric







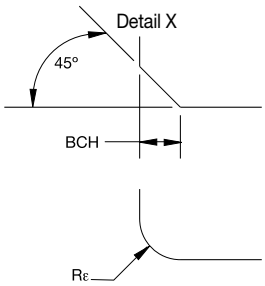
WS15PE

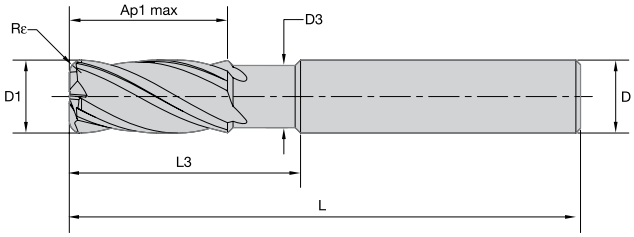
● first choice
○ alternate choice

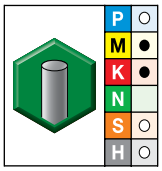
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
2545563	477804002MT	4,0	6	12,00	55	0,20	4
2545564	477805002MT	5,0	6	13,00	57	0,20	4
2545565	477806002MT	6,0	6	13,00	57	0,20	4
2545570	477807003MT	7,0	8	16,00	63	0,20	4
2545603	477808003MT	8,0	8	16,00	63	0,20	4
2601245	477810004MT	10,0	10	22,00	72	0,30	4
2601246	477812005MT	12,0	12	26,00	83	0,30	4
2601248	477814014MT	14,0	14	26,00	83	0,30	4
2601249	477816006MT	16,0	16	32,00	92	0,30	4
2601251	477820007MT	20,0	20	38,00	104	0,30	4

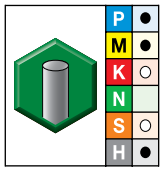
VariMill I • Series 47N7 • Square End • Neck • 4 Flute • Metric









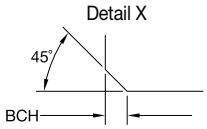


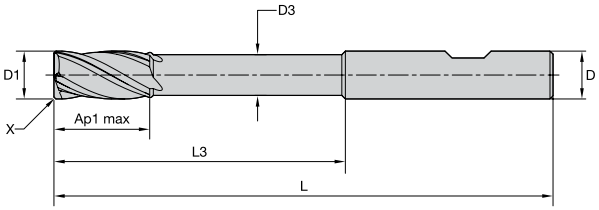
● first choice
○ alternate choice

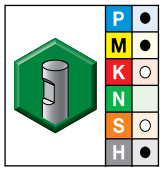
WP15PE		TiAlN-LT										
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	BCH	ZU
	–	3462450	47N704002LT	4,0	6	3,60	12,00	16,00	55	0,40	–	4
	–	3462451	47N704012LT	4,0	6	3,60	12,00	16,00	55	0,50	–	4
	–	3462453	47N704022LT	4,0	6	3,60	12,00	16,00	55	1,00	–	4
	–	3462454	47N705002LT	5,0	6	4,60	13,00	18,00	57	0,50	–	4
	–	3462455	47N705012LT	5,0	6	4,60	13,00	18,00	57	1,00	–	4
	–	3462457	47N706002LT	6,0	6	5,50	13,00	21,00	57	0,50	–	4
	–	3462459	47N706012LT	6,0	6	5,50	13,00	21,00	57	1,00	–	4
6522659	47N7060R2TK	3462461	47N706022LT	6,0	6	5,50	13,00	21,00	57	1,50	–	4
6522658	47N7060C2W		–	6,0	6	5,50	13,00	21,00	57	–	0,40	4
	–	3462462	47N708003LT	8,0	8	7,50	16,00	27,00	63	0,50	–	4
	–	3462464	47N708013LT	8,0	8	7,50	16,00	27,00	63	1,00	–	4
6522681	47N7080R3TK	3462466	47N708023LT	8,0	8	7,50	16,00	27,00	63	1,50	–	4
	–	3462467	47N708033LT	8,0	8	7,50	16,00	27,00	63	2,00	–	4
6522660	47N7080C3W		–	8,0	8	7,50	16,00	27,00	63	–	0,40	4
	–	3462468	47N710004LT	10,0	10	9,50	22,00	32,00	72	0,50	–	4
	–	3462470	47N710014LT	10,0	10	9,50	22,00	32,00	72	1,00	–	4
6522683	47N7100R4TK	3462472	47N710024LT	10,0	10	9,50	22,00	32,00	72	1,50	–	4
	–	3462473	47N710034LT	10,0	10	9,50	22,00	32,00	72	2,00	–	4
6522682	47N7100C4W		–	10,0	10	9,50	22,00	32,00	72	–	0,50	4
	–	3462475	47N712005LT	12,0	12	11,50	26,00	38,00	83	0,50	–	4
	–	3462477	47N712015LT	12,0	12	11,50	26,00	38,00	83	1,00	–	4
6522685	47N7120R5TK	3462479	47N712025LT	12,0	12	11,50	26,00	38,00	83	1,50	–	4
	–	3462480	47N712035LT	12,0	12	11,50	26,00	38,00	83	2,00	–	4
	–	3462482	47N712045LT	12,0	12	11,50	26,00	38,00	83	4,00	–	4
6522684	47N7120C5W		–	12,0	12	11,50	26,00	38,00	83	–	0,50	4
6522686	47N7120R5TP		–	12,0	12	11,50	26,00	38,00	83	3,00	–	4
	–	3462484	47N716006LT	16,0	16	15,00	32,00	44,00	92	1,00	–	4
	–	3462486	47N716016LT	16,0	16	15,00	32,00	44,00	92	2,00	–	4
	–	3462488	47N716026LT	16,0	16	15,00	32,00	44,00	92	4,00	–	4
6522687	47N7160C6W		–	16,0	16	15,00	32,00	44,00	92	–	0,50	4
6522688	47N7160R6TE		–	16,0	16	15,00	32,00	44,00	92	0,50	–	4
6522689	47N7160R6TP		–	16,0	16	15,00	32,00	44,00	92	3,00	–	4
3462491	47N720007MT	3462490	47N720007LT	20,0	20	19,00	38,00	55,00	104	1,00	–	4
	–	3462492	47N720017LT	20,0	20	19,00	38,00	55,00	104	2,00	–	4
6522690	47N7200C7W		–	20,0	20	19,00	38,00	55,00	104	–	0,50	4
6522701	47N7200R7TE		–	20,0	20	19,00	38,00	55,00	104	0,50	–	4
6522702	47N7200R7TP		–	20,0	20	19,00	38,00	55,00	104	3,00	–	4
6522703	47N7200R7TR		–	20,0	20	19,00	38,00	55,00	104	5,00	–	4

VariMill I • Series 47N6 • Square End • Long Neck • 4 Flute • Metric









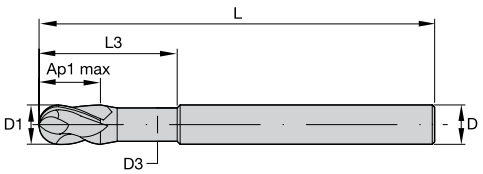
● first choice
○ alternate choice

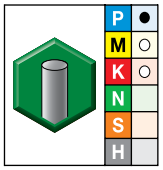
TiAlN-LW

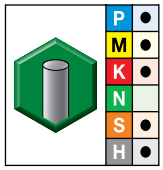
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	BCH	ZU
4067705	47N606002LW	6,0	6	5,50	12,00	42,00	100	0,40	4
4067706	47N608003LW	8,0	8	7,30	16,00	62,00	100	0,40	4
4067707	47N610004LW	10,0	10	9,10	20,00	60,00	100	0,50	4
4067708	47N612005LW	12,0	12	11,00	24,00	73,00	125	0,50	4
4067709	47N616006LW	16,0	16	14,56	32,00	100,00	150	0,50	4
4067710	47N620007LW	20,0	20	18,20	40,00	98,00	175	0,50	4

VariMill I • Series 47N0 • Ball Nose • Neck • 4 Flute • Metric









● first choice
○ alternate choice

WP15PE | **TiAlN-LT**

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	ZU
5576818	47N005002T	2605589	47N005002LT	5,0	6	4,70	9,00	15,00	57	4
5576819	47N006002T	2605590	47N006002LT	6,0	6	5,64	10,00	15,00	57	4
5576820	47N008003T	2605591	47N008003LT	8,0	8	7,52	12,00	20,00	63	4
5576821	47N010004T	2605592	47N010004LT	10,0	10	9,40	14,00	25,00	72	4
5576822	47N012005T	2605593	47N012005LT	12,0	12	11,28	16,00	30,00	83	4
5576823	47N016006T		–	16,0	16	15,04	22,00	38,00	92	4
5576824	47N020007T		–	20,0	20	18,80	26,00	50,00	104	4

VariMill I • Series 4V05 4V15 4V45 4V65 • Application Data • WP15PE • Inch





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac. / dec.	D1 — Diameter 1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	7/16 .4375	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000	1 1/4 1.2500
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039	.0040
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0029
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0029
K	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	.0026
	3	1.5 x D	0.5 x D	1 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	.0026
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033	.0036
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039	.0040
	2	1.5 D	0.2 x D	0.5 x D	230	–	390	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill I • Series 4V0T • Application Data • WS15PE • Inch





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac. / dec.	D1 — Diameter 1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000	1-1/4 1.2500
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0034	.0039	.0044	.0049	.0049
	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0034	.0039	.0044	.0049	.0049
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0034	.0039	.0044	.0049	.0049
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0029	.0034	.0039	.0045	.0048
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0026	.0030	.0034	.0039	.0040
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0023	.0027	.0031	.0036	.0039
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0019	.0022	.0025	.0028	.0029
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0023	.0027	.0031	.0036	.0039
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0019	.0022	.0025	.0028	.0029
K	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	.0034	.0039	.0044	.0049	.0049
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0029	.0034	.0039	.0045	.0048
	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	.0023	.0027	.0031	.0036	.0039
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0015	.0018	.0021	.0024	.0026
	3	1.5 x D	0.5 x D	1 x D	80	–	130	IPT	.0015	.0018	.0021	.0024	.0026
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0021	.0025	.0028	.0033	.0036
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0026	.0030	.0034	.0039	.0040
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	.0019	.0022	.0025	.0028	.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill I • Series 4VP5 • Application Data • TiAlN-LT • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/4	3/8	1/2	5/8	3/4	1
								dec.	.2500	.3750	.5000	.6250	.7500	1.000
P	0	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	1	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	2	0.75 x D	0.5 x D	0.75 x D	460	–	620	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	3	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	4	0.75 x D	0.5 x D	0.5 x D	300	–	490	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	6	0.75 x D	0.5 x D	0.5 x D	160	–	250	IPT	.0010	.0015	.0019	.0022	.0025	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	230	IPT	.0010	.0015	.0019	.0022	.0025	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	490	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	3	0.75 x D	0.5 x D	0.75 x D	360	–	430	IPT	.0012	.0018	.0023	.0027	.0031	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	3	0.75 x D	0.5 x D	0.75 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	4	0.75 x D	0.5 x D	0.75 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	460	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	2	0.75 x D	0.2 x D	0.75 x D	230	–	390	IPT	.0010	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".
Side milling aplications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling aplications — for longest reach (L3) tools, reduce ae by 30%.

VariMill I • Series 4VPT • Application Data • WS15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/2	5/8	3/4	1
								dec.	.5000	.6250	.7500	1.000
P	1	0.75 x D	0.5 x D	0.75 x D	500	–	650	IPT	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	–	625	IPT	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	–	525	IPT	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	475	IPT	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	325	IPT	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	–	225	IPT	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0029	.0034	.0039	.0045
	2	0.75 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0015	.0018	.0021	.0024
	3	0.75 x D	0.5 x D	0.75 x D	80	–	130	IPT	.0015	.0018	.0021	.0024
	4	0.75 x D	0.5 x D	0.75 x D	160	–	200	IPT	.0021	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	450	IPT	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill I • Series 4VN5 • Application Data • TiAlN-LT • TiAlN-LW • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN-LW Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/4	3/8	1/2	5/8	3/4	1
								dec.	.2500	.3750	.5000	.6250	.7500	1.000
P	1	0.75 x D	0.5 x D	0.75 x D	500	–	650	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	–	625	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	–	525	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	475	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	325	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	–	225	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	3	0.75 x D	0.5 x D	0.75 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	4	0.75 x D	0.5 x D	0.75 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	450	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill I • Series 4V00 • Application Data • WP15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4
								dec.	.1250	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500	1.0000	1.2500
P	0	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	1	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	2	1.25 x D	0.5 x D	1 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	3	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	4	1.25 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039	.0040
	5	1.25 x D	0.5 x D	1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
	6	1.25 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0029
M	1	1.25 x D	0.5 x D	1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	2	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
	3	1.25 x D	0.5 x D	1 x D	200	–	230	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0029
K	1	1.25 x D	0.5 x D	1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	2	1.25 x D	0.5 x D	1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	3	1.25 x D	0.5 x D	1 x D	360	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
S	1	1 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	2	1 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	.0026
	3	1.25 x D	0.5 x D	1 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	.0026
	4	1.25 x D	0.5 x D	1 x D	160	–	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033	.0036
H	1	1.25 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039	.0040
	2	1.25 x D	0.2 x D	0.5 x D	230	–	390	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill I • Series 4VP0 • Application Data • TiAlN-LT • Inch





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac. dec.	D1 — Diameter 1/4 .2500	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.000
P	0	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	1	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	2	0.75 x D	0.5 x D	0.75 x D	460	–	620	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	3	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	4	0.75 x D	0.5 x D	0.5 x D	300	–	490	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	6	0.75 x D	0.5 x D	0.5 x D	160	–	250	IPT	.0010	.0015	.0019	.0022	.0025	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	230	IPT	.0010	.0015	.0019	.0022	.0025	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	490	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	3	0.75 x D	0.5 x D	0.75 x D	360	–	430	IPT	.0012	.0018	.0023	.0027	.0031	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	3	0.75 x D	0.5 x D	0.75 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	4	0.75 x D	0.5 x D	0.75 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	460	IPT	.0014	.0020	.0026	.0030	.0034	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".
Side milling aplications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling aplications — for longest reach (L3) tools, reduce ae by 30%.

VariMill I • Series 4777 • Application Data • WP15PE • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. mm	D1 — Diameter 4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	–	140	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill I • Series 4717 • Application Data • TiAlN-LW • Metric





Material Group		Side Milling (A)										Recommended feed per tooth (fz = mm/th) for side milling (A).						
		Finishing					Roughing											
		A		TiAlN Cutting Speed – vc m/min			A		TiAlN Cutting Speed – vc m/min				D1 – Diameter					
		ap	ae	min		max	ap	ae	min		max	mm	6,0	8,0	10,0	12,0	16,0	20,0
P	1	Ap1 max	0,05 x D*	300	–	400	Ap1 max	0,2 x D	150	–	200	fz	0,044	0,060	0,072	0,083	0,092	0,114
	2	Ap1 max	0,05 x D*	280	–	380	Ap1 max	0,2 x D	140	–	190	fz	0,044	0,060	0,072	0,083	0,092	0,114
	3	Ap1 max	0,05 x D*	240	–	320	Ap1 max	0,2 x D	120	–	160	fz	0,036	0,050	0,061	0,070	0,079	0,101
	4	Ap1 max	0,05 x D*	180	–	300	Ap1 max	0,2 x D	90	–	150	fz	0,033	0,045	0,054	0,062	0,070	0,088
	5	Ap1 max	0,05 x D*	120	–	200	Ap1 max	0,2 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,063	0,081
	6	Ap1 max	0,05 x D*	100	–	150	Ap1 max	0,2 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,052	0,065
M	1	Ap1 max	0,05 x D*	180	–	230	Ap1 max	0,2 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,079	0,101
	2	Ap1 max	0,05 x D*	120	–	160	Ap1 max	0,2 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,063	0,081
	3	Ap1 max	0,05 x D*	120	–	140	Ap1 max	0,2 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,052	0,065
K	1	Ap1 max	0,05 x D*	240	–	300	Ap1 max	0,2 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,092	0,114
	2	Ap1 max	0,05 x D*	220	–	260	Ap1 max	0,2 x D	110	–	130	fz	0,036	0,050	0,061	0,070	0,079	0,101
	3	Ap1 max	0,05 x D*	200	–	260	Ap1 max	0,2 x D	100	–	130	fz	0,029	0,040	0,048	0,056	0,063	0,081
S	1	Ap1 max	0,05 x D*	50	–	90	Ap1 max	0,2 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,087	0,101
	2	Ap1 max	0,05 x D*	25	–	40	Ap1 max	0,2 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054
	3	Ap1 max	0,05 x D*	25	–	40	Ap1 max	0,2 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054
	4	Ap1 max	0,05 x D*	50	–	60	Ap1 max	0,2 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,064	0,074
H	1	Ap1 max	0,05 x D*	160	–	280	Ap1 max	0,2 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,070	0,088

*For cutting data above, use ae ≤ 0,8mm.

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.
For finishing, increase feed per tooth by 20%.

VariMill I • Series 4727 • Application Data • TiAlN-LW • Metric





Material Group		Side Milling (A)										Recommended feed per tooth (fz = mm/th) for side milling (A).			
		Finishing					Roughing								
		A		TiAlN Cutting Speed – vc m/min			A		TiAlN Cutting Speed – vc m/min				D1 – Diameter		
		ap	ae	min		max	ap	ae	min		max	mm	12,0	16,0	20,0
P	1	Ap1 max	0,05 x D*	300	–	400	Ap1 max	0,2 x D	150	–	200	fz	0,083	0,101	0,114
	2	Ap1 max	0,05 x D*	280	–	380	Ap1 max	0,2 x D	140	–	190	fz	0,083	0,101	0,114
	3	Ap1 max	0,05 x D*	240	–	320	Ap1 max	0,2 x D	120	–	160	fz	0,070	0,087	0,101
	4	Ap1 max	0,05 x D*	180	–	300	Ap1 max	0,2 x D	90	–	150	fz	0,062	0,077	0,088
	5	Ap1 max	0,05 x D*	120	–	200	Ap1 max	0,2 x D	60	–	100	fz	0,056	0,070	0,081
	6	Ap1 max	0,05 x D*	100	–	150	Ap1 max	0,2 x D	50	–	75	fz	0,047	0,057	0,065
M	1	Ap1 max	0,05 x D*	180	–	230	Ap1 max	0,2 x D	90	–	115	fz	0,070	0,087	0,101
	2	Ap1 max	0,05 x D*	120	–	160	Ap1 max	0,2 x D	60	–	80	fz	0,056	0,070	0,081
	3	Ap1 max	0,05 x D*	120	–	140	Ap1 max	0,2 x D	60	–	70	fz	0,047	0,057	0,065
K	1	Ap1 max	0,05 x D*	240	–	300	Ap1 max	0,2 x D	120	–	150	fz	0,083	0,101	0,114
	2	Ap1 max	0,05 x D*	220	–	260	Ap1 max	0,2 x D	110	–	130	fz	0,070	0,087	0,101
	3	Ap1 max	0,05 x D*	200	–	260	Ap1 max	0,2 x D	100	–	130	fz	0,056	0,070	0,081
S	1	Ap1 max	0,05 x D*	50	–	90	Ap1 max	0,2 x D	50	–	90	fz	0,070	0,087	0,101
	2	Ap1 max	0,05 x D*	25	–	40	Ap1 max	0,2 x D	25	–	40	fz	0,037	0,046	0,054
	3	Ap1 max	0,05 x D*	25	–	40	Ap1 max	0,2 x D	25	–	40	fz	0,037	0,046	0,054
	4	Ap1 max	0,05 x D*	50	–	60	Ap1 max	0,2 x D	50	–	60	fz	0,052	0,064	0,074
H	1	Ap1 max	0,05 x D*	160	–	280	Ap1 max	0,2 x D	80	–	140	fz	0,062	0,077	0,088

*For cutting data above, use ae ≤ 0,8mm.

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.
For finishing, increase feed per tooth by 20%.

VariMill I • Series 4778 • Application Data • WS15PE • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — vc m/min min	–	max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter 4,0	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill I • Series 47N7 • Application Data • WP15PE • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc m/min min	–	max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter 4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,064	0,074
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill I • Series 47N7 • Application Data • TiAlN • Metric







Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.							
		A		B	Cutting Speed – vc m/min				D1 – Diameter						
		ap	ae	ap	min		max	mm	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,064	0,074
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill I • Series 47N6 • Application Data • TiAlN-LW • Metric







Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.						
		A		B	Cutting Speed – vc m/min				D1 – Diameter					
		ap	ae	ap	min		max	mm	6,0	8,0	10,0	12,0	16,0	20,0
P	0	1,5 x D	0,2 x D	0,5 x D	150	–	200	fz	0,044	0,060	0,072	0,083	0,101	0,114
	1	1,5 x D	0,2 x D	0,5 x D	150	–	200	fz	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,2 x D	0,5 x D	140	–	190	fz	0,044	0,060	0,072	0,083	0,101	0,114
	3	1,5 x D	0,2 x D	0,5 x D	120	–	160	fz	0,036	0,050	0,061	0,070	0,087	0,101
	4	1,5 x D	0,2 x D	0,5 x D	90	–	150	fz	0,033	0,045	0,054	0,062	0,077	0,088
	5	1,5 x D	0,2 x D	0,5 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,070	0,081
	6	1,5 x D	0,2 x D	0,5 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,057	0,065
M	1	1,5 x D	0,2 x D	0,5 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,2 x D	0,5 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081
	3	1,5 x D	0,2 x D	0,5 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,057	0,065
K	1	1,5 x D	0,2 x D	0,5 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,2 x D	0,5 x D	110	–	130	fz	0,036	0,050	0,061	0,070	0,087	0,101
	3	1,5 x D	0,2 x D	0,5 x D	110	–	130	fz	0,029	0,040	0,048	0,056	0,070	0,081
S	1	1,5 x D	0,2 x D	0,5 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,1 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054
	3	1,5 x D	0,2 x D	0,5 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054
	4	1,5 x D	0,2 x D	0,5 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,064	0,074
H	1	1,5 x D	0,1 x D	0,3 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,077	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill I™ • Series 47N0 • Application Data • WP15PE/TiAlN-LT • Metric







Material Group		Side Milling (A) and Slotting (B)			WP15PE/TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.									
		A		B	Cutting Speed — vc m/min				D1 — Diameter								
		ap	ae	ap	min		max	mm	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	1,25 x D	0,5 x D	1 x D	150	–	200	fz	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	1,25 x D	0,5 x D	1 x D	150	–	200	fz	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	1,25 x D	0,5 x D	1 x D	140	–	190	fz	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	1,25 x D	0,5 x D	1 x D	120	–	160	fz	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	1,25 x D	0,5 x D	0,75 x D	90	–	150	fz	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
	5	1,25 x D	0,5 x D	1 x D	60	–	100	fz	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	6	1,25 x D	0,5 x D	0,75 x D	50	–	75	fz	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
M	1	1,25 x D	0,5 x D	1 x D	90	–	115	fz	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	1,25 x D	0,5 x D	1 x D	60	–	80	fz	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	3	1,25 x D	0,5 x D	1 x D	60	–	70	fz	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
K	1	1,25 x D	0,5 x D	1 x D	120	–	150	fz	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	1,25 x D	0,5 x D	1 x D	110	–	140	fz	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	3	1,25 x D	0,5 x D	1 x D	110	–	130	fz	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
S	1	1 x D	0,3 x D	0,3 x D	50	–	90	fz	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	1 x D	0,3 x D	0,3 x D	25	–	40	fz	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	3	1,25 x D	0,5 x D	1 x D	25	–	40	fz	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	4	1,25 x D	0,5 x D	1 x D	50	–	60	fz	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074
H	1	1,25 x D	0,5 x D	0,75 x D	80	–	140	fz	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.



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HANITA™

VariMill II™

High-Performance Solid End Milling

The VariMill II 5-flute solid carbide end mill family is a proven leader in high-performance milling, achieving supreme surface finishes in multiple materials through various milling operations, including full slotting up to a depth of cut of 1 x D.

Features and Benefits

Unequal flute spacing to cut harmonics and reduce the development of vibrations during cutting.

Center cutting for improved ramping capabilities and plunging.

38° helix angle to provide the best combination between a roughing and a finishing tool.

Unique core design to offer maximum room for chip evacuation while keeping the tool design stable.



VariMill II carbide end mills utilize a proprietary design driven by a unique relief style and unequal flute spacing.

STABLE

Unequal flute spacing design to ensure low vibrations and high cutting stability.

PRODUCTIVE

5 flutes to increase feed-rate per revolution and exceed metal removal expectations.

VERSATILE

Maximum performance in multiple operations and the best choice to remove great volumes of chips in difficult-to-machine materials.

ADVANCED PRODUCTIVITY

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
WP15PE WS15PE	5

DIAMETER RANGE

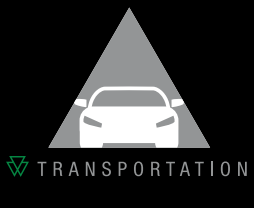
INCH	METRIC
3/16–1"	4–25mm

INDUSTRY









APPLICATIONS

MATERIALS





SIDE MILLING



RAMPING



HELICAL INTERPOLATION



SLOTTING



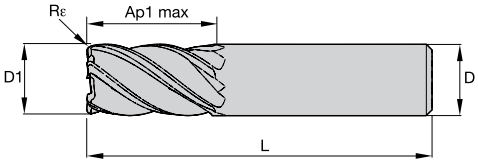
DYNAMIC MILLING

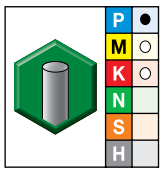


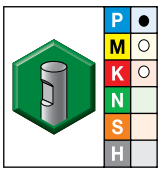
PLUNGING

VariMill II • Series 5V0C • Square End • 5 Flute • Inch









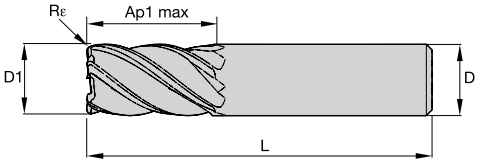
● first choice
○ alternate choice

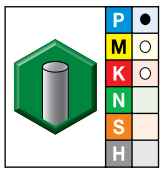
WP15PE		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
5577051	5V0C05000AT	–		3/16	3/16	5/8	2 1/4	.015	5
5577052	5V0C05000BT	–		3/16	3/16	5/8	2 1/4	.030	5
5577053	5V0C05000ST	–		3/16	3/16	5/8	2 1/4	–	5
6513583	5V1C05020AT	–		3/16	3/16	3/4	2 1/2	.015	5
6513582	5V1C05020ST	–		3/16	3/16	3/4	2 1/2	–	5
6513585	5V4C07002AT	–		1/4	1/4	3/8	2	.015	5
6513586	5V4C07002BT	–		1/4	1/4	3/8	2	.030	5
6513584	5V4C07002ST	–		1/4	1/4	3/8	2	–	5
5577054	5V0C07002AT	–		1/4	1/4	3/4	2 1/2	.015	5
5577055	5V0C07002BT	–		1/4	1/4	3/4	2 1/2	.030	5
5577056	5V0C07002CT	–		1/4	1/4	3/4	2 1/2	.060	5
5577057	5V0C07002ST	–		1/4	1/4	3/4	2 1/2	–	5
6513588	5V1C07002AT	–		1/4	1/4	1 1/8	3	.015	5
6513589	5V1C07002BT	–		1/4	1/4	1 1/8	3	.030	5
6513587	5V1C07002ST	–		1/4	1/4	1 1/8	3	–	5
5577058	5V0C08003AT	–		5/16	5/16	3/4	2 1/2	.015	5
5577059	5V0C08003BT	–		5/16	5/16	3/4	2 1/2	.030	5
5577100	5V0C08003CT	–		5/16	5/16	3/4	2 1/2	.060	5
5577101	5V0C08003ST	–		5/16	5/16	3/4	2 1/2	–	5
6513591	5V4C10004AT	–		3/8	3/8	1/2	2	.015	5
6513592	5V4C10004BT	–		3/8	3/8	1/2	2	.030	5
6513590	5V4C10004ST	–		3/8	3/8	1/2	2	–	5
5577102	5V0C10004AT	–		3/8	3/8	7/8	2 1/2	.015	5
5577103	5V0C10004BT	–		3/8	3/8	7/8	2 1/2	.030	5
5577104	5V0C10004CT	–		3/8	3/8	7/8	2 1/2	.060	5
5577105	5V0C10004ST	–		3/8	3/8	7/8	2 1/2	–	5
6513594	5V1C10014AT	–		3/8	3/8	1 1/4	3	.015	5
6513595	5V1C10014BT	–		3/8	3/8	1 1/4	3	.030	5
6513593	5V1C10014ST	–		3/8	3/8	1 1/4	3	–	5
6517095	5V4C13015BT	–		1/2	1/2	5/8	2 1/2	.030	5
6517096	5V4C13015CT	–		1/2	1/2	5/8	2 1/2	.060	5
6517094	5V4C13015ST	–		1/2	1/2	5/8	2 1/2	–	5
6517098	5V0C13005BT	–		1/2	1/2	1	3	.030	5
6517097	5V0C13005ST	–		1/2	1/2	1	3	–	5
5577106	5V0C13015AT	5577107	5V0C13015AW	1/2	1/2	1 1/4	3	.015	5
5577108	5V0C13015BT	5577109	5V0C13015BW	1/2	1/2	1 1/4	3	.030	5
5577110	5V0C13015CT	5577111	5V0C13015CW	1/2	1/2	1 1/4	3	.060	5
5577112	5V0C13015DT	5577113	5V0C13015DW	1/2	1/2	1 1/4	3	.090	5
5577114	5V0C13015ET	5577115	5V0C13015EW	1/2	1/2	1 1/4	3	.120	5
5577116	5V0C13015ST	5577117	5V0C13015SW	1/2	1/2	1 1/4	3	–	5
6517100	5V1C13015AT	–		1/2	1/2	1 5/8	4	.015	5
6517111	5V1C13015BT	–		1/2	1/2	1 5/8	4	.030	5
6517112	5V1C13015CT	–		1/2	1/2	1 5/8	4	.060	5
6517099	5V1C13015ST	–		1/2	1/2	1 5/8	4	–	5
6517114	5V1C13025BT	–		1/2	1/2	2 1/8	4	.030	5
6517115	5V1C13025CT	–		1/2	1/2	2 1/8	4	.060	5
6517116	5V1C13025ET	–		1/2	1/2	2 1/8	4	.120	5
6517113	5V1C13025ST	–		1/2	1/2	2 1/8	4	–	5
6517118	5V4C16006BT	–		5/8	5/8	3/4	3	.030	5
6517117	5V4C16006ST	–		5/8	5/8	3/4	3	–	5
5577118	5V0C16006BT	5577119	5V0C16006BW	5/8	5/8	1 1/4	3 1/2	.030	5
5577130	5V0C16006CT	5577131	5V0C16006CW	5/8	5/8	1 1/4	3 1/2	.060	5

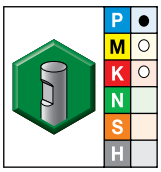
VariMill II • Series 5V0C • Square End • 5 Flute • Inch

(continued)







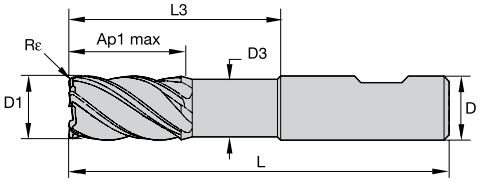


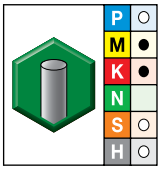
● first choice
○ alternate choice

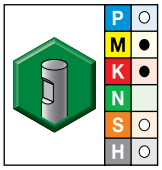
WP15PE		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
5577132	5V0C16006DT	5577133	5V0C16006DW	5/8	5/8	1 1/4	3 1/2	.090	5
5577134	5V0C16006ST	5577135	5V0C16006SW	5/8	5/8	1 1/4	3 1/2	–	5
6517120	5V1C16006BT		–	5/8	5/8	1 5/8	3 1/2	.030	5
6517121	5V1C16006CT		–	5/8	5/8	1 5/8	3 1/2	.060	5
6517122	5V1C16006ET		–	5/8	5/8	1 5/8	3 1/2	.120	5
6517119	5V1C16006ST		–	5/8	5/8	1 5/8	3 1/2	–	5
6517123	5V6C16006ST		–	5/8	5/8	2 1/8	4 1/2	–	5
6517125	5V1C16016BT		–	5/8	5/8	2 5/8	5	.030	5
6517124	5V1C16016ST		–	5/8	5/8	2 5/8	5	–	5
5577136	5V0C19007BT	5577137	5V0C19007BW	3/4	3/4	1 1/2	4	.030	5
5577138	5V0C19007CT	5577139	5V0C19007CW	3/4	3/4	1 1/2	4	.060	5
5577160	5V0C19007DT	5577161	5V0C19007DW	3/4	3/4	1 1/2	4	.090	5
5577162	5V0C19007ET	5577163	5V0C19007EW	3/4	3/4	1 1/2	4	.120	5
5577164	5V0C19007ST	5577165	5V0C19007SW	3/4	3/4	1 1/2	4	–	5
6517141	5V0C19027BT		–	3/4	3/4	1 3/4	4	.030	5
6517142	5V0C19027CT		–	3/4	3/4	1 3/4	4	.060	5
6517130	5V0C19027ST		–	3/4	3/4	1 3/4	4	–	5
6517146	5V1C19007BT		–	3/4	3/4	2 1/4	5	.030	5
6517147	5V1C19007CT		–	3/4	3/4	2 1/4	5	.060	5
6517148	5V1C19007ET		–	3/4	3/4	2 1/4	5	.120	5
6517145	5V1C19007ST		–	3/4	3/4	2 1/4	5	–	5
6517150	5V2C19017BT		–	3/4	3/4	3 1/4	6	.030	5
6517149	5V2C19017ST		–	3/4	3/4	3 1/4	6	–	5
5577166	5V0C25008BT	5577167	5V0C25008BW	1	1	1 3/4	4 1/2	.030	5
5577168	5V0C25008CT	5577169	5V0C25008CW	1	1	1 3/4	4 1/2	.060	5
5577182	5V0C25008ET	5577183	5V0C25008EW	1	1	1 3/4	4 1/2	.120	5
5577184	5V0C25008ST	5577185	5V0C25008SW	1	1	1 3/4	4 1/2	–	5
6517154	5V6C25008BT		–	1	1	2 1/4	5	.030	5
6517155	5V6C25008CT		–	1	1	2 1/4	5	.060	5
6517153	5V6C25008ST		–	1	1	2 1/4	5	–	5
6517159	5V1C25008ET		–	1	1	3 1/4	6	.120	5

VariMill II • Series 5VNC • Square End • Neck • 5 Flute • Inch







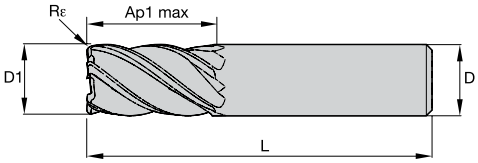


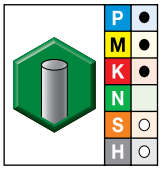
● first choice
○ alternate choice

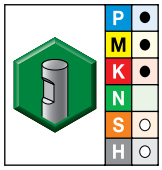
WP15PE		WP15PE									
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
5594727	5VNC07012AT		–	1/4	1/4	.24	1/2	1.250	4	.015	5
5594728	5VNC10014AT		–	3/8	3/8	.35	7/8	1.875	4	.015	5
5594729	5VNC13005BT	5594850	5VNC13005BW	1/2	1/2	.47	1 1/4	2.250	4	.030	5
5594851	5VNC16006BT	5594852	5VNC16006BW	5/8	5/8	.59	1 1/4	2.250	4	.030	5
5594853	5VNC19017BT	5594854	5VNC19017BW	3/4	3/4	.71	1 1/2	3.250	5 1/2	.030	5
5594855	5VNC25018BT	5594856	5VNC25018BW	1	1	.94	1 3/4	3.250	5 1/2	.030	5

VariMill II • Series 5V0S • Square End • 5 Flute • Inch







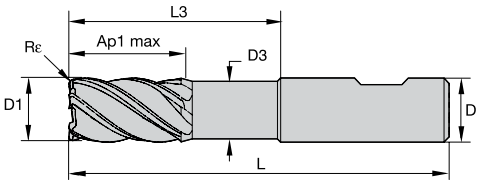


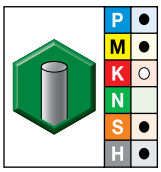
● first choice
○ alternate choice

WP15PE		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
3552614	TM5V0S05000A	–		3/16	3/16	5/8	2 1/4	.015	5
3552615	TM5V0S05000B	–		3/16	3/16	5/8	2 1/4	.030	5
3552613	TM5V0S05000S	–		3/16	3/16	5/8	2 1/4	–	5
3552617	TM5V0S07002A	–		1/4	1/4	3/4	2 1/2	.015	5
3552618	TM5V0S07002B	–		1/4	1/4	3/4	2 1/2	.030	5
3660162	TM5V0S07002C	–		1/4	1/4	3/4	2 1/2	.060	5
3552616	TM5V0S07002S	–		1/4	1/4	3/4	2 1/2	–	5
3552585	TM5V0S08003A	–		5/16	5/16	3/4	2 1/2	.015	5
3552587	TM5V0S08003B	–		5/16	5/16	3/4	2 1/2	.030	5
3552586	TM5V0S08003S	–		5/16	5/16	3/4	2 1/2	–	5
3552589	TM5V0S10004A	–		3/8	3/8	7/8	2 1/2	.015	5
3552590	TM5V0S10004B	–		3/8	3/8	7/8	2 1/2	.030	5
3660385	TM5V0S10004C	–		3/8	3/8	7/8	2 1/2	.060	5
3552588	TM5V0S10004S	–		3/8	3/8	7/8	2 1/2	–	5
3552620	TM5V0S13015A	3552580	TM5V0S13015AW	1/2	1/2	1 1/4	3	.015	5
3552621	TM5V0S13015B	3552581	TM5V0S13015BW	1/2	1/2	1 1/4	3	.030	5
3660386	TM5V0S13015C	3660390	TM5V0S13015CW	1/2	1/2	1 1/4	3	.060	5
3552622	TM5V0S13015E	3552582	TM5V0S13015EW	1/2	1/2	1 1/4	3	.120	5
3552619	TM5V0S13015S	3552579	TM5V0S13015SW	1/2	1/2	1 1/4	3	–	5
3552612	TM5V0S16006B	3552578	TM5V0S16006BW	5/8	5/8	1 1/4	3 1/2	.030	5
3552611	TM5V0S16006S	3552577	TM5V0S16006SW	5/8	5/8	1 1/4	3 1/2	–	5
3552592	TM5V0S19007B	3552538	TM5V0S19007BW	3/4	3/4	1 1/2	4	.030	5
3552591	TM5V0S19007S	–		3/4	3/4	1 1/2	4	–	5
3552607	TM5V0S25008B	–		1	1	1 3/4	4 1/2	.030	5

VariMill II • Series 5VNS • Square End • Neck • 5 Flute • Inch







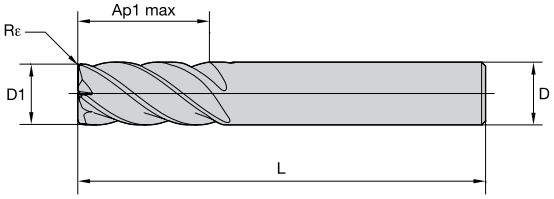
● first choice
○ alternate choice

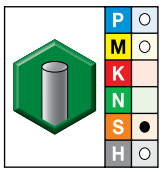
AlTiN-MT

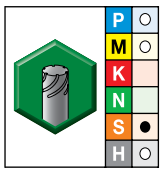
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3552489	TM5VNS10014A	3/8	3/8	.35	7/8	1 7/8	4	.015	5
3738996	TM5VNS13005B	1/2	1/2	.47	1 1/4	2 1/4	4	.030	5
3738998	TM5VNS19017B	3/4	3/4	.71	1 1/2	3 1/4	5 1/2	.030	5
3738999	TM5VNS25018B	1	1	.94	1 3/4	3 1/4	5 1/2	.030	5

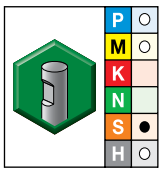
VariMill II ER • Series 5V0E • Square End • Eccentric Relief • 5 Flute • Inch











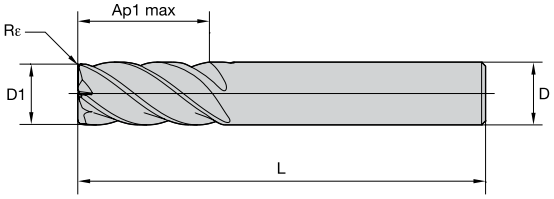
● first choice
○ alternate choice

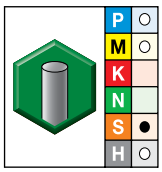
WS15PE		WS15PE		WS15PE							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6146484	5V4E05000AT	–		–		3/16	3/16	5/16	2	.015	5
6146485	5V4E05000BT	–		–		3/16	3/16	5/16	2	.030	5
6146483	5V4E05000ST	–		–		3/16	3/16	5/16	2	–	5
6146487	5V0E05000AT	–		–		3/16	3/16	9/16	2	.015	5
6146488	5V0E05000BT	–		–		3/16	3/16	9/16	2	.030	5
6146486	5V0E05000ST	–		–		3/16	3/16	9/16	2	–	5
6146490	5V1E05000AT	–		–		3/16	3/16	3/4	2 1/2	.015	5
6146521	5V1E05000BT	–		–		3/16	3/16	3/4	2 1/2	.030	5
6146489	5V1E05000ST	–		–		3/16	3/16	3/4	2 1/2	–	5
6146523	5V4E07002AT	–		–		1/4	1/4	3/8	2	.015	5
6146524	5V4E07002BT	–		–		1/4	1/4	3/8	2	.030	5
6146525	5V4E07002CT	–		–		1/4	1/4	3/8	2	.060	5
6146522	5V4E07002ST	–		–		1/4	1/4	3/8	2	–	5
6146528	5V0E07002AT	–		–		1/4	1/4	3/4	2 1/2	.015	5
6146529	5V0E07002BT	–		–		1/4	1/4	3/4	2 1/2	.030	5
6146530	5V0E07002CT	–		–		1/4	1/4	3/4	2 1/2	.060	5
6146526	5V0E07002ST	–		–		1/4	1/4	3/4	2 1/2	–	5
6146532	5V1E07002AT	–		–		1/4	1/4	1 1/8	3	.015	5
6146533	5V1E07002BT	–		–		1/4	1/4	1 1/8	3	.030	5
6146534	5V1E07002CT	–		–		1/4	1/4	1 1/8	3	.060	5
6146531	5V1E07002ST	–		–		1/4	1/4	1 1/8	3	–	5
6146536	5V0E08003AT	–		–		5/16	5/16	13/16	2 1/2	.015	5
6146537	5V0E08003BT	–		–		5/16	5/16	13/16	2 1/2	.030	5
6146538	5V0E08003CT	–		–		5/16	5/16	13/16	2 1/2	.060	5
6146535	5V0E08003ST	–		–		5/16	5/16	13/16	2 1/2	–	5
6146540	5V4E10004AT	–		–		3/8	3/8	1/2	2	.015	5
6146541	5V4E10004BT	–		–		3/8	3/8	1/2	2	.030	5
6146542	5V4E10004CT	–		–		3/8	3/8	1/2	2	.060	5
6146543	5V4E10004ET	–		–		3/8	3/8	1/2	2	.120	5
6146539	5V4E10004ST	–		–		3/8	3/8	1/2	2	–	5
5594857	5V0E10004AT	–		–		3/8	3/8	7/8	2 1/2	.015	5
5594858	5V0E10004BT	–		–		3/8	3/8	7/8	2 1/2	.030	5
5594859	5V0E10004ST	–		–		3/8	3/8	7/8	2 1/2	–	5
6146545	5V0E10014AT	–		–		3/8	3/8	1	2 1/2	.015	5
6146546	5V0E10014BT	–		–		3/8	3/8	1	2 1/2	.030	5
6146547	5V0E10014CT	–		–		3/8	3/8	1	2 1/2	.060	5
6146548	5V0E10014ET	–		–		3/8	3/8	1	2 1/2	.120	5
6146544	5V0E10014ST	–		–		3/8	3/8	1	2 1/2	–	5
6146550	5V1E10004AT	–		–		3/8	3/8	1	3	.015	5
6146551	5V1E10004BT	–		–		3/8	3/8	1	3	.030	5
6146549	5V1E10004ST	–		–		3/8	3/8	1	3	–	5
–		6146552	5V4E13015AV	–		1/2	1/2	5/8	2 1/2	.015	5
–		6146553	5V4E13015BV	–		1/2	1/2	5/8	2 1/2	.030	5
–		6146554	5V4E13015CV	–		1/2	1/2	5/8	2 1/2	.060	5
–		6146555	5V4E13015DV	–		1/2	1/2	5/8	2 1/2	.090	5
–		6146556	5V4E13015EV	–		1/2	1/2	5/8	2 1/2	.120	5
–		6146557	5V4E13015SV	–		1/2	1/2	5/8	2 1/2	–	5
6146558	5V0E13005BT		–	–		1/2	1/2	1	3	.030	5
6146559	5V0E13005CT		–	–		1/2	1/2	1	3	.060	5
6146560	5V0E13005ET		–	–		1/2	1/2	1	3	.120	5
6146561	5V0E13005ST		–	–		1/2	1/2	1	3	–	5
6146562	5V0E13015AT	5594860	5V0E13015AV	5594861	5V0E13015AW	1/2	1/2	1 1/4	3	.015	5
6146563	5V0E13015BT	5594862	5V0E13015BV	5594863	5V0E13015BW	1/2	1/2	1 1/4	3	.030	5
6146564	5V0E13015CT	5594864	5V0E13015CV	5594865	5V0E13015CW	1/2	1/2	1 1/4	3	.060	5
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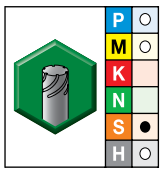
VariMill II ER • Series 5V0E • Square End • Eccentric Relief • 5 Flute • Inch

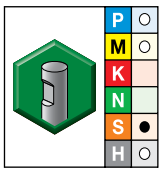
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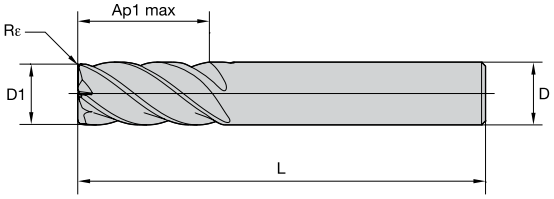
● first choice
○ alternate choice

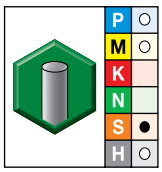
WS15PE		WS15PE		WS15PE							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6146567	5V0E13015ST	5594870	5V0E13015SV	5594871	5V0E13015SW	1/2	1/2	1 1/4	3	–	5
6146568	5V1E13015BT		–		–	1/2	1/2	1 5/8	4	.030	5
6146569	5V1E13015CT		–		–	1/2	1/2	1 5/8	4	.060	5
6146570	5V1E13015ET		–		–	1/2	1/2	1 5/8	4	.120	5
6146571	5V1E13015ST		–		–	1/2	1/2	1 5/8	4	–	5
6525205	5V6E13015BT		–		–	1/2	1/2	2 1/8	4	.030	5
6525206	5V6E13015CT		–		–	1/2	1/2	2 1/8	4	.060	5
6525207	5V6E13015ET		–		–	1/2	1/2	2 1/8	4	.120	5
6525204	5V6E13015ST		–		–	1/2	1/2	2 1/8	4	–	5
	–	6146572	5V4E16006BV		–	5/8	5/8	3/4	3	.030	5
	–	6146573	5V4E16006CV		–	5/8	5/8	3/4	3	.060	5
	–	6146574	5V4E16006EV		–	5/8	5/8	3/4	3	.120	5
	–	6146575	5V4E16006SV		–	5/8	5/8	3/4	3	–	5
6146576	5V0E16006BT	5594872	5V0E16006BV	5594873	5V0E16006BW	5/8	5/8	1 1/4	3 1/2	.030	5
6146577	5V0E16006CT	5594874	5V0E16006CV	5594875	5V0E16006CW	5/8	5/8	1 1/4	3 1/2	.060	5
6146578	5V0E16006ET		–		–	5/8	5/8	1 1/4	3 1/2	.120	5
6146579	5V0E16006ST	5594876	5V0E16006SV	5594877	5V0E16006SW	5/8	5/8	1 1/4	3 1/2	–	5
	–	6146580	5V1E16006BV		–	5/8	5/8	1 5/8	3 1/2	.030	5
	–	6146581	5V1E16006CV	6146582	5V1E16006CW	5/8	5/8	1 5/8	3 1/2	.060	5
	–	6146583	5V1E16006DV		–	5/8	5/8	1 5/8	3 1/2	.090	5
	–	6146584	5V1E16006EV		–	5/8	5/8	1 5/8	3 1/2	.120	5
	–	6146585	5V1E16006SV		–	5/8	5/8	1 5/8	3 1/2	–	5
6525209	5V6E16006BT		–		–	5/8	5/8	2 5/8	5	.030	5
6525210	5V6E16006CT		–		–	5/8	5/8	2 5/8	5	.060	5
6525231	5V6E16006ET		–		–	5/8	5/8	2 5/8	5	.120	5
6525208	5V6E16006ST		–		–	5/8	5/8	2 5/8	5	–	5
6146591	5V0E19007BT	5594878	5V0E19007BV	5594879	5V0E19007BW	3/4	3/4	1 1/2	4	.030	5
6146592	5V0E19007CT	5594880	5V0E19007CV	5594881	5V0E19007CW	3/4	3/4	1 1/2	4	.060	5
	–	5594882	5V0E19007DV	5594883	5V0E19007DW	3/4	3/4	1 1/2	4	.090	5
6146593	5V0E19007ET	5594884	5V0E19007EV	5594885	5V0E19007EW	3/4	3/4	1 1/2	4	.120	5
	–		–	6146590	5V0E19007FW	3/4	3/4	1 1/2	4	.250	5
6146594	5V0E19007ST	5594886	5V0E19007SV	5594887	5V0E19007SW	3/4	3/4	1 1/2	4	–	5
	–	6146595	5V0E19017BV		–	3/4	3/4	1 5/8	4	.030	5
	–	6146596	5V0E19017CV		–	3/4	3/4	1 5/8	4	.060	5
	–	6146597	5V0E19017EV		–	3/4	3/4	1 5/8	4	.120	5
	–	6146598	5V0E19017SV		–	3/4	3/4	1 5/8	4	–	5
6525233	5V0E19027BT		–		–	3/4	3/4	1 3/4	4	.030	5
6525234	5V0E19027CT		–		–	3/4	3/4	1 3/4	4	.060	5
6525235	5V0E19027ET		–		–	3/4	3/4	1 3/4	4	.120	5
6525232	5V0E19027ST		–		–	3/4	3/4	1 3/4	4	–	5
6525237	5V1E19007BT		–		–	3/4	3/4	2 1/4	5	.030	5
6525238	5V1E19007CT	6146599	5V1E19007CV		–	3/4	3/4	2 1/4	5	.060	5
6525239	5V1E19007ET	6146600	5V1E19007EV		–	3/4	3/4	2 1/4	5	.120	5
6525236	5V1E19007ST	6146601	5V1E19007SV		–	3/4	3/4	2 1/4	5	–	5
6525261	5V2E19007BT		–		–	3/4	3/4	3 1/4	6	.030	5
6525240	5V2E19007ST		–		–	3/4	3/4	3 1/4	6	–	5
	–	6146607	5V4E25008FV		–	1	1	1 1/4	4	.250	5
	–	6146608	5V4E25008SV		–	1	1	1 1/4	4	–	5
6525263	5V0E25008BT	5594888	5V0E25008BV	5594889	5V0E25008BW	1	1	1 3/4	4 1/2	.030	5
6525264	5V0E25008CT	5594890	5V0E25008CV	5594891	5V0E25008CW	1	1	1 3/4	4 1/2	.060	5
6525265	5V0E25008ET	5594892	5V0E25008EV	5594893	5V0E25008EW	1	1	1 3/4	4 1/2	.120	5
	–	5594894	5V0E25008FV	5594895	5V0E25008FW	1	1	1 3/4	4 1/2	.250	5
6525262	5V0E25008ST	5594896	5V0E25008SV	5594897	5V0E25008SW	1	1	1 3/4	4 1/2	–	5
	–		–	6146609	5V1E25008AW	1	1	3 1/4	6	.015	5
6525267	5V1E25008BT		–	6146610	5V1E25008BW	1	1	3 1/4	6	.030	5
6525268	5V1E25008CT		–	6146611	5V1E25008CW	1	1	3 1/4	6	.060	5

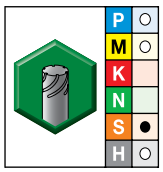
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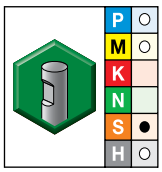
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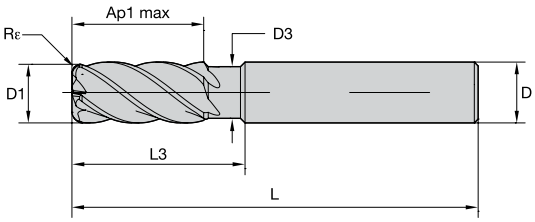


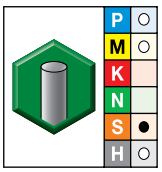
● first choice
○ alternate choice

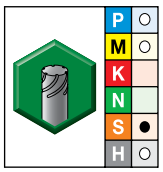
WS15PE		WS15PE		WS15PE							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
–		–		6146612	5V1E25008DW	1	1	3 1/4	6	.090	5
–		–		6146613	5V1E25008EW	1	1	3 1/4	6	.120	5
–		–		6146614	5V1E25008FW	1	1	3 1/4	6	.250	5
6525266	5V1E25008ST	–		6146615	5V1E25008SW	1	1	3 1/4	6	—	5
–		–		6146618	5V0E32009CW	1 1/4	1 1/4	3 1/4	6	.060	5
–		–		6146619	5V0E32009SW	1 1/4	1 1/4	3 1/4	6	—	5
–		–		6146620	5V1E32009CW	1 1/4	1 1/4	5	8	.060	5
–		–		6146621	5V1E32009SW	1 1/4	1 1/4	5	8	—	5

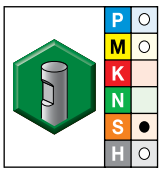
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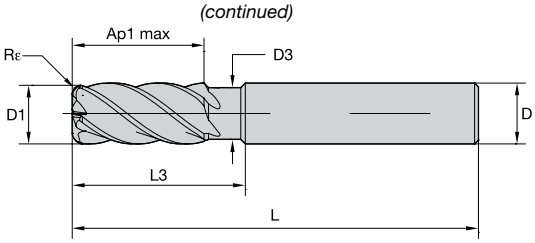
● first choice
○ alternate choice

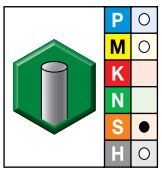
WS15PE		WS15PE		WS15PE									
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
6168921	5VNE07002AT	–		–		1/4	1/4	.24	3/8	1.125	2 1/2	.015	5
6168922	5VNE07002BT	–		–		1/4	1/4	.24	3/8	1.125	2 1/2	.030	5
6168660	5VNE07002ST	–		–		1/4	1/4	.24	3/8	1.125	2 1/2	–	5
6168925	5VNE07012AT	–		–		1/4	1/4	.24	5/8	1.750	4	.015	5
6168926	5VNE07012BT	–		–		1/4	1/4	.24	5/8	1.750	4	.030	5
6168924	5VNE07012ST	–		–		1/4	1/4	.24	5/8	1.750	4	–	5
6168929	5VNE10004AT	–		–		3/8	3/8	.35	1/2	1.375	3	.015	5
6168930	5VNE10004BT	–		–		3/8	3/8	.35	1/2	1.375	3	.030	5
6168941	5VNE10004CT	–		–		3/8	3/8	.35	1/2	1.375	3	.060	5
6168928	5VNE10004ST	–		–		3/8	3/8	.35	1/2	1.375	3	–	5
5594898	5VNE10014AT	–		–		3/8	3/8	.35	7/8	1.875	4	.015	5
6168943	5VNE10014BT	–		–		3/8	3/8	.35	7/8	1.875	4	.030	5
6168944	5VNE10014CT	–		–		3/8	3/8	.35	7/8	1.875	4	.060	5
6168942	5VNE10014ST	–		–		3/8	3/8	.35	7/8	1.875	4	–	5
6168946	5VNE10024AT	–		–		3/8	3/8	.35	7/8	2.375	4	.015	5
6168947	5VNE10024BT	–		–		3/8	3/8	.35	7/8	2.375	4	.030	5
6168948	5VNE10024CT	–		–		3/8	3/8	.35	7/8	2.375	4	.060	5
6168945	5VNE10024ST	–		–		3/8	3/8	.35	7/8	2.375	4	–	5
6168954	5VNE13005AT	–		–		1/2	1/2	.47	1 1/4	2.250	4	.015	5
–	–	5594899	5VNE13005BV	5594900	5VNE13005BW	1/2	1/2	.47	1 1/4	2.250	4	.030	5
6168955	5VNE13005CT	–		–		1/2	1/2	.47	1 1/4	2.250	4	.060	5
6168956	5VNE13005DT	–		–		1/2	1/2	.47	1 1/4	2.250	4	.090	5
6168957	5VNE13005ET	–		–		1/2	1/2	.47	1 1/4	2.250	4	.120	5
–	–	6168959	5VNE13015AV	–		1/2	1/2	.47	5/8	.875	5	.015	5
–	–	6168960	5VNE13015BV	–		1/2	1/2	.47	5/8	.875	5	.030	5
–	–	6168961	5VNE13015CV	–		1/2	1/2	.47	5/8	.875	5	.060	5
–	–	6168962	5VNE13015EV	–		1/2	1/2	.47	5/8	.875	5	.120	5
–	–	6168958	5VNE13015SV	–		1/2	1/2	.47	5/8	.875	5	–	5
–	–	6168963	5VNE13025SV	–		1/2	1/2	.47	5/8	.875	6	–	5
6168950	5VNE130Z5AT	–		–		1/2	1/2	.47	5/8	1.375	3	.015	5
6168951	5VNE130Z5BT	–		–		1/2	1/2	.47	5/8	1.375	3	.030	5
6168952	5VNE130Z5CT	–		–		1/2	1/2	.47	5/8	1.375	3	.060	5
6168953	5VNE13005ST	–		–		1/2	1/2	.47	5/8	2.250	4	–	5
–	–	6168965	5VNE16016AV	–		5/8	5/8	.59	1 1/4	2.250	5	.015	5
–	–	5594901	5VNE16006BV	5594902	5VNE16006BW	5/8	5/8	.59	1 1/4	2.250	4	.030	5
–	–	6168966	5VNE16016BV	–		5/8	5/8	.59	1 1/4	2.250	5	.030	5
–	–	6168967	5VNE16016CV	–		5/8	5/8	.59	1 1/4	2.250	5	.060	5
–	–	6168968	5VNE16016EV	–		5/8	5/8	.59	1 1/4	2.250	5	.120	5
–	–	6168964	5VNE16016SV	–		5/8	5/8	.59	1 1/4	2.250	5	–	5
–	–	6168971	5VNE16026BV	–		5/8	5/8	.59	3/4	1.000	6	.030	5
–	–	6168972	5VNE16026CV	–		5/8	5/8	.59	3/4	1.000	6	.060	5
–	–	6168973	5VNE16026DV	–		5/8	5/8	.59	3/4	1.000	6	.090	5
–	–	6168974	5VNE16026EV	–		5/8	5/8	.59	3/4	1.000	6	.120	5
–	–	6168969	5VNE16026SV	–		5/8	5/8	.59	3/4	1.000	6	–	5
6168976	5VNE19007AT	–		–		3/4	3/4	.71	1	2.250	4	.015	5
6168977	5VNE19007BT	–		–		3/4	3/4	.71	1	2.250	4	.030	5
6168978	5VNE19007CT	–		–		3/4	3/4	.71	1	2.250	4	.060	5
6168979	5VNE19007ET	–		–		3/4	3/4	.71	1	2.250	4	.120	5
6168975	5VNE19007ST	–		–		3/4	3/4	.71	1	2.250	4	–	5
–	–	6168981	5VNE19027AV	–		3/4	3/4	.71	1 1/2	3.250	6	.015	5
–	–	5594903	5VNE19017BV	5594904	5VNE19017BW	3/4	3/4	.71	1 1/2	3.250	5 1/2	.030	5
–	–	6168982	5VNE19027BV	–		3/4	3/4	.71	1 1/2	3.250	6	.030	5

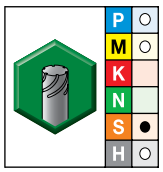
VariMill II ER • Series 5VNE • Square End • Eccentric Relief • Neck • 5 flute • Inch

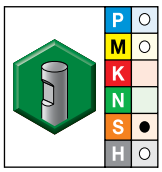
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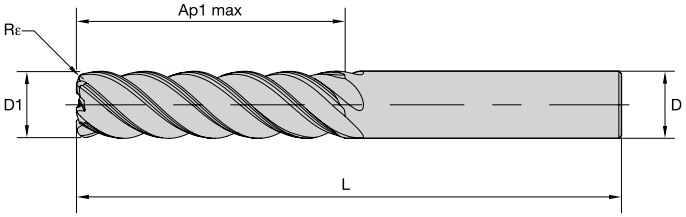


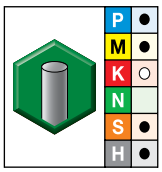
● first choice
○ alternate choice

WS15PE		WS15PE		WS15PE									
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
	–	6168983	5VNE19027CV		–	3/4	3/4	.71	1 1/2	3.250	6	.060	5
	–	6168984	5VNE19027DV		–	3/4	3/4	.71	1 1/2	3.250	6	.090	5
	–	6168985	5VNE19027EV		–	3/4	3/4	.71	1 1/2	3.250	6	.120	5
	–	6168980	5VNE19027SV		–	3/4	3/4	.71	1 1/2	3.250	6	–	5
	–	6168986	5VNE19037SV		–	3/4	3/4	.71	1 1/2	4.250	7	–	5
	–	6169008	5VNE25048SV		–	1	1	.94	1 1/4	1.750	8	–	5
6168988	5VNE25008AT		–		–	1	1	.94	1 1/4	2.250	4	.015	5
6168989	5VNE25008BT		–		–	1	1	.94	1 1/4	2.250	4	.030	5
6168990	5VNE25008CT		–		–	1	1	.94	1 1/4	2.250	4	.060	5
6169001	5VNE25008DT		–		–	1	1	.94	1 1/4	2.250	4	.090	5
6169002	5VNE25008ET		–		–	1	1	.94	1 1/4	2.250	4	.120	5
6168987	5VNE25008ST		–		–	1	1	.94	1 1/4	2.250	4	–	5
	–	6169004	5VNE25028AV		–	1	1	.94	1 1/4	3.250	6	.015	5
	–	6169005	5VNE25028BV		–	1	1	.94	1 1/4	3.250	6	.030	5
	–	6169006	5VNE25028CV		–	1	1	.94	1 1/4	3.250	6	.060	5
	–	6169007	5VNE25028EV		–	1	1	.94	1 1/4	3.250	6	.120	5
	–	6169003	5VNE25028SV		–	1	1	.94	1 1/4	3.250	6	–	5
	–	5594905	5VNE25018BV	5594906	5VNE25018BW	1	1	.94	1 3/4	3.250	5 1/2	.030	5

VariMill II Long • Series 5W1S • Square End • Long Length • 5 Flute • Inch







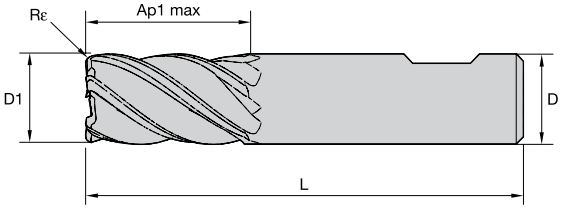
● first choice
○ alternate choice

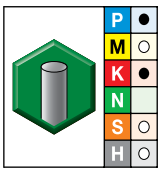
AlTiN-MT

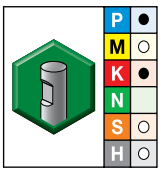
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
5095168	TM5W1S07002A	1/4	1/4	1	3	.015	5
5095169	TM5W1S07002B	1/4	1/4	1	3	.030	5
5095167	TM5W1S07002S	1/4	1/4	1	3	–	5
5095341	TM5W1S08003A	5/16	5/16	1 1/4	3	.015	5
5095342	TM5W1S08003B	5/16	5/16	1 1/4	3	.030	5
5095345	TM5W1S10004A	3/8	3/8	1 1/2	4	.015	5
5095346	TM5W1S10004B	3/8	3/8	1 1/2	4	.030	5
5095347	TM5W1S10004C	3/8	3/8	1 1/2	4	.060	5
5095343	TM5W1S10004S	3/8	3/8	1 1/2	4	–	5
5095420	TM5W1S13005A	1/2	1/2	2	5	.015	5
5095421	TM5W1S13005B	1/2	1/2	2	5	.030	5
5095422	TM5W1S13005C	1/2	1/2	2	5	.060	5
5095348	TM5W1S13005S	1/2	1/2	2	5	–	5
5095425	TM5W1S16006A	5/8	5/8	2 1/2	5 1/4	.015	5
5095426	TM5W1S16006B	5/8	5/8	2 1/2	5 1/4	.030	5
5095427	TM5W1S16006C	5/8	5/8	2 1/2	5 1/4	.060	5
5095533	TM5W1S16006D	5/8	5/8	2 1/2	5 1/4	.090	5
5095428	TM5W1S16006E	5/8	5/8	2 1/2	5 1/4	.120	5
5095423	TM5W1S16006S	5/8	5/8	2 1/2	5 1/4	–	5
5095471	TM5W6S19007A	3/4	3/4	3	6	.015	5
5095472	TM5W1S19007B	3/4	3/4	3	6	.030	5
5095473	TM5W1S19007C	3/4	3/4	3	6	.060	5
5095534	TM5W1S19007D	3/4	3/4	3	6	.090	5
5095474	TM5W1S19007E	3/4	3/4	3	6	.120	5
5095429	TM5W1S19007S	3/4	3/4	3	6	–	5
5095477	TM5W1S25008A	1	1	4	7	.015	5
5095530	TM5W1S25008B	1	1	4	7	.030	5
5095531	TM5W1S25008C	1	1	4	7	.060	5
5095532	TM5W1S25008E	1	1	4	7	.120	5
5095475	TM5W1S25008S	1	1	4	7	–	5

VariMill II • Series 5777 • Square End • Non-Center Cutting • 5 Flute • Metric







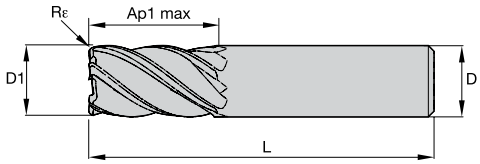


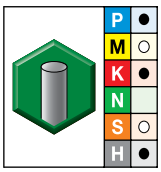
● first choice
○ alternate choice

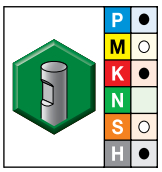
WP15PE		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
3524587	577704002MT	–		4,0	6	11,00	55	0,25	5
3524586	577704012MT	–		4,0	6	11,00	55	–	5
3524588	577705002MT	–		5,0	6	13,00	57	0,25	5
6525049	577706002ET	–		6,0	6	13,00	57	0,50	5
6525050	577706002JT	–		6,0	6	13,00	57	1,00	5
3524590	577706002MT	–		6,0	6	13,00	57	0,40	5
3524589	577706012MT	–		6,0	6	13,00	57	–	5
6525181	577708003JT	–		8,0	8	19,00	63	1,00	5
6525182	577708003KT	–		8,0	8	19,00	63	1,50	5
3524593	577708003MT	–		8,0	8	19,00	63	0,50	5
3524592	577708013MT	–		8,0	8	19,00	63	–	5
6525183	577710004JT	–		10,0	10	22,00	72	1,00	5
6525184	577710004KT	–		10,0	10	22,00	72	1,50	5
3524596	577710004MT	–		10,0	10	22,00	72	0,50	5
3524595	577710014MT	–		10,0	10	22,00	72	–	5
3524598	577712005MT	–		12,0	12	26,00	83	0,75	5
6525185	577712015ET	–		12,0	12	26,00	73	0,50	5
6525186	577712015JT	–		12,0	12	26,00	73	1,00	5
6525187	577712015KT	–		12,0	12	26,00	73	1,50	5
3524597	577712015MT	–		12,0	12	26,00	83	–	5
6525188	577712015NT	–		12,0	12	26,00	73	2,50	5
6525189	577716006JT	–		16,0	16	32,00	92	1,00	5
3524601	577716006MT	3524620	577716006MW	16,0	16	32,00	92	0,75	5
6525190	577716006PT	–		16,0	16	32,00	92	3,00	5
6525201	577716006QT	–		16,0	16	32,00	92	4,00	5
3524600	577716016MT	–		16,0	16	32,00	92	–	5
3524605	577720007MT	–		20,0	20	38,00	104	0,75	5
6525202	577720007PT	–		20,0	20	38,00	104	3,00	5
3524603	577720017MT	–		20,0	20	38,00	104	–	5
3524606	577725008MT	–		25,0	25	45,00	121	0,75	5
6525203	577725008RT	–		25,0	25	45,00	121	5,00	5

VariMill II • Series 577C • Square End • Center Cutting • 5 Flute • Metric







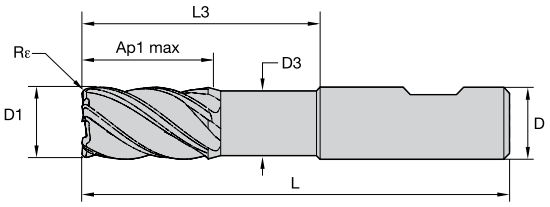


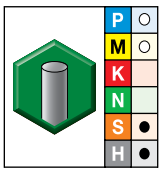
● first choice
○ alternate choice

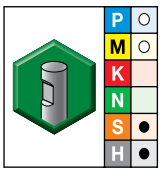
WP15PE		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
5578866	577C04002T	5578867	577C04002W	4,0	6	11,00	55	0,25	5
5578868	577C04012T		–	4,0	6	11,00	55	–	5
5578990	577C05002T	5578991	577C05002W	5,0	6	13,00	57	0,25	5
6519448	577C050R2TE		–	5,0	6	13,00	57	0,50	5
5578992	577C06002T	5578993	577C06002W	6,0	6	13,00	57	0,40	5
5578994	577C06012T		–	6,0	6	13,00	57	–	5
6519449	577C060R2TE		–	6,0	6	13,00	57	0,50	5
6519450	577C060R2TJ		–	6,0	6	13,00	57	1,00	5
5578995	577C07003T		–	7,0	8	16,00	63	0,40	5
5578997	577C08003T	5578998	577C08003W	8,0	8	19,00	63	0,50	5
5578999	577C08013T		–	8,0	8	19,00	63	–	5
6519481	577C080R3TJ		–	8,0	8	19,00	63	1,00	5
6519482	577C080R3TK		–	8,0	8	19,00	63	1,50	5
5579021	577C09004T		–	9,0	10	19,00	72	0,50	5
5579023	577C10004T	5579024	577C10004W	10,0	10	22,00	72	0,50	5
5579025	577C10014T		–	10,0	10	22,00	72	–	5
6519483	577C100R4TJ		–	10,0	10	22,00	72	1,00	5
6519484	577C100R4TK		–	10,0	10	22,00	72	1,50	5
6519485	577C100R4TM		–	10,0	10	22,00	72	2,00	5
5579026	577C12005T	5579027	577C12005W	12,0	12	26,00	83	0,75	5
5579028	577C12015T		–	12,0	12	26,00	83	–	5
6519486	577C120R5TE		–	12,0	12	26,00	83	0,50	5
6519487	577C120R5TJ		–	12,0	12	26,00	83	1,00	5
6519488	577C120R5TK		–	12,0	12	26,00	83	1,50	5
6519489	577C120R5TM		–	12,0	12	26,00	83	2,00	5
6519490	577C120R5TN		–	12,0	12	26,00	83	2,50	5
6519491	577C120R5TP		–	12,0	12	26,00	83	3,00	5
5579029	577C14004T	5579040	577C14004W	14,0	14	26,00	83	0,75	5
5579041	577C14014T		–	14,0	14	26,00	83	–	5
5579042	577C16006T	5579043	577C16006W	16,0	16	32,00	92	0,75	5
5579044	577C16016T		–	16,0	16	32,00	92	–	5
6519492	577C160R6TE		–	16,0	16	32,00	92	0,50	5
6519493	577C160R6TJ		–	16,0	16	32,00	92	1,00	5
6519497	577C160R6TM		–	16,0	16	32,00	92	2,00	5
6519499	577C160R6TP		–	16,0	16	32,00	92	3,00	5
6519500	577C160R6TQ		–	16,0	16	32,00	92	4,00	5
5579045	577C18008T		–	18,0	18	32,00	92	0,75	5
5579047	577C20007T	5579048	577C20007W	20,0	20	38,00	104	0,75	5
5579049	577C20017T		–	20,0	20	38,00	104	–	5
6519501	577C200R7TJ		–	20,0	20	38,00	104	1,00	5
6519502	577C200R7TM		–	20,0	20	38,00	104	2,00	5
6519503	577C200R7TP		–	20,0	20	38,00	104	3,00	5
6519504	577C200R7TQ		–	20,0	20	38,00	104	4,00	5
6519505	577C200R7TR		–	20,0	20	38,00	104	5,00	5
5579060	577C25008T	5579061	577C25008W	25,0	25	45,00	121	0,75	5
6519506	577C250R8TM		–	25,0	25	45,00	121	2,00	5
6519507	577C250R8TP		–	25,0	25	45,00	121	3,00	5
6519508	577C250R8TQ		–	25,0	25	45,00	121	4,00	5
6519509	577C250R8TR		–	25,0	25	45,00	121	5,00	5

VariMill II • Series 57N8 • Square End • Non-Center Cutting • Neck • 5 Flute • Metric







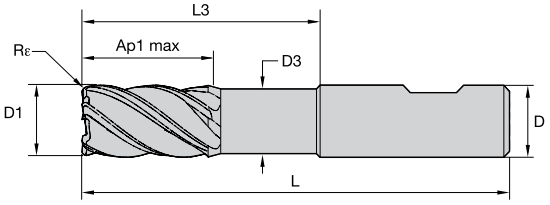


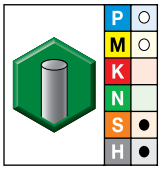
● first choice
○ alternate choice

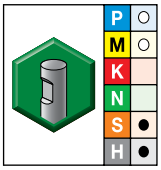
WS15PE		WS15PE									
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
3524626	57N806002MT	–		6,0	6	5,60	13,00	18,00	63	–	5
3524627	57N806022MT	–		6,0	6	5,60	13,00	18,00	63	0,50	5
6492821	57N8060R2MTG	–		6,0	6	5,64	13,00	18,00	63	0,75	5
3524629	57N808003MT	–		8,0	8	7,50	19,00	24,00	76	–	5
3524631	57N808023MT	–		8,0	8	7,50	19,00	24,00	76	0,50	5
6492822	57N8080R3MTG	–		8,0	8	7,52	19,00	24,00	76	0,75	5
6492825	57N8080R3MTK	–		8,0	8	7,52	19,00	24,00	76	1,50	5
3524632	57N810004MT	–		10,0	10	9,40	22,00	30,00	76	–	5
3524643	57N810024MT	–		10,0	10	9,40	22,00	30,00	76	0,50	5
3524644	57N810034MT	–		10,0	10	9,40	22,00	30,00	76	1,00	5
3524645	57N810054MT	–		10,0	10	9,40	22,00	30,00	76	2,00	5
6492823	57N8100R4MTG	–		10,0	10	9,40	22,00	30,00	76	0,75	5
6492826	57N8100R4MTK	–		10,0	10	9,40	22,00	30,00	76	1,50	5
3524647	57N812025MT	–		12,0	12	11,28	26,00	36,00	83	0,50	5
3524648	57N812035MT	–		12,0	12	11,28	26,00	36,00	83	1,00	5
3524649	57N812055MT	–		12,0	12	11,28	26,00	36,00	83	2,00	5
6492827	57N8120R5MTK	–		12,0	12	11,28	26,00	36,00	83	1,50	5
6492829	57N8120R5MTN	–		12,0	12	11,28	26,00	36,00	83	2,50	5
6492830	57N8120R5MTP	–		12,0	12	11,28	26,00	36,00	83	3,00	5
3524650	57N816006MT	–		16,0	16	15,05	32,00	48,00	100	–	5
3524651	57N816026MT	3562867	57N816026MW	16,0	16	15,05	32,00	48,00	100	0,50	5
3524652	57N816036MT	–		16,0	16	15,05	32,00	48,00	100	1,00	5
3524654	57N816076MT	3524692	57N816076MW	16,0	16	15,05	32,00	48,00	100	3,00	5
6492832	57N8160R6MTQ	–		16,0	16	15,04	32,00	48,00	100	4,00	5
–		3524693	57N820027MW	20,0	20	18,80	38,00	60,00	115	0,50	5
6492824	57N8200R7MTJ	–		20,0	20	18,80	38,00	60,00	115	1,00	5
6492833	57N8200R7MTR	–		20,0	20	18,80	38,00	60,00	115	5,00	5
6492831	57N8250R8MTP	–		25,0	25	23,50	45,00	75,00	135	3,00	5
6492834	57N8250R8MTR	–		25,0	25	23,50	45,00	75,00	135	5,00	5

VariMill II • Series 57NC • Square End • Center Cutting • Neck • 5 Flute • Metric







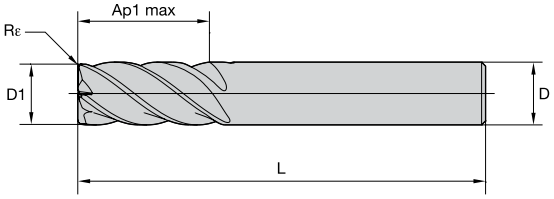


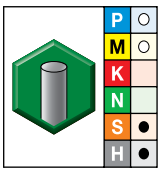
● first choice
○ alternate choice

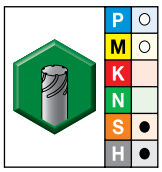
WS15PE		WS15PE										
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
5598906	57NC06002T		–	6,0	6	5,64	13,00	18,00	63	–	5
5598907	57NC06022T		–	6,0	6	5,64	13,00	18,00	63	0,50	5
5598909	57NC06032T		–	6,0	6	5,64	13,00	18,00	63	1,00	5
–		5599071	57NC06042W	6,0	6	5,64	13,00	18,00	63	1,50	5
6569491	57NC060R2TK		–	6,0	6	5,64	13,00	17,82	63	1,50	5
5599072	57NC08003T		–	8,0	8	7,52	19,00	24,00	76	–	5
5599073	57NC08023T	5599074	57NC08023W	8,0	8	7,52	19,00	24,00	76	0,50	5
5599075	57NC08033T	5599076	57NC08033W	8,0	8	7,52	19,00	24,00	76	1,00	5
6569493	57NC080R3TM	5599077	57NC08053W	8,0	8	7,52	19,00	24,00	76	2,00	5
6569492	57NC080R3TK		–	8,0	8	7,52	19,00	24,00	76	1,50	5
5599078	57NC10004T		–	10,0	10	9,40	22,00	30,00	76	–	5
5599079	57NC10024T	5599080	57NC10024W	10,0	10	9,40	22,00	30,00	76	0,50	5
5599081	57NC10034T	5599082	57NC10034W	10,0	10	9,40	22,00	30,00	76	1,00	5
5599083	57NC10054T		–	10,0	10	9,40	22,00	30,00	76	2,00	5
6569494	57NC100R4TK		–	10,0	10	9,40	22,00	30,00	76	1,50	5
5599085	57NC12005T		–	12,0	12	11,28	26,00	36,00	83	–	5
5599086	57NC12025T	5599087	57NC12025W	12,0	12	11,28	26,00	36,00	83	0,50	5
5599088	57NC12035T		–	12,0	12	11,28	26,00	36,00	83	1,00	5
5599090	57NC12055T	5599091	57NC12055W	12,0	12	11,28	26,00	36,00	83	2,00	5
6569495	57NC120R5TK		–	12,0	12	11,28	26,00	36,00	83	1,50	5
6569496	57NC120R5TP		–	12,0	12	11,28	26,00	36,00	83	3,00	5
5599092	57NC16006T		–	16,0	16	15,04	32,00	48,00	100	–	5
5599093	57NC16026T	5598905	57NC16026W	16,0	16	15,04	32,00	48,00	100	0,50	5
5599094	57NC16036T	5599095	57NC16036W	16,0	16	15,04	32,00	48,00	100	1,00	5
5599096	57NC16056T		–	16,0	16	15,04	32,00	48,00	100	2,00	5
5599098	57NC16076T	5599099	57NC16076W	16,0	16	15,04	32,00	48,00	100	3,00	5
6569497	57NC160R6TQ		–	16,0	16	15,04	32,00	48,00	100	4,00	5
5599100	57NC20007T		–	20,0	20	18,80	38,00	60,00	115	–	5
5599101	57NC20027T	5599102	57NC20027W	20,0	20	18,80	38,00	60,00	115	0,50	5
5599103	57NC20037T	5599104	57NC20037W	20,0	20	18,80	38,00	60,00	115	1,00	5
5599105	57NC20057T		–	20,0	20	18,80	38,00	60,00	115	2,00	5
5599107	57NC20077T	5599108	57NC20077W	20,0	20	18,80	38,00	60,00	115	3,00	5
5599109	57NC20087T		–	20,0	20	18,80	38,00	60,00	115	4,00	5
6569498	57NC200R7TR		–	20,0	20	18,80	38,00	60,00	115	5,00	5
5599111	57NC25008T		–	25,0	25	23,50	45,00	75,00	135	–	5
5599112	57NC25028T		–	25,0	25	23,50	45,00	75,00	135	0,50	5
5599114	57NC25038T	5599115	57NC25038W	25,0	25	23,50	45,00	75,00	135	1,00	5
5599116	57NC25058T		–	25,0	25	23,50	45,00	75,00	135	2,00	5
5599118	57NC25078T		–	25,0	25	23,50	45,00	75,00	135	3,00	5
5599120	57NC25088T		–	25,0	25	23,50	45,00	75,00	135	4,00	5

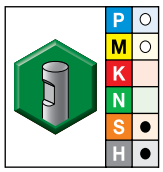
VariMill II ER • Series 577E • Square End • Eccentric Relief • 5 Flute • Metric









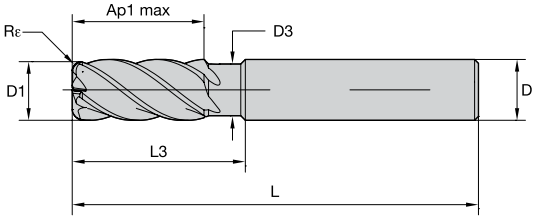


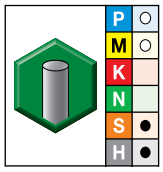
● first choice
○ alternate choice

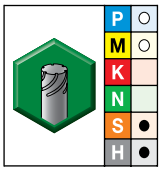
WS15PE		WS15PE		WS15PE							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
5599171	577E10004T		–		–	10,0	10	22,00	72	—	5
	–		–	5599176	577E12015W	12,0	12	26,00	83	0,75	5
	–	5599177	577E16006V		–	16,0	16	32,00	92	—	5
	–	5599178	577E16016V	5599179	577E16016W	16,0	16	32,00	92	0,75	5
	–	5599180	577E20007V		–	20,0	20	38,00	104	—	5
	–	5599181	577E20017V	5599182	577E20017W	20,0	20	38,00	104	0,75	5
	–	5599183	577E25018V		–	25,0	25	45,00	121	0,75	5

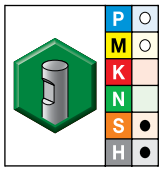
VariMill II ER • Series 57NE • Square End • Eccentric Relief • Neck • 5 Flute • Metric









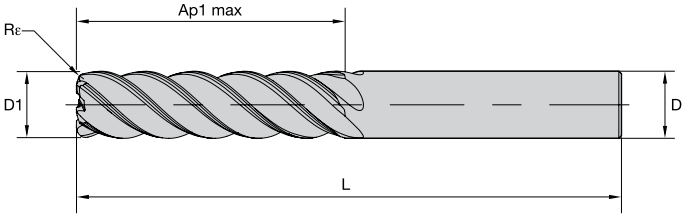


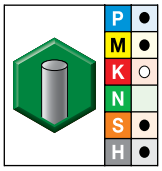
● first choice
○ alternate choice

WS15PE		WS15PE		WS15PE									
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
5599122	57NE10004T		–		–	10,0	10	9,40	22,00	30,00	76	–	5
5599123	57NE10024T		–	5599124	57NE10024W	10,0	10	9,40	22,00	30,00	76	0,50	5
5599125	57NE10034T		–	5599126	57NE10034W	10,0	10	9,40	22,00	30,00	76	1,00	5
5599127	57NE10054T		–	5599128	57NE10054W	10,0	10	9,40	22,00	30,00	76	2,00	5
	–	5599129	57NE12005V		–	12,0	12	11,28	26,00	36,00	83	–	5
	–	5599130	57NE12025V	5599131	57NE12025W	12,0	12	11,28	26,00	36,00	83	0,50	5
	–	5599132	57NE12035V	5599133	57NE12035W	12,0	12	11,28	26,00	36,00	83	1,00	5
	–	5599134	57NE12055V	5599135	57NE12055W	12,0	12	11,28	26,00	36,00	83	2,00	5
	–	5599136	57NE16006V		–	16,0	16	15,04	32,00	48,00	100	–	5
	–	5599137	57NE16026V	5599138	57NE16026W	16,0	16	15,04	32,00	48,00	100	0,50	5
	–	5599139	57NE16036V	5599140	57NE16036W	16,0	16	15,04	32,00	48,00	100	1,00	5
	–	5599141	57NE16056V	5599142	57NE16056W	16,0	16	15,04	32,00	48,00	100	2,00	5
	–	5599143	57NE20007V		–	20,0	20	18,80	38,00	60,00	115	–	5
	–	5599144	57NE20027V	5599145	57NE20027W	20,0	20	18,80	38,00	60,00	115	0,50	5
	–	5599146	57NE20037V	5599147	57NE20037W	20,0	20	18,80	38,00	60,00	115	1,00	5
	–	5599148	57NE20057V	5599149	57NE20057W	20,0	20	18,80	38,00	60,00	115	2,00	5
	–	5599160	57NE20087V	5599161	57NE20087W	20,0	20	18,80	38,00	60,00	115	4,00	5
	–	5599162	57NE25008V		–	25,0	25	23,50	45,00	75,00	135	–	5
	–	5599163	57NE25028V		–	25,0	25	23,50	45,00	75,00	135	0,50	5
	–	5599165	57NE25038V		–	25,0	25	23,50	45,00	75,00	135	1,00	5
	–	5599167	57NE25058V		–	25,0	25	23,50	45,00	75,00	135	2,00	5
	–	5599169	57NE25088V		–	25,0	25	23,50	45,00	75,00	135	4,00	5

VariMill II Long • Series 5718 • Square End • Long Length • 5 Flute • Metric







● first choice
○ alternate choice

AlTiN-MT

order # catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
571806002MT	6,0	6	24,00	76	–	5
571806012MT	6,0	6	24,00	76	0,50	5
571806022MT	6,0	6	24,00	76	1,00	5
571808003MT	8,0	8	32,00	76	–	5
571808013MT	8,0	8	32,00	76	0,50	5
571808023MT	8,0	8	32,00	76	1,00	5
571810004MT	10,0	10	40,00	100	–	5
571810014MT	10,0	10	40,00	100	0,50	5
571810034MT	10,0	10	40,00	100	2,00	5
571810044MT	10,0	10	40,00	100	2,50	5
571812005MT	12,0	12	48,00	125	–	5
571812015MT	12,0	12	48,00	125	0,50	5
571812025MT	12,0	12	48,00	125	1,00	5
571812035MT	12,0	12	48,00	125	2,00	5
571812045MT	12,0	12	48,00	125	2,50	5
571814014MT	14,0	14	56,00	120	–	5
571814024MT	14,0	14	56,00	120	1,00	5
571814054MT	14,0	14	56,00	120	4,00	5
571816006MT	16,0	16	64,00	141	–	5
571816016MT	16,0	16	64,00	141	0,50	5
571816026MT	16,0	16	64,00	141	1,00	5
571816036MT	16,0	16	64,00	141	2,00	5
571816046MT	16,0	16	64,00	141	3,00	5
571816056MT	16,0	16	64,00	141	4,00	5
571818018MT	18,0	18	72,00	150	–	5
571820007MT	20,0	20	80,00	150	–	5
571820017MT	20,0	20	80,00	150	0,50	5
571820027MT	20,0	20	80,00	150	1,00	5
571820037MT	20,0	20	80,00	150	2,00	5
571820047MT	20,0	20	80,00	150	3,00	5
571820057MT	20,0	20	80,00	150	4,00	5
571825008MT	25,0	25	100,00	170	–	5
571825018MT	25,0	25	100,00	170	0,50	5
571825028MT	25,0	25	100,00	170	1,00	5
571825038MT	25,0	25	100,00	170	2,00	5
571825048MT	25,0	25	100,00	170	3,00	5

VariMill II • Series 5V0C • Application Data • WP15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc SFM min		max	frac.	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter 3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	1 1/4
								dec.	0.1875	0.2500	0.3125	0.3750	0.5000	0.6250	0.7500	1.0000	1.2500
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	0.0013	0.0018	0.0023	0.0027	0.0034	0.0039	0.0044	0.0049	0.0049
	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	0.0013	0.0018	0.0023	0.0027	0.0034	0.0039	0.0044	0.0049	0.0049
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	0.0013	0.0018	0.0023	0.0027	0.0034	0.0039	0.0044	0.0049	0.0049
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	0.0011	0.0015	0.0020	0.0023	0.0029	0.0034	0.0039	0.0045	0.0048
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	0.0010	0.0014	0.0017	0.0020	0.0026	0.0030	0.0034	0.0039	0.0040
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	0.0009	0.0012	0.0016	0.0018	0.0023	0.0027	0.0031	0.0036	0.0039
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	0.0008	0.0010	0.0013	0.0015	0.0019	0.0022	0.0025	0.0028	0.0029
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	0.0011	0.0015	0.0020	0.0023	0.0029	0.0034	0.0039	0.0045	0.0048
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	0.0009	0.0012	0.0016	0.0018	0.0023	0.0027	0.0031	0.0036	0.0039
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	0.0008	0.0010	0.0013	0.0015	0.0019	0.0022	0.0025	0.0028	0.0029
K	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	0.0013	0.0018	0.0023	0.0027	0.0034	0.0039	0.0044	0.0049	0.0049
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	0.0011	0.0015	0.0020	0.0023	0.0029	0.0034	0.0039	0.0045	0.0048
	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	0.0009	0.0012	0.0016	0.0018	0.0023	0.0027	0.0031	0.0036	0.0039
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	0.0011	0.0015	0.0020	0.0023	0.0029	0.0034	0.0039	0.0045	0.0048
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	0.0006	0.0008	0.0010	0.0012	0.0015	0.0018	0.0021	0.0024	0.0026
	3	1.5 x D	0.5 x D	1 x D	80	–	130	IPT	0.0006	0.0008	0.0010	0.0012	0.0015	0.0018	0.0021	0.0024	0.0026
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	0.0008	0.0011	0.0014	0.0017	0.0021	0.0025	0.0028	0.0033	0.0036
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	0.0010	0.0014	0.0017	0.0020	0.0026	0.0030	0.0034	0.0039	0.0040
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	0.0008	0.0010	0.0013	0.0015	0.0019	0.0022	0.0025	0.0028	0.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill II • Series 5VNC • Application Data • WP15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc SFM min		max	frac.	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter 1/4	5/16	3/8	1/2	5/8	3/4	1
								dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	0.0012	0.0016	0.0018	0.0023	0.0027	0.0031	0.0036
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	0.0010	0.0013	0.0015	0.0019	0.0022	0.0025	0.0028
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	0.0015	0.0020	0.0023	0.0029	0.0034	0.0039	0.0045
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	0.0012	0.0016	0.0018	0.0023	0.0027	0.0031	0.0036
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	0.0010	0.0013	0.0015	0.0019	0.0022	0.0025	0.0028
K	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	0.0018	0.0023	0.0027	0.0034	0.0039	0.0044	0.0049
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	0.0015	0.0020	0.0023	0.0029	0.0034	0.0039	0.0045
	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	0.0012	0.0016	0.0018	0.0023	0.0027	0.0031	0.0036
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	0.0015	0.0020	0.0023	0.0029	0.0034	0.0039	0.0045
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	0.0008	0.0010	0.0012	0.0015	0.0018	0.0021	0.0024
	3	1.5 x D	0.5 x D	1 x D	80	–	130	IPT	0.0008	0.0010	0.0012	0.0015	0.0018	0.0021	0.0024
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	0.0011	0.0014	0.0017	0.0021	0.0025	0.0028	0.0033
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	0.0014	0.0017	0.0020	0.0026	0.0030	0.0034	0.0039
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	0.0010	0.0013	0.0015	0.0019	0.0022	0.0025	0.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill II • Series 5V0S • Application Data • WP15PE • Inch







Material Group		A		B	WP15PE Cutting Speed — vc SFM			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
									D1 — Diameter							
		ap	ae	ap	min		max	frac. dec.	3/16 .1880	1/4 .2500	5/16 .3130	3/8 .3750	7/16 .4380	1/2 .5000	5/8 .6250	3/4 .7500	1 1.000
P	1	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	460	–	620	IPT	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	3	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	4	1.25 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039
	5	1.25 x D	0.5 x D	1 x D	200	–	330	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	6	1.25 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
M	1	1.25 x D	0.5 x D	1 x D	260	–	330	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	2	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	3	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
K	1	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	360	–	460	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	3	1.25 x D	0.5 x D	1 x D	330	–	430	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
S	1	1.0 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	1.0 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	3	1.25 x D	0.5 x D	1 x D	80	–	130	IPT	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	4	1.25 x D	0.5 x D	1 x D	160	–	200	IPT	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033
H	1	1.25 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on > 1/2" diameter.

VariMill II • Series 5VNS • Application Data • ALTIN-MT • Inch







Material Group		A		B	AlTiN Cutting Speed — vc SFM			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.						
									D1 — Diameter					
		ap	ae	ap	min		max	frac. dec.	1/4 .2500	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.000
P	1	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	460	–	620	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	0.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	490	IPT	0.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	160	–	250	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	3	0.75 x D	0.5 x D	0.75 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	4	0.75 x D	0.5 x D	0.75 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	460	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust accordingly on > 1/2" diameter.

VariMill II ER • Series 5V0E • Application Data • WS15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4
								dec.	.1875	.2500	.3750	.5000	.6250	.7500	1.0000	1.2500
P	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	0.0010	0.0014	0.0020	0.0026	0.0030	0.0034	0.0039	0.0040
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	0.0009	0.0012	0.0018	0.0023	0.0027	0.0031	0.0036	0.0039
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	0.0008	0.0010	0.0015	0.0019	0.0022	0.0025	0.0028	0.0029
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	0.0011	0.0015	0.0023	0.0029	0.0034	0.0039	0.0045	0.0048
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	0.0009	0.0012	0.0018	0.0023	0.0027	0.0031	0.0036	0.0039
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	0.0008	0.0010	0.0015	0.0019	0.0022	0.0025	0.0028	0.0029
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	0.0011	0.0015	0.0023	0.0029	0.0034	0.0039	0.0045	0.0048
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	0.0006	0.0008	0.0012	0.0015	0.0018	0.0021	0.0024	0.0026
	3	1.5 x D	0.5 x D	1 x D	80	–	130	IPT	0.0006	0.0008	0.0012	0.0015	0.0018	0.0021	0.0024	0.0026
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	0.0008	0.0011	0.0017	0.0021	0.0025	0.0028	0.0033	0.0036
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	0.0010	0.0014	0.0020	0.0026	0.0030	0.0034	0.0039	0.0040
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	0.0008	0.0010	0.0015	0.0019	0.0022	0.0025	0.0028	0.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill II ER • Series 5VNE • Application Data • WS15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/4	3/8	1/2	5/8	3/4	1	1 1/4
								dec.	.2500	.3750	.5000	.6250	.7500	1.0000	1.2500
P	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	0.0014	0.0020	0.0026	0.0030	0.0034	0.0039	0.0040
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	0.0012	0.0018	0.0023	0.0027	0.0031	0.0036	0.0039
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	0.0010	0.0015	0.0019	0.0022	0.0025	0.0028	0.0029
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	0.0015	0.0023	0.0029	0.0034	0.0039	0.0045	0.0048
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	0.0012	0.0018	0.0023	0.0027	0.0031	0.0036	0.0039
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	0.0010	0.0015	0.0019	0.0022	0.0025	0.0028	0.0029
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	0.0015	0.0023	0.0029	0.0034	0.0039	0.0045	0.0048
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	0.0008	0.0012	0.0015	0.0018	0.0021	0.0024	0.0026
	3	1.5 x D	0.5 x D	1 x D	80	–	130	IPT	0.0008	0.0012	0.0015	0.0018	0.0021	0.0024	0.0026
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	0.0011	0.0017	0.0021	0.0025	0.0028	0.0033	0.0036
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	0.0014	0.0020	0.0026	0.0030	0.0034	0.0039	0.0040
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	0.0010	0.0015	0.0019	0.0022	0.0025	0.0028	0.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill II • Series 5W1S • Application Data • ALTIN-MT • Inch





Material Group		Side Milling (A) A ap	A ae	AlTiN-MT Cutting Speed — vc SFM min	max	frac. dec.	Recommended feed per tooth (IPT = inch/th) for side milling (A). D1 — Diameter 1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.000
P	0	Ap1 max	0.05 x D	980	1310	IPT	0.0022	0.0028	0.0033	0.0041	0.0047	0.0053	0.0059
	1	Ap1 max	0.05 x D	980	1310	IPT	0.0022	0.0028	0.0033	0.0041	0.0047	0.0053	0.0059
	2	Ap1 max	0.05 x D	920	1250	IPT	0.0022	0.0028	0.0033	0.0041	0.0047	0.0053	0.0059
	3	Ap1 max	0.05 x D	790	1050	IPT	0.0018	0.0023	0.0027	0.0035	0.0041	0.0046	0.0054
	4	Ap1 max	0.05 x D	590	980	IPT	0.0017	0.0021	0.0025	0.0031	0.0036	0.0040	0.0046
	5	Ap1 max	0.05 x D	390	660	IPT	0.0015	0.0019	0.0022	0.0028	0.0033	0.0037	0.0043
	6	Ap1 max	0.05 x D	330	490	IPT	0.0012	0.0016	0.0018	0.0023	0.0027	0.0030	0.0034
M	1	Ap1 max	0.05 x D	590	750	IPT	0.0018	0.0023	0.0027	0.0035	0.0041	0.0046	0.0054
	2	Ap1 max	0.05 x D	390	520	IPT	0.0015	0.0019	0.0022	0.0028	0.0033	0.0037	0.0043
	3	Ap1 max	0.05 x D	390	460	IPT	0.0012	0.0016	0.0018	0.0023	0.0027	0.0030	0.0034
K	1	Ap1 max	0.05 x D	790	980	IPT	0.0022	0.0028	0.0033	0.0041	0.0047	0.0053	0.0059
	2	Ap1 max	0.05 x D	720	920	IPT	0.0018	0.0023	0.0027	0.0035	0.0041	0.0046	0.0054
	3	Ap1 max	0.05 x D	720	850	IPT	0.0015	0.0019	0.0022	0.0028	0.0033	0.0037	0.0043
S	1	Ap1 max	0.05 x D	160	300	IPT	0.0015	0.0020	0.0023	0.0029	0.0034	0.0039	0.0045
	2	Ap1 max	0.05 x D	80	130	IPT	0.0008	0.0010	0.0012	0.0015	0.0018	0.0021	0.0024
	3	Ap1 max	0.05 x D	80	130	IPT	0.0008	0.0010	0.0012	0.0015	0.0018	0.0021	0.0024
	4	Ap1 max	0.05 x D	160	200	IPT	0.0011	0.0014	0.0017	0.0021	0.0025	0.0028	0.0033
H	1	Ap1 max	0.05 x D	520	920	IPT	0.0017	0.0021	0.0025	0.0031	0.0036	0.0040	0.0046
	2	Ap1 max	0.05 x D	460	790	IPT	0.0012	0.0016	0.0018	0.0023	0.0027	0.0030	0.0034

**For the above cutting data, do not exceed an overall ae of .032".*

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machinining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill II • Series 5777 • Application Data • WP15PE • Metric



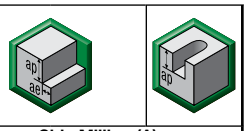




Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. mm	D1 — Diameter 4,0	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on > 12mm diameters.

VariMill II • Series 577C • Application Data • WP15PE • Metric

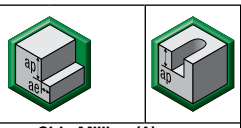




Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed – vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 – Diameter 4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	–	140	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	2	1,5 x D	0,2 x D	0,5 x D	70	–	120	fz	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill II • Series 57N8 • Application Data • WS15PE • Metric

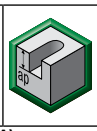




Material Group		Side Milling (A) and Slotting (B) ap	ae	ap	WS15PE Cutting Speed – vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 – Diameter 6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,077	0,088	0,098

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm diameters.

VariMill II • Series 57NC • Application Data • WS15PE • Metric


Material Group		Side Milling (A) and Slotting (B)			WS15PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.									
		A		B	Cutting Speed – vc m/min				D1 – Diameter								
		ap	ae	ap	min		max	mm	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	–	140	fz	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	2	1,5 x D	0,2 x D	0,5 x D	70	–	120	fz	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill II ER • Series 577E • Application Data • WS15PE • Metric





Material Group		Side Milling (A) and Slotting (B)			WS15PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.						
		A		B	Cutting Speed – vc m/min				D1 – Diameter					
		ap	ae	ap	min		max	mm	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,040	0,047	0,052	0,057	0,061	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,040	0,047	0,052	0,057	0,061	0,065	0,071
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	2	1,5 x D	0,2 x D	0,5 x D	70	–	120	fz	0,040	0,047	0,052	0,057	0,061	0,065	0,071

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill II ER • Series 57NE • Application Data • WS15PE • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. mm	D1 — Diameter 10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,040	0,047	0,052	0,057	0,061	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,040	0,047	0,052	0,057	0,061	0,065	0,071
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	25	–	40	fz	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	2	1,5 x D	0,2 x D	0,5 x D	70	–	120	fz	0,040	0,047	0,052	0,057	0,061	0,065	0,071

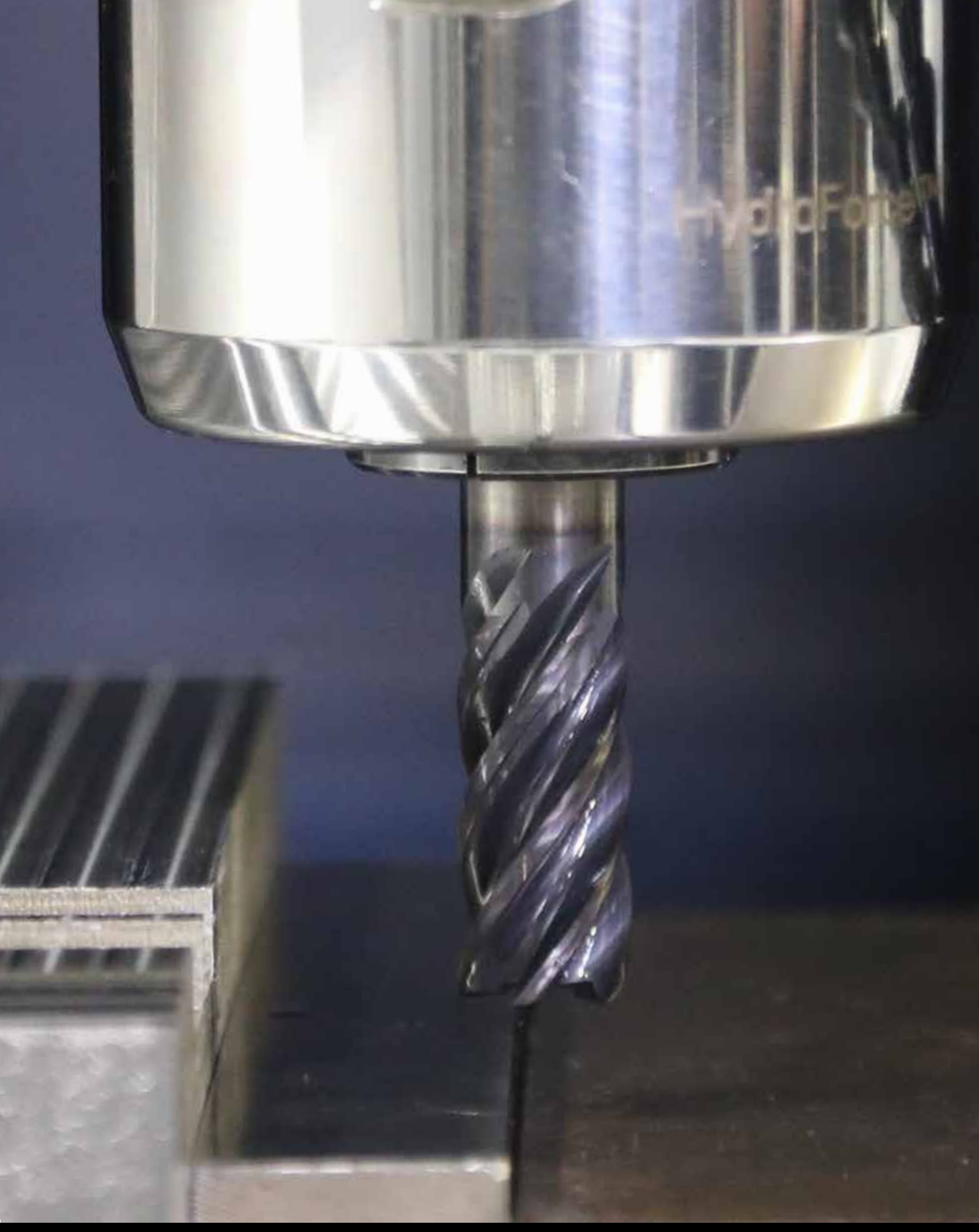
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill II Long • Series 5718 • Application Data • ALTIN-MT • Metric




Material Group		Side Milling (A) A ap	A ae	AlTiN Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz = mm/th) for side milling (A). mm	D1 — Diameter 6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	Ap1 max	0,05 x D	300	-	400	fz	0,053	0,072	0,086	0,099	0,111	0,121	0,130	0,137	0,149
	1	Ap1 max	0,05 x D	300	-	400	fz	0,053	0,072	0,086	0,099	0,111	0,121	0,130	0,137	0,149
	2	Ap1 max	0,05 x D	280	-	380	fz	0,053	0,072	0,086	0,099	0,111	0,121	0,130	0,137	0,149
	3	Ap1 max	0,05 x D	240	-	320	fz	0,044	0,060	0,073	0,084	0,095	0,105	0,113	0,121	0,137
	4	Ap1 max	0,05 x D	180	-	300	fz	0,039	0,054	0,065	0,075	0,084	0,092	0,099	0,106	0,117
	5	Ap1 max	0,05 x D	120	-	200	fz	0,035	0,048	0,058	0,067	0,076	0,084	0,091	0,097	0,109
	6	Ap1 max	0,05 x D	100	-	150	fz	0,030	0,040	0,048	0,056	0,062	0,068	0,073	0,078	0,085
M	1	Ap1 max	0,05 x D	180	-	230	fz	0,044	0,060	0,073	0,084	0,095	0,105	0,113	0,121	0,137
	2	Ap1 max	0,05 x D	120	-	160	fz	0,035	0,048	0,058	0,067	0,076	0,084	0,091	0,097	0,109
	3	Ap1 max	0,05 x D	120	-	140	fz	0,030	0,040	0,048	0,056	0,062	0,068	0,073	0,078	0,085
K	1	Ap1 max	0,05 x D	240	-	300	fz	0,053	0,072	0,086	0,099	0,111	0,121	0,130	0,137	0,149
	2	Ap1 max	0,05 x D	220	-	280	fz	0,044	0,060	0,073	0,084	0,095	0,105	0,113	0,121	0,137
	3	Ap1 max	0,05 x D	220	-	260	fz	0,035	0,048	0,058	0,067	0,076	0,084	0,091	0,097	0,109
S	1	Ap1 max	0,05 x D	50	-	90	fz	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	Ap1 max	0,05 x D	25	-	40	fz	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	Ap1 max	0,05 x D	25	-	40	fz	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	Ap1 max	0,05 x D	50	-	60	fz	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	Ap1 max	0,05 x D	160	-	280	fz	0,039	0,054	0,065	0,075	0,084	0,092	0,099	0,106	0,117
	2	Ap1 max	0,05 x D	140	-	240	fz	0,030	0,040	0,048	0,056	0,062	0,068	0,073	0,078	0,085

** For the above cutting data, do not exceed an overall ae of 0,8mm.*
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machinining centers, please adjust parameters accordingly on >0,5mm diameters.



widia.com

HANITA™

VariMill III™ ER

High-Performance Solid End Milling

VariMill III ER is a 7-flute solid carbide end mill engineered to provide the highest metal removal rates in difficult-to-machine workpiece materials, providing extended tool life in semi-finishing, finishing, and dynamic milling operations.

Features and Benefits

7 unequally spaced flutes: one tool for roughing and finishing.

Center cutting: better floor finish and added flexibility.

Eccentric relief: increases edge strength – higher feed rates.

Safe-Lock: eliminates end mill pull-out with no run-out.



VariMill III ER features 7 unequally spaced flutes and a Safe-Lock™ function to allow the tool to be used in roughing and finishing operations without end mill pull-out.

FAST

The 7-flute geometry ensures the highest feed-rates in side milling operations.

DYNAMIC

The flute and core design enable high performance and productivity in high-speed and dynamic milling applications.

SPECIFIC

VariMill III ER is particularly engineered to tackle all milling applications on difficult-to-cut materials such as heat-resistant superalloys and stainless steels.

DYNAMICALLY PRODUCTIVE

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
WS15PE	7

DIAMETER RANGE

INCH	METRIC
3/8–1"	10–20mm

INDUSTRY







APPLICATIONS

MATERIALS

P M S



SIDE MILLING



DYNAMIC MILLING



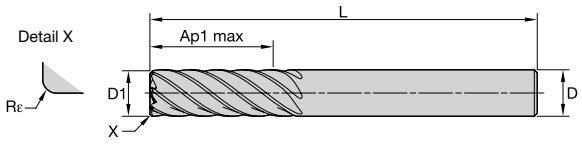
HELICAL INTERPOLATION

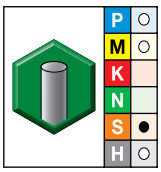


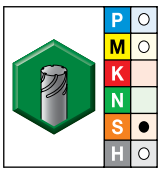
RAMPING

VariMill III ER • Series 7V1E 7V2E • Square End • 7 Flute • Inch







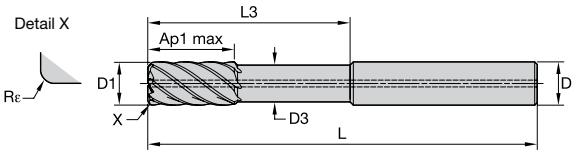


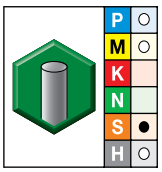
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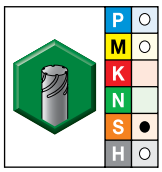
WS15PE		WS15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6566337	7V0E10004AT	–		3/8	3/8	7/8	2 1/2	.015	7
6566338	7V0E10004BT	–		3/8	3/8	7/8	2 1/2	.030	7
6566336	7V0E10004ST	–		3/8	3/8	7/8	2 1/2	–	7
5971350	7V1E10004AT	–		3/8	3/8	1 1/8	3	.015	7
5971421	7V1E10004BT	–		3/8	3/8	1 1/8	3	.030	7
6566339	7V1E10004ST	–		3/8	3/8	1 1/8	3	–	7
5971422	7V2E10004AT	–		3/8	3/8	1 7/8	4	.015	7
5971423	7V2E10004BT	–		3/8	3/8	1 7/8	4	.030	7
6566411	7V0E13005BT	–		1/2	1/2	1 1/4	3	.030	7
6566412	7V0E13005CT	–		1/2	1/2	1 1/4	3	.060	7
6566340	7V0E13005ST	–		1/2	1/2	1 1/4	3	–	7
5971427	7V1E13005BT	–		1/2	1/2	1 1/2	3 1/2	.030	7
5971428	7V1E13005CT	–		1/2	1/2	1 1/2	3 1/2	.060	7
5971429	7V1E13005ET	–		1/2	1/2	1 1/2	3 1/2	.120	7
–		5971430	7V2E13005BV	1/2	1/2	2 1/2	4 1/2	.030	7
–		5971431	7V2E13005CV	1/2	1/2	2 1/2	4 1/2	.060	7
–		5971432	7V2E13005EV	1/2	1/2	2 1/2	4 1/2	.120	7
6566414	7V0E16006BT	–		5/8	5/8	1 1/4	3 1/2	.030	7
6566413	7V0E16006ST	–		5/8	5/8	1 1/4	3 1/2	–	7
5971435	7V1E16006BT	–		5/8	5/8	1 7/8	4	.030	7
5971436	7V1E16006CT	–		5/8	5/8	1 7/8	4	.060	7
–		5971437	7V2E16006BV	5/8	5/8	3 1/8	5 1/2	.030	7
–		5971438	7V2E16006CV	5/8	5/8	3 1/8	5 1/2	.060	7
6566416	7V0E19007BT	–		3/4	3/4	1 3/4	4	.030	7
6566417	7V0E19007CT	–		3/4	3/4	1 3/4	4	.060	7
6566418	7V0E19007ET	–		3/4	3/4	1 3/4	4	.120	7
6566415	7V0E19007ST	–		3/4	3/4	1 3/4	4	–	7
5971445	7V1E19007BT	–		3/4	3/4	2 1/4	5	.030	7
–		5971448	7V1E19007BV	3/4	3/4	2 1/4	5	.030	7
–		5971449	7V1E19007CV	3/4	3/4	2 1/4	5	.060	7
5971446	7V1E19007CT	–		3/4	3/4	2 1/4	5	.060	7
–		5971450	7V1E19007EV	3/4	3/4	2 1/4	5	.120	7
5971447	7V1E19007ET	–		3/4	3/4	2 1/4	5	.120	7
6566421	7V1E19007ST	–		3/4	3/4	2 1/4	5	–	7
–		5971451	7V2E19007BV	3/4	3/4	3 3/4	6	.030	7
–		5971452	7V2E19007CV	3/4	3/4	3 3/4	6	.060	7
–		5971453	7V2E19007EV	3/4	3/4	3 3/4	6	.120	7
5971456	7V1E25008CT	–		1	1	3	5 1/2	.060	7
–		5971457	7V1E25008CV	1	1	3	5 1/2	.060	7
–		5971458	7V2E25008CV	1	1	5	7 1/2	.060	7

VariMill III ER • Series 7VNX • Square End • Internal Coolant • 7 Flute • Inch







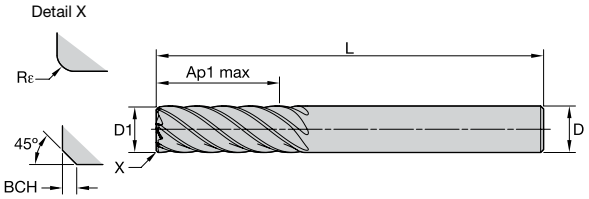


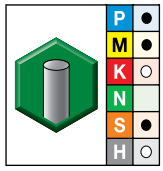
● first choice
○ alternate choice

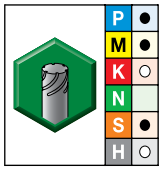
WS15PE		WS15PE									
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	Z U
5971348	7VNX10004AT		–	3/8	3/8	.35	3/4	2.125	4	.015	7
5971349	7VNX10004BT		–	3/8	3/8	.35	3/4	2.125	4	.030	7
5971424	7VNX13005BT		–	1/2	1/2	.47	1	2.375	4 1/2	.030	7
5971425	7VNX13005CT		–	1/2	1/2	.47	1	2.375	4 1/2	.060	7
5971426	7VNX13005ET		–	1/2	1/2	.47	1	2.375	4 1/2	.120	7
5971433	7VNX16006BT		–	5/8	5/8	.59	1 1/4	2.750	5	.030	7
5971434	7VNX16006CT		–	5/8	5/8	.59	1 1/4	2.750	5	.060	7
5971439	7VNX19007BT	5971442	7VNX19007BV	3/4	3/4	.71	1 1/2	3.125	5 1/2	.030	7
5971440	7VNX19007CT	5971443	7VNX19007CV	3/4	3/4	.71	1 1/2	3.125	5 1/2	.060	7
5971441	7VNX19007ET	5971444	7VNX19007EV	3/4	3/4	.71	1 1/2	3.125	5 1/2	.120	7
5971454	7VNX25008CT	5971455	7VNX25008CV	1	1	.94	2	3.375	6	.060	7

VariMill III ER • Series 771E 772E • Square End • 7 Flute • Metric







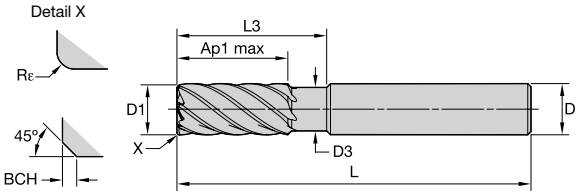


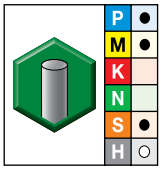
● first choice
○ alternate choice

WS15PE		WS15PE								
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH	Z U
5978092	771E10004T		–	10,0	10	30,00	76	–	0,50	7
5978093	771E10024T		–	10,0	10	30,00	76	0,50	–	7
5978094	772E10004T		–	10,0	10	50,00	100	–	0,50	7
5978095	772E10024T		–	10,0	10	50,00	100	0,50	–	7
5978098	771E12005T		–	12,0	12	36,00	100	–	0,50	7
5978099	771E12025T		–	12,0	12	36,00	100	0,50	–	7
5978100	772E12005T	5978102	772E12005V	12,0	12	60,00	125	–	0,50	7
5978101	772E12025T	5978103	772E12025V	12,0	12	60,00	125	0,50	–	7
5978106	771E16006T		–	16,0	16	48,00	110	–	0,50	7
5978107	771E16026T		–	16,0	16	48,00	110	0,50	–	7
5978108	772E16006T	5978110	772E16006V	16,0	16	80,00	141	–	0,50	7
5978109	772E16026T	5978111	772E16026V	16,0	16	80,00	141	0,50	–	7
5978114	771E20007T		–	20,0	20	60,00	125	–	0,50	7
5978115	771E20027T		–	20,0	20	60,00	125	0,50	–	7
5978116	772E20007T	5978118	772E20007V	20,0	20	100,00	166	–	0,50	7
5978117	772E20027T	5978119	772E20027V	20,0	20	100,00	166	0,50	–	7

VariMill III ER • Series 77NE • Square End • Neck • 7 Flute • Metric







● first choice
○ alternate choice

WS15PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	BCH	Z U
5978039	77NE10004T	10,0	10	9,40	22,00	30,00	76	–	0,50	7
5978040	77NE10024T	10,0	10	9,40	22,00	30,00	76	0,50	–	7
5978096	77NE12005T	12,0	12	11,28	26,00	36,00	83	–	0,50	7
5978097	77NE12025T	12,0	12	11,28	26,00	36,00	83	0,50	–	7
5978104	77NE16006T	16,0	16	15,04	32,00	48,00	100	–	0,50	7
5978105	77NE16026T	16,0	16	15,04	32,00	48,00	100	0,50	–	7
5978112	77NE20007T	20,0	20	18,80	38,00	60,00	115	–	0,50	7
5978113	77NE20027T	20,0	20	18,80	38,00	60,00	115	0,50	–	7

VariMill III ER • Series 7V1E • Application Data • WS15PE • Inch





Material Group		Side Milling (A) A		WS15PE Cutting Speed — vc SFM			Recommended feed per tooth (IPT = inch/th) for side milling (A). D1 — Diameter				
							frac.	3/8	1/2	5/8	3/4	1
		ap	ae	min		max	dec.	.3750	.5000	.6250	.7500	1.0000
P	4	Ap1 max	0.1 x D	300	–	490	IPT	0.0020	0.0026	0.0030	0.0034	0.0039
	5	Ap1 max	0.1 x D	200	–	330	IPT	0.0018	0.0023	0.0027	0.0031	0.0036
M	1	Ap1 max	0.1 x D	300	–	380	IPT	0.0023	0.0029	0.0034	0.0039	0.0045
	2	Ap1 max	0.1 x D	200	–	260	IPT	0.0018	0.0023	0.0027	0.0031	0.0036
	3	Ap1 max	0.1 x D	200	–	230	IPT	0.0015	0.0019	0.0022	0.0025	0.0028
S	1	Ap1 max	0.1 x D	160	–	300	IPT	0.0023	0.0029	0.0034	0.0039	0.0045
	2	Ap1 max	0.1 x D	80	–	130	IPT	0.0012	0.0015	0.0018	0.0021	0.0024
	3	Ap1 max	0.1 x D	80	–	130	IPT	0.0012	0.0015	0.0018	0.0021	0.0024
	4	Ap1 max	0.1 x D	160	–	200	IPT	0.0017	0.0021	0.0025	0.0028	0.0033
H	1	Ap1 max	0.1 x D	260	–	460	IPT	0.0020	0.0026	0.0030	0.0034	0.0039
	2	Ap1 max	0.1 x D	230	–	390	IPT	0.0015	0.0019	0.0022	0.0025	0.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill III ER • Series 7V1E • Application Data • WS15PE • Inch





Material Group		Side Milling (A) A		WS15PE Cutting Speed — vc SFM			Recommended feed per tooth (IPT = inch/th) for side milling (A). D1 — Diameter				
							frac.	3/8	1/2	5/8	3/4	1
		ap	ae	min		max	dec.	.3750	.5000	.6250	.7500	1.0000
P	4	Ap1 max	0.06 x D	590	-	980	IPT	0.0025	0.0031	0.0036	0.0040	0.0046
	5	Ap1 max	0.06 x D	390	-	660	IPT	0.0022	0.0028	0.0033	0.0037	0.0043
M	1	Ap1 max	0.06 x D	590	-	750	IPT	0.0027	0.0035	0.0041	0.0046	0.0054
	2	Ap1 max	0.06 x D	390	-	520	IPT	0.0022	0.0028	0.0033	0.0037	0.0043
	3	Ap1 max	0.06 x D	390	-	460	IPT	0.0018	0.0023	0.0027	0.0030	0.0034
S	1	Ap1 max	0.06 x D	160	-	300	IPT	0.0023	0.0029	0.0034	0.0039	0.0045
	2	Ap1 max	0.06 x D	80	-	130	IPT	0.0012	0.0015	0.0018	0.0021	0.0024
	3	Ap1 max	0.06 x D	80	-	130	IPT	0.0012	0.0015	0.0018	0.0021	0.0024
	4	Ap1 max	0.06 x D	160	-	200	IPT	0.0017	0.0021	0.0025	0.0028	0.0033
H	1	Ap1 max	0.06 x D	520	-	920	IPT	0.0025	0.0031	0.0036	0.0040	0.0046
	2	Ap1 max	0.06 x D	460	-	790	IPT	0.0018	0.0023	0.0027	0.0030	0.0034

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill III ER • Series 7V2E • Application Data • WS15PE • Inch





Material Group		Side Milling (A) A		WS15PE Cutting Speed — vc SFM			Recommended feed per tooth (IPT = inch/th) for side milling (A). D1 — Diameter					
		ap	ae	min		max	frac. dec.	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	0	Ap1 max	0.05 x D	980	–	1310	IPT	0.0033	0.0041	0.0047	0.0053	0.0059
	1	Ap1 max	0.05 x D	980	–	1310	IPT	0.0033	0.0041	0.0047	0.0053	0.0059
	2	Ap1 max	0.05 x D	920	–	1250	IPT	0.0033	0.0041	0.0047	0.0053	0.0059
	3	Ap1 max	0.05 x D	790	–	1050	IPT	0.0027	0.0035	0.0041	0.0046	0.0054
	4	Ap1 max	0.05 x D	590	–	980	IPT	0.0025	0.0031	0.0036	0.0040	0.0046
	5	Ap1 max	0.05 x D	390	–	660	IPT	0.0022	0.0028	0.0033	0.0037	0.0043
	6	Ap1 max	0.05 x D	330	–	490	IPT	0.0018	0.0023	0.0027	0.0030	0.0034
M	1	Ap1 max	0.05 x D	590	–	750	IPT	0.0027	0.0035	0.0041	0.0046	0.0054
	2	Ap1 max	0.05 x D	390	–	520	IPT	0.0022	0.0028	0.0033	0.0037	0.0043
	3	Ap1 max	0.05 x D	390	–	460	IPT	0.0018	0.0023	0.0027	0.0030	0.0034
K	1	Ap1 max	0.05 x D	790	–	980	IPT	0.0033	0.0041	0.0047	0.0053	0.0059
	2	Ap1 max	0.05 x D	720	–	920	IPT	0.0027	0.0035	0.0041	0.0046	0.0054
	3	Ap1 max	0.05 x D	720	–	850	IPT	0.0022	0.0028	0.0033	0.0037	0.0043
S	1	Ap1 max	0.05 x D	160	–	300	IPT	0.0023	0.0029	0.0034	0.0039	0.0045
	2	Ap1 max	0.05 x D	80	–	130	IPT	0.0012	0.0015	0.0018	0.0021	0.0024
	3	Ap1 max	0.05 x D	80	–	130	IPT	0.0012	0.0015	0.0018	0.0021	0.0024
	4	Ap1 max	0.05 x D	160	–	200	IPT	0.0017	0.0021	0.0025	0.0028	0.0033
H	1	Ap1 max	0.05 x D	520	–	920	IPT	0.0025	0.0031	0.0036	0.0040	0.0046
	2	Ap1 max	0.06 x D	460	–	790	IPT	0.0018	0.0023	0.0027	0.0030	0.0034

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill III ER • Series 7VNX • Application Data • WS15PE • Inch





Material Group		Side Milling (A) A		WS15PE Cutting Speed — vc SFM			Recommended feed per tooth (IPT = inch/th) for side milling (A). D1 — Diameter					
		ap	ae	min		max	frac. dec.	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	4	1 x D	0.15 x D	300	-	490	IPT	0.0020	0.0026	0.0030	0.0034	0.0039
	5	1 x D	0.15 x D	200	-	330	IPT	0.0018	0.0023	0.0027	0.0031	0.0036
M	1	1 x D	0.15 x D	300	-	380	IPT	0.0023	0.0029	0.0034	0.0039	0.0045
	2	1 x D	0.15 x D	200	-	260	IPT	0.0018	0.0023	0.0027	0.0031	0.0036
	3	1 x D	0.15 x D	200	-	230	IPT	0.0015	0.0019	0.0022	0.0025	0.0028
S	1	1 x D	0.15 x D	160	-	300	IPT	0.0023	0.0029	0.0034	0.0039	0.0045
	2	1 x D	0.15 x D	80	-	130	IPT	0.0012	0.0015	0.0018	0.0021	0.0024
	3	1 x D	0.15 x D	80	-	130	IPT	0.0012	0.0015	0.0018	0.0021	0.0024
	4	1 x D	0.15 x D	160	-	200	IPT	0.0017	0.0021	0.0025	0.0028	0.0033
H	1	1 x D	0.15 x D	260	-	460	IPT	0.0020	0.0026	0.0030	0.0034	0.0039
	2	1 x D	0.15 x D	230	-	390	IPT	0.0015	0.0019	0.0022	0.0025	0.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill III ER • Series 7VNX • Application Data • WS15PE • Inch





Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).						
		A		Cutting Speed — vc SFM				D1 — Diameter					
							frac.	3/8	1/2	5/8	3/4	1
		ap	ae	min		max	dec.	.3750	.5000	.6250	.7500	1.0000
P	4	Ap1 max	0.06 x D	590	–	980	IPT	.0025	.0031	.0036	.0040	.0046
	5	Ap1 max	0.06 x D	390	–	660	IPT	.0022	.0028	.0033	.0037	.0043
M	1	Ap1 max	0.06 x D	590	–	750	IPT	.0027	.0035	.0041	.0046	.0054
	2	Ap1 max	0.06 x D	390	–	520	IPT	.0022	.0028	.0033	.0037	.0043
	3	Ap1 max	0.06 x D	390	–	460	IPT	.0018	.0023	.0027	.0030	.0034
S	1	Ap1 max	0.06 x D	160	–	300	IPT	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.06 x D	80	–	130	IPT	.0012	.0015	.0018	.0021	.0024
	3	Ap1 max	0.06 x D	80	–	130	IPT	.0012	.0015	.0018	.0021	.0024
	4	Ap1 max	0.06 x D	160	–	200	IPT	.0017	.0021	.0025	.0028	.0033
H	1	Ap1 max	0.06 x D	520	–	920	IPT	.0025	.0031	.0036	.0040	.0046
	2	Ap1 max	0.06 x D	460	–	790	IPT	.0018	.0023	.0027	.0030	.0034

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

VariMill III ER • Series 771E • Finishing • Application Data • WS15PE • Metric





Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (fz = mm/th) for side milling (A).							
		A		Cutting Speed — vc m/min				D1 — Diameter						
		ap	ae	min		max	mm	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	4	Ap1 max	0,1 x D	90	-	150	fz	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	Ap1 max	0,1 x D	60	-	100	fz	0,048	0,056	0,063	0,070	0,076	0,081	0,091
M	1	Ap1 max	0,1 x D	90	-	115	fz	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	Ap1 max	0,1 x D	60	-	80	fz	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	Ap1 max	0,1 x D	60	-	70	fz	0,040	0,047	0,052	0,057	0,061	0,065	0,071
S	1	Ap1 max	0,1 x D	50	-	90	fz	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	Ap1 max	0,1 x D	25	-	40	fz	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	Ap1 max	0,1 x D	25	-	40	fz	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	Ap1 max	0,1 x D	50	-	60	fz	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	Ap1 max	0,1 x D	80	-	140	fz	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	2	Ap1 max	0,1 x D	70	-	120	fz	0,040	0,047	0,052	0,057	0,061	0,065	0,071

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill III ER • Series 771E • Semi-Finishing • Application Data • WS15PE • Metric





Material Group		Side Milling (A) A		WS15PE Cutting Speed – vc m/min			Recommended feed per tooth (fz = mm/th) for side milling (A). D1 – Diameter						
		ap	ae	min		max	mm	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	4	Ap1 max	0,06 x D	180	-	300	fz	0,065	0,075	0,084	0,092	0,099	0,106	0,117
	5	Ap1 max	0,06 x D	120	-	200	fz	0,058	0,067	0,076	0,084	0,091	0,097	0,109
M	1	Ap1 max	0,06 x D	180	-	230	fz	0,073	0,084	0,095	0,105	0,113	0,121	0,137
	2	Ap1 max	0,06 x D	120	-	160	fz	0,058	0,067	0,076	0,084	0,091	0,097	0,109
	3	Ap1 max	0,06 x D	120	-	140	fz	0,048	0,056	0,062	0,068	0,073	0,078	0,085
S	1	Ap1 max	0,06 x D	50	-	90	fz	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	Ap1 max	0,06 x D	25	-	40	fz	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	Ap1 max	0,06 x D	25	-	40	fz	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	Ap1 max	0,06 x D	50	-	60	fz	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	Ap1 max	0,06 x D	160	-	280	fz	0,065	0,075	0,084	0,092	0,099	0,106	0,117
	2	Ap1 max	0,06 x D	140	-	240	fz	0,048	0,056	0,062	0,068	0,073	0,078	0,085

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill III ER • Series 772E • Application Data • WS15PE • Metric





Material Group		Side Milling (A) A		WS15PE Cutting Speed – vc m/min			Recommended feed per tooth (fz = mm/th) for side milling (A). D1 – Diameter						
		ap	ae	min		max	mm	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,05 x D	300	–	400	fz	0,086	0,099	0,111	0,121	0,130	0,137
	1	Ap1 max	0,05 x D	300	–	400	fz	0,086	0,099	0,111	0,121	0,130	0,137
	2	Ap1 max	0,05 x D	280	–	380	fz	0,086	0,099	0,111	0,121	0,130	0,137
	3	Ap1 max	0,05 x D	240	–	320	fz	0,073	0,084	0,095	0,105	0,113	0,121
	4	Ap1 max	0,05 x D	180	–	300	fz	0,065	0,075	0,084	0,092	0,099	0,106
	5	Ap1 max	0,05 x D	120	–	200	fz	0,058	0,067	0,076	0,084	0,091	0,097
	6	Ap1 max	0,05 x D	100	–	150	fz	0,048	0,056	0,062	0,068	0,073	0,078
M	1	Ap1 max	0,05 x D	180	–	230	fz	0,073	0,084	0,095	0,105	0,113	0,121
	2	Ap1 max	0,05 x D	120	–	160	fz	0,058	0,067	0,076	0,084	0,091	0,097
	3	Ap1 max	0,05 x D	120	–	140	fz	0,048	0,056	0,062	0,068	0,073	0,078
K	1	Ap1 max	0,05 x D	240	–	300	fz	0,086	0,099	0,111	0,121	0,130	0,137
	2	Ap1 max	0,05 x D	220	–	280	fz	0,073	0,084	0,095	0,105	0,113	0,121
	3	Ap1 max	0,05 x D	220	–	260	fz	0,058	0,067	0,076	0,084	0,091	0,097
S	1	Ap1 max	0,05 x D	50	–	90	fz	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,05 x D	25	–	40	fz	0,032	0,037	0,042	0,046	0,050	0,054
	3	Ap1 max	0,05 x D	25	–	40	fz	0,032	0,037	0,042	0,046	0,050	0,054
	4	Ap1 max	0,05 x D	50	–	60	fz	0,045	0,052	0,058	0,064	0,069	0,074
H	1	Ap1 max	0,05 x D	160	–	280	fz	0,065	0,075	0,084	0,092	0,099	0,106
	2	Ap1 max	0,06 x D	140	–	240	fz	0,048	0,056	0,062	0,068	0,073	0,078

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill III ER • Series 77NE • Application Data • WS15PE • Metric

Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (fz = mm/th) for side milling (A).					
		A		Cutting Speed – vc m/min				D1 – Diameter				
		ap	ae	min		max	mm	10,0	12,0	14,0	16,0	18,0	20,0
P	4	1 x D	0,15 x D	90	-	150	fz	0,054	0,062	0,070	0,077	0,083	0,088
	5	1 x D	0,15 x D	60	-	100	fz	0,048	0,056	0,063	0,070	0,076	0,081
M	1	1 x D	0,15 x D	90	-	115	fz	0,061	0,070	0,079	0,087	0,095	0,101
	2	1 x D	0,15 x D	60	-	80	fz	0,048	0,056	0,063	0,070	0,076	0,081
	3	1 x D	0,15 x D	60	-	70	fz	0,040	0,047	0,052	0,057	0,061	0,065
S	1	1 x D	0,15 x D	50	-	90	fz	0,061	0,070	0,079	0,087	0,095	0,101
	2	1 x D	0,15 x D	25	-	40	fz	0,032	0,037	0,042	0,046	0,050	0,054
	3	1 x D	0,15 x D	25	-	40	fz	0,032	0,037	0,042	0,046	0,050	0,054
	4	1 x D	0,15 x D	50	-	60	fz	0,045	0,052	0,058	0,064	0,069	0,074
H	1	1 x D	0,15 x D	80	-	140	fz	0,054	0,062	0,070	0,077	0,083	0,088
	2	1 x D	0,15 x D	70	-	120	fz	0,040	0,047	0,052	0,057	0,061	0,065

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

VariMill™ Chip Splitter

High-Performance Solid End Milling

VariMill Chip Splitter end mills shear chips to pieces, enabling the tool to efficiently dive into deep cavities while using dynamic milling strategies in stainless steel and superalloy applications.

Features and Benefits

Chip splitters along the flute break chips into small pieces, which are easier to evacuate.

5-flute geometry for steel applications.

7-flute geometry for stainless steel and superalloy applications.

Up to 4.5 x D Ap1 max, which helps prevent bird-nesting and possible tool breakage.



The end mill design is enhanced with small chip splitters along the tool's cutting edges to break chips into small pieces without reducing the wall finish. These smaller chips are easier to evacuate from the pocket area, especially when machining deep cavities.

DYNAMIC

The end mill evacuates chips in dynamic milling operations with complex tool paths.

EFFICIENT

Operators can utilize the full feed rate, up to the machine's capacity, with the 5- and 7-flute end mill configurations. Dynamic milling processes are typically run using a low value of radial engagement, which generates a thin chip thickness enabling higher feed rate-per-tooth values and subsequently higher MRRs and productivity.

STEADY

No more machine downtime due to tool breakage and bad chip formation and evacuation. The machine will keep running as long as the tool has material to cut in dynamic and trochoidal milling processes.

DYNAMIC CHIP FLOW

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
WP15PE WS15PE	5 & 7

DIAMETER RANGE

INCH	METRIC
1/2–1"	—

INDUSTRY







APPLICATIONS

MATERIALS

P M S



SIDE MILLING



DYNAMIC MILLING



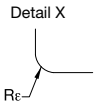
HELICAL INTERPOLATION

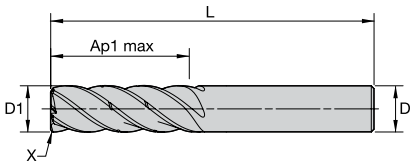


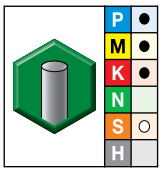
RAMPING

VariMill Chip Splitter • Series 570T • Radiused • 5 Flute • Cylindrical Shank • Inch









WP15PE

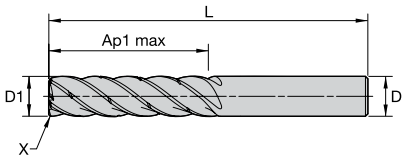
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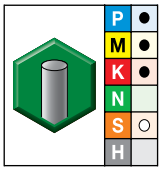
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6853744	570TE13006RET	1/2	1/2	1 1/2	3 1/2	.030	5
6853747	570TE19009RET	3/4	3/4	2 1/4	5	.030	5
6853750	570TE2500ARET	1	1	2 1/4	5	.030	5

VariMill Chip Splitter • Series 571T • Radiused • 5 Flute • Cylindrical Shank • Inch









WP15PE

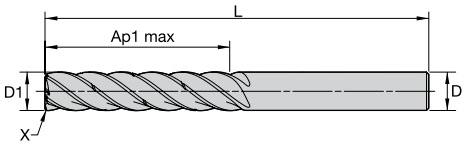
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○ alternate choice

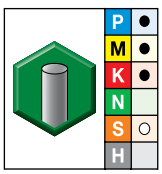
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6853745	571TE13016RET	1/2	1/2	2	4	.030	5
6853748	571TE19019RET	3/4	3/4	3	6	.030	5
6853761	571TE2501ARET	1	1	3 1/2	6 1/2	.030	5

VariMill Chip Splitter • Series 572T • Radiused • 5 Flute • Cylindrical Shank • Inch









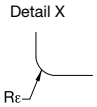
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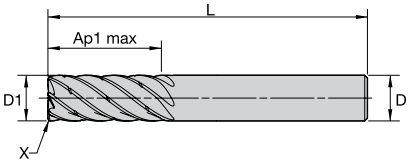
● first choice
○ alternate choice

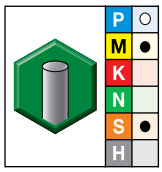
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6853746	572TE13026RET	1/2	1/2	2 1/2	5	.030	5
6853749	572TE19029RET	3/4	3/4	4	7	.030	5
6853762	572TE2502ARET	1	1	4 1/2	7 1/2	.030	5

VariMill Chip Splitter • Series 770T • Radiused • 7 Flute • Cylindrical Shank • Inch









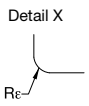
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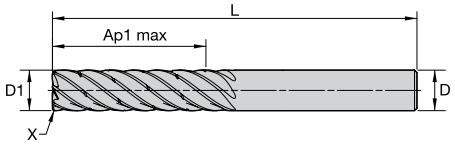
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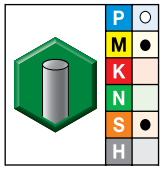
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6853763	770TE13006RET	1/2	1/2	1 1/4	3 1/2	.030	7
6853764	770TE13006RGT	1/2	1/2	1 1/4	3 1/2	.060	7
6853795	770TE2500ARET	1	1	1 3/4	4 1/2	.030	7
6853796	770TE2500ARGT	1	1	1 3/4	4 1/2	.060	7
6853797	770TE2500ARKT	1	1	1 3/4	4 1/2	.120	7

VariMill Chip Splitter • Series 771T • Radiused • 7 Flute • Cylindrical Shank • Inch









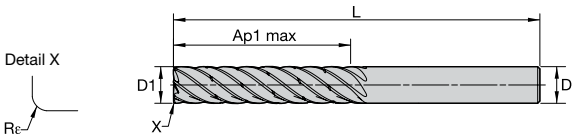
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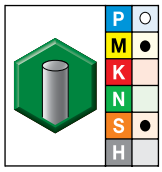
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6853765	771TE13016RET	1/2	1/2	2 1/8	4 1/2	.030	7
6853766	771TE13016RGT	1/2	1/2	2 1/8	4 1/2	.060	7
6853769	771TE19019RET	3/4	3/4	2 1/4	5	.030	7
6853770	771TE19019RGT	3/4	3/4	2 1/4	5	.060	7
6853791	771TE19019RKT	3/4	3/4	2 1/4	5	.120	7
6853798	771TE2501ARET	1	1	2 1/4	5	.030	7
6853799	771TE2501ARGT	1	1	2 1/4	5	.060	7
6853800	771TE2501ARKT	1	1	2 1/4	5	.120	7

VariMill Chip Splitter • Series 772T • Radiused • 7 Flute • Cylindrical Shank • Inch







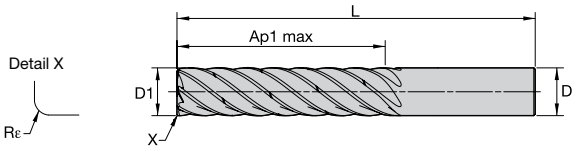
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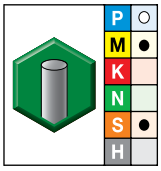
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6853767	772TE13026RET	1/2	1/2	2 1/2	5	.030	7
6853768	772TE13026RGT	1/2	1/2	2 1/2	5	.060	7
6853792	772TE19029RET	3/4	3/4	3 3/4	7	.030	7
6853793	772TE19029RGT	3/4	3/4	3 3/4	7	.060	7
6853794	772TE19029RKT	3/4	3/4	3 3/4	7	.120	7
6853801	772TE2502ARET	1	1	3 1/2	6 1/2	.030	7
6853802	772TE2502ARGT	1	1	3 1/2	6 1/2	.060	7
6853803	772TE2502ARKT	1	1	3 1/2	6 1/2	.120	7

VariMill Chip Splitter • Series 773T • Radiused • 7 Flute • Cylindrical Shank • Inch







WS15PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6853804	773TE2503ARET	1	1	4 1/2	7 1/2	.030	7
6853805	773TE2503ARGT	1	1	4 1/2	7 1/2	.060	7
6853806	773TE2503ARKT	1	1	4 1/2	7 1/2	.120	7

VariMill Chip Splitter • Series 570T 571T 572T • Application Data • WP15PE • Inch • ae = 10% of D1





Material Group		Side Milling		WP15PE Cutting Speed — Vc (SFM)			Recommended feed per tooth (fz=IPT) for side milling at ae = 10% of D1 D1 — Diameter					
		ap	ae	min	Start	max	fraction	3/8	1/2	5/8	3/4	1
P	0	ap max	0.1 x D1	880	1030	1180	IPT	.0034	.0039	.0048	.0054	.0059
	1	ap max	0.1 x D1	880	1030	1180	IPT	.0034	.0039	.0048	.0054	.0059
	2	ap max	0.1 x D1	830	990	1125	IPT	.0034	.0039	.0048	.0054	.0059
	3	ap max	0.1 x D1	710	830	954	IPT	.0024	.0033	.0041	.0048	.0054
	4	ap max	0.1 x D1	530	705	880	IPT	.0026	.0030	.0036	.0042	.0046
	5	ap max	0.1 x D1	350	470	590	IPT	.0023	.0026	.0033	.0038	.0043
	6	ap max	0.1 x D1	295	370	440	IPT	.0019	.0022	.0027	.0031	.0033
M	1	ap max	0.1 x D1	530	600	675	IPT	.0029	.0033	.0041	.0048	.0054
	2	ap max	0.1 x D1	350	405	465	IPT	.0023	.0026	.0033	.0038	.0043
	3	ap max	0.1 x D1	350	380	410	IPT	.0019	.0022	.0027	.0031	.0033
K	1	ap max	0.1 x D1	710	795	880	IPT	.0034	.0039	.0048	.0054	.0059
	2	ap max	0.1 x D1	650	740	820	IPT	.0029	.0033	.0041	.0048	.0054
	3	ap max	0.1 x D1	650	705	765	IPT	.0023	.0026	.0033	.0038	.0043
S	1	ap max	0.1 x D1	295	410	530	IPT	.0029	.0033	.0041	.0048	.0054
	2	ap max	0.1 x D1	145	190	235	IPT	.0015	.0018	.0022	.0026	.0029
	3	ap max	0.1 x D1	145	190	235	IPT	.0015	.0018	.0022	.0026	.0029
	4	ap max	0.1 x D1	295	320	350	IPT	.0021	.0024	.0030	.0035	.0039
H	1	ap max	0.1 x D1	470	640	820	IPT	.0026	.0030	.0036	.0042	.0046
	2	ap max	0.1 x D1	415	560	710	IPT	.0019	.0022	.0027	.0031	.0033

VariMill Chip Splitter • Series 570T 571T 572T • Application Data • WP15PE • Inch • ae = 5% of D1





Material Group		Side Milling		WP15PE Cutting Speed — Vc (SFM)			Recommended feed per tooth (fz=IPT) for side milling at ae = 5% of D1 D1 — Diameter					
		ap	ae	min	Start	max	fraction	3/8	1/2	5/8	3/4	1
P	0	ap max	0.05 x D1	980	1145	1310	IPT	.0050	.0050	.0060	.0070	.0080
	1	ap max	0.05 x D1	980	1145	1310	IPT	.0050	.0050	.0060	.0070	.0080
	2	ap max	0.05 x D1	920	1100	1250	IPT	.0050	.0050	.0060	.0070	.0080
	3	ap max	0.05 x D1	790	920	1050	IPT	.0040	.0040	.0060	.0060	.0070
	4	ap max	0.05 x D1	590	785	980	IPT	.0030	.0040	.0050	.0060	.0060
	5	ap max	0.05 x D1	390	525	660	IPT	.0030	.0040	.0040	.0050	.0060
	6	ap max	0.05 x D1	330	410	490	IPT	.0030	.0030	.0040	.0040	.0050
M	1	ap max	0.05 x D1	590	670	750	IPT	.0040	.0040	.0060	.0060	.0070
	2	ap max	0.05 x D1	390	455	520	IPT	.0030	.0040	.0040	.0050	.0060
	3	ap max	0.05 x D1	390	425	460	IPT	.0030	.0030	.0040	.0040	.0050
K	1	ap max	0.05 x D1	790	885	980	IPT	.0050	.0050	.0060	.0070	.0080
	2	ap max	0.05 x D1	720	820	920	IPT	.0040	.0040	.0060	.0060	.0070
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S	1	ap max	0.05 x D1	330	460	590	IPT	.0040	.0040	.0060	.0060	.0070
	2	ap max	0.05 x D1	160	210	260	IPT	.0020	.0020	.0030	.0030	.0040
	3	ap max	0.05 x D1	160	210	260	IPT	.0020	.0020	.0030	.0030	.0040
	4	ap max	0.05 x D1	330	360	390	IPT	.0030	.0030	.0040	.0050	.0050
H	1	ap max	0.05 x D1	520	720	920	IPT	.0030	.0040	.0050	.0040	.0060
	2	ap max	0.05 x D1	460	625	790	IPT	.0030	.0030	.0040	.0040	.0050

VariMill Chip Splitter • Series 570T 571T 572T • Application Data • WP15PE • Inch • ae = 2% of D1





Material Group		Side Milling		WP15PE Cutting Speed — Vc (SFM)			Recommended feed per tooth (fz=IPT) for side milling at ae = 2% of D1 D1 — Diameter					
		ap	ae	min	Start	max	fraction	3/8	1/2	5/8	3/4	1
P	0	ap max	0.02 x D1	1000	1170	1330	IPT	.0070	.0080	.0090	.0011	.0110
	1	ap max	0.02 x D1	1000	1170	1330	IPT	.0070	.0080	.0090	.0011	.0110
	2	ap max	0.02 x D1	340	1120	1275	IPT	.0070	.0080	.0090	.0011	.0110
	3	ap max	0.02 x D1	805	940	1070	IPT	.0060	.0060	.0080	.0090	.0100
	4	ap max	0.02 x D1	600	800	1000	IPT	.0050	.0060	.0070	.0080	.0090
	5	ap max	0.02 x D1	400	535	670	IPT	.0040	.0050	.0060	.0070	.0080
	6	ap max	0.02 x D1	335	420	500	IPT	.0040	.0040	.0050	.0060	.0070
M	1	ap max	0.02 x D1	600	680	765	IPT	.0060	.0060	.0080	.0090	.0100
	2	ap max	0.02 x D1	400	460	530	IPT	.0040	.0050	.0060	.0070	.0080
	3	ap max	0.02 x D1	400	430	470	IPT	.0040	.0040	.0050	.0060	.0070
K	1	ap max	0.02 x D1	805	900	1000	IPT	.0070	.0080	.0090	.0110	.0110
	2	ap max	0.02 x D1	735	830	940	IPT	.0060	.0060	.0080	.0090	.0100
	3	ap max	0.02 x D1	735	800	860	IPT	.0040	.0050	.0060	.0070	.0080
S	1	ap max	0.02 x D1	330	470	600	IPT	.0060	.0060	.0080	.0090	.0100
	2	ap max	0.02 x D1	165	215	265	IPT	.0030	.0030	.0040	.0050	.0060
	3	ap max	0.02 x D1	165	215	265	IPT	.0030	.0030	.0040	.0050	.0060
	4	ap max	0.02 x D1	330	360	390	IPT	.0040	.0050	.0060	.0070	.0080
H	1	ap max	0.02 x D1	530	730	930	IPT	.0050	.0060	.0070	.0080	.0090
	2	ap max	0.02 x D1	470	630	800	IPT	.0040	.0040	.0050	.0060	.0070

VariMill Chip Splitter • Series 770T 771T 772T 773T • Application Data • WS15PE • Inch • ae = 10% of D1





Material Group		Side Milling		WS15PE Cutting Speed — Vc (SFM)			Recommended feed per tooth (fz=IPT) for side milling at ae = 10% of D1 D1 — Diameter					
		ap	ae	min	Start	max	fraction	3/8	1/2	5/8	3/4	1
P	4	ap max	0.1 x D1	530	705	880	IPT	.0026	.0030	.0036	.0042	.0046
	5	ap max	0.1 x D1	350	470	590	IPT	.0023	.0026	.0033	.0038	.0043
	6	ap max	0.1 x D1	295	370	440	IPT	.0019	.0022	.0027	.0031	.0033
M	1	ap max	0.1 x D1	530	600	675	IPT	.0029	.0033	.0041	.0048	.0054
	2	ap max	0.1 x D1	350	405	465	IPT	.0023	.0026	.0033	.0038	.0043
	3	ap max	0.1 x D1	350	380	410	IPT	.0019	.0022	.0027	.0031	.0033
S	1	ap max	0.1 x D1	295	410	530	IPT	.0029	.0033	.0041	.0048	.0054
	2	ap max	0.1 x D1	145	190	235	IPT	.0015	.0018	.0022	.0026	.0029
	3	ap max	0.1 x D1	145	190	235	IPT	.0015	.0018	.0022	.0026	.0029
	4	ap max	0.1 x D1	295	320	350	IPT	.0021	.0024	.0030	.0035	.0039
H	1	ap max	0.1 x D1	470	640	820	IPT	.0026	.0030	.0036	.0042	.0046
	2	ap max	0.1 x D1	415	560	710	IPT	.0019	.0022	.0027	.0031	.0033

VariMill Chip Splitter • Series 770T 771T 772T 773T • Application Data • WS15PE • Inch • ae = 5% of D1





Material Group		Side Milling		WS15PE Cutting Speed — Vc (SFM)			Recommended feed per tooth (fz=IPT) for side milling at ae = 5% of D1 D1 — Diameter					
		ap	ae	min	Start	max	fraction	3/8	1/2	5/8	3/4	1
P	4	ap max	0.05 x D1	590	785	980	IPT	.0030	.0040	.0050	.0060	.0060
	5	ap max	0.05 x D1	390	525	660	IPT	.0030	.0040	.0040	.0050	.0060
	6	ap max	0.05 x D1	330	410	490	IPT	.0030	.0030	.0040	.0040	.0050
M	1	ap max	0.05 x D1	590	670	750	IPT	.0040	.0040	.0060	.0060	.0070
	2	ap max	0.05 x D1	390	455	520	IPT	.0030	.0040	.0040	.0050	.0060
	3	ap max	0.05 x D1	390	425	460	IPT	.0030	.0030	.0040	.0040	.0050
S	1	ap max	0.05 x D1	330	460	590	IPT	.0040	.0040	.0060	.0060	.0070
	2	ap max	0.05 x D1	160	210	260	IPT	.0020	.0020	.0030	.0030	.0040
	3	ap max	0.05 x D1	160	210	260	IPT	.0020	.0020	.0030	.0030	.0040
	4	ap max	0.05 x D1	330	360	390	IPT	.0030	.0030	.0040	.0050	.0050
H	1	ap max	0.05 x D1	520	720	920	IPT	.0030	.0040	.0050	.0040	.0060
	2	ap max	0.05 x D1	460	625	790	IPT	.0030	.0030	.0040	.0040	.0050

VariMill Chip Splitter • Series 770T 771T 772T 773T • Application Data • WS15PE • Inch • ae = 2% of D1





Material Group		Side Milling		WS15PE Cutting Speed — Vc (SFM)			Recommended feed per tooth (fz=IPT) for side milling at ae = 2% of D1 D1 — Diameter					
		ap	ae	min	Start	max	fraction	3/8	1/2	5/8	3/4	1
P	4	ap max	0.02 x D1	600	800	1000	IPT	.0050	.0060	.0070	.0080	.0090
	5	ap max	0.02 x D1	400	535	670	IPT	.0040	.0050	.0060	.0070	.0080
	6	ap max	0.02 x D1	335	420	500	IPT	.0040	.0040	.0050	.0060	.0070
M	1	ap max	0.02 x D1	600	680	765	IPT	.0060	.0060	.0080	.0090	.0100
	2	ap max	0.02 x D1	400	460	530	IPT	.0040	.0050	.0060	.0070	.0080
	3	ap max	0.02 x D1	400	430	470	IPT	.0040	.0040	.0050	.0060	.0070
S	1	ap max	0.02 x D1	330	470	600	IPT	.0060	.0060	.0080	.0090	.0100
	2	ap max	0.02 x D1	165	215	265	IPT	.0030	.0030	.0040	.0050	.0060
	3	ap max	0.02 x D1	165	215	265	IPT	.0030	.0030	.0040	.0050	.0060
	4	ap max	0.02 x D1	330	360	390	IPT	.0040	.0050	.0060	.0070	.0080
H	1	ap max	0.02 x D1	530	730	930	IPT	.0050	.0060	.0070	.0080	.0090
	2	ap max	0.02 x D1	470	630	800	IPT	.0040	.0040	.0050	.0060	.0070

Roughers

High-Performance Solid End Milling

The High-Performance Roughers group of products includes numerous end mills with chip breaker profiles to operate on multiple materials and in multiple end markets, providing effective chip control to reduce the spindle power and efficiently machine components when a high quantity of material needs to be removed. This group is designed with chip breaker profiles to operate on low-power machines or when the cutting conditions are not stable.

Features and Benefits

Chipbreaker profiles to generate small and easy-to-evacuate chips.

Center cut for improved plunging and ramping applications.

Different helix angles to ensure the best performance and cutting actions on different materials categories.



The chip breaker profile on Rougher end mills helps reduce cutting forces and temperature increases, allowing the tool to perform operations longer. With different available shapes, the roughing profiles ensure the formation of small chips, which are easier to evacuate from the cutting area on different workpiece materials.

SMOOTH

The chipbreaker profile helps reduce cutting forces and the generation of high temperatures.

EASY

Small chips are easy to evacuate from the cutting area, increasing productivity and reducing machine downtime.

FIRM

The Roughers' end mills are the perfect tool when full slotting operations are the daily job.

ROUGHING BEYOND THE LIMITS

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
WP15PE WS15PE TiAlN	3–6

DIAMETER RANGE

INCH	METRIC
3/16–1"	3–25mm

INDUSTRY









APPLICATIONS

MATERIALS

P M K S H



SIDE MILLING



RAMPING



HELICAL INTERPOLATION



SLOTTING



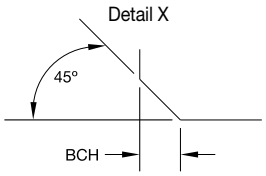
DYNAMIC MILLING

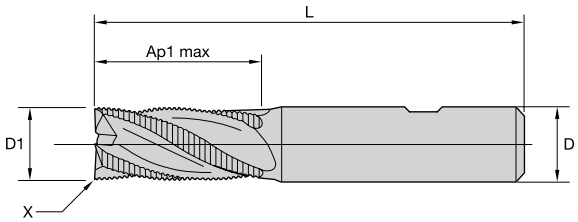


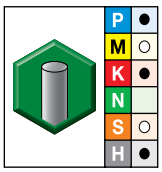
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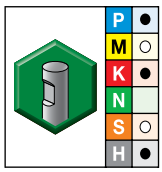
Roughers • Series 4S0R • Chamfer • Inch









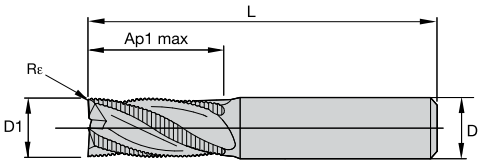


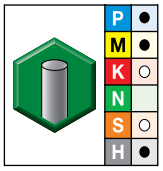
● first choice
○ alternate choice

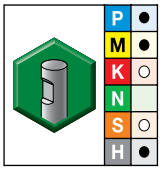
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	–	2831385	TR4S4R07002	1/4	1/4	3/8	2	.012	3
5577389	4S0R07002NT		–	1/4	1/4	3/4	2 1/2	.012	3
	–	1952552	TR4S4R10004	3/8	3/8	1/2	2	.020	4
	–	5577390	4S0R10004NW	3/8	3/8	7/8	2 1/2	.020	4
	–	1952593	TR4S4R13005	1/2	1/2	5/8	2 1/2	.020	4
	–	5577391	4S0R13005NW	1/2	1/2	1	3	.020	4
	–	2831360	TR4S4R16006	5/8	5/8	3/4	3	.020	4
	–	5577392	4S0R16006NW	5/8	5/8	1 1/4	3 1/2	.020	4
	–	2831355	TR4S4R19007	3/4	3/4	7/8	3 1/2	.020	4
	–	5577393	4S0R19007NW	3/4	3/4	1 1/2	4	.020	4
	–	5577395	4S0R25018NW	1	1	1 1/2	4	.020	4
	–	5577394	4S0R25008NW	1	1	1 1/2	4	.020	5

Roughers • Series 4M0R 4M4R • Radius • Inch







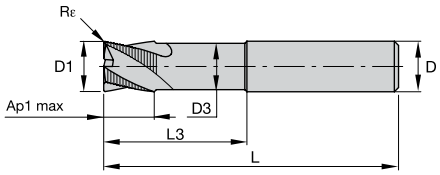


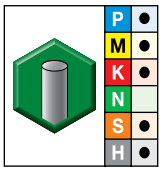
● first choice
○ alternate choice

WP15PE		WP15PE							
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5577384	4M4R07002BT		–	1/4	1/4	3/8	2	.030	3
5577315	4M0R07002BT		–	1/4	1/4	3/4	2 1/2	.030	4
5577385	4M4R10004BT		–	3/8	3/8	1/2	2	.030	4
5577316	4M0R10004BT		–	3/8	3/8	7/8	2 1/2	.030	4
	–	5577386	4M4R13005XW	1/2	1/2	5/8	2 1/2	.040	4
	–	5577317	4M0R13005XW	1/2	1/2	1 1/4	3	.040	4
	–	5577319	4M0R16016XW	5/8	5/8	1 1/4	3 1/2	.040	6
	–	5577388	4M4R19009XW	3/4	3/4	7/8	3 1/2	.050	4
	–	5577381	4M0R19017XW	3/4	3/4	1 1/2	4	.050	6
	–	5577380	4M0R19007XW	3/4	3/4	1 1/2	4	.050	4
	–	3321507	TM4M1R19017A	3/4	3/4	2 1/4	5	.050	6
	–	5577383	4M0R25018XW	1	1	1 1/2	4	.050	6
	–	5577382	4M0R25008XW	1	1	1 1/2	4	.050	4
	–	3099533	TM4M1R25018A	1	1	2 1/4	5	.050	6

Roughers • Series 4QN3 • Radius • Neck • Inch





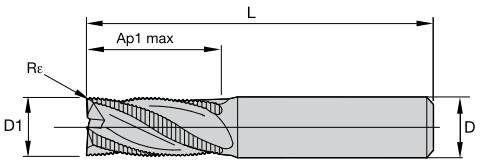


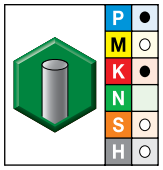
● first choice
○ alternate choice

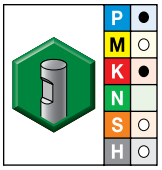
		TiAlN-LT							
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
2837886	TF4QN310014A	3/8	3/8	.35	1/2	2 1/4	4	.020	3
2837870	TF4QN313005A	1/2	1/2	.47	5/8	2 1/4	5	.030	3
2837826	TF4QN319007A	3/4	3/4	.71	1	2 1/4	5	.030	3

Roughers • Series 4Q03 4Q05 4Q43 • Radius • Inch







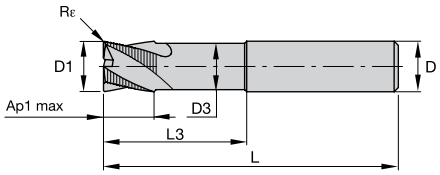


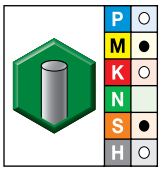
● first choice
○ alternate choice

		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
	–	5576744	4Q4305000XW	3/16	3/16	5/16	2	.010	3
5576674	4Q0305000XT		–	3/16	3/16	5/8	2	.010	3
	–	5576675	4Q0307002XW	1/4	1/4	3/4	2 1/2	.020	3
	–	5576747	4Q4310014XW	3/8	3/8	1/2	2	.020	3
	–	5576677	4Q0310014XW	3/8	3/8	1	2 1/2	.020	3
	–	5576678	4Q0313015BW	1/2	1/2	1 1/4	3	.030	3
	–	5576679	4Q0316006BW	5/8	5/8	1 5/8	3 1/2	.030	3
	–	5576750	4Q4319017BW	3/4	3/4	1	3 1/2	.030	3
	–	5576743	4Q0525008BW	1	1	2	4	.030	4

Roughers • Series 4U50 • Radius • Inch







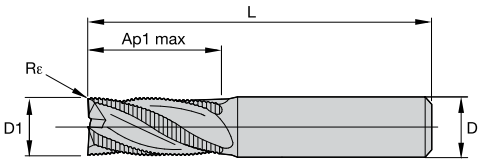
● first choice
○ alternate choice

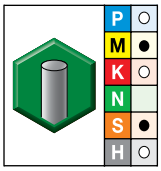
WS15PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
6441870	4U50E0700R2BT	1/4	1/4	.24	3/8	.75	2 1/2	.030	4
6441871	4U50E1000R4BT	3/8	3/8	.35	1/2	1.13	3	.030	4
6441872	4U50E1300R5BT	1/2	1/2	.47	5/8	1.50	3 1/2	.030	4
6441873	4U50E1601R6BT	5/8	5/8	.59	5/8	1.88	4	.030	6
6441874	4U50E1901R7XT	3/4	3/4	.71	3/4	2.25	4 1/2	.050	6
6441875	4U50E2501R8XT	1	1	.94	1	3.00	5 1/2	.050	6

Roughers • Series 4U80 • Radius • Inch







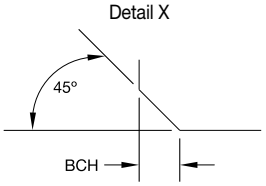
● first choice
○ alternate choice

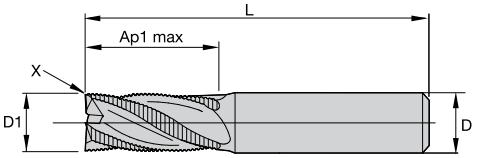
WS15PE

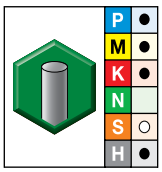
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6441861	4U80E0700R2BT	1/4	1/4	3/4	2 1/2	.030	4
6441862	4U80E0800R3BT	5/16	5/16	13/16	2 1/2	.030	4
6441863	4U80E1000R4BT	3/8	3/8	7/8	2 1/2	.030	4
6441864	4U80E1300R5BT	1/2	1/2	1 1/4	3	.030	4
6441865	4U80E1600R6BT	5/8	5/8	1 7/8	4	.030	6
6441866	4U80E1900R7XT	3/4	3/4	1 1/2	4	.050	4
6441867	4U80E1901R7XT	3/4	3/4	1 1/2	4	.050	6
6441868	4U80E2500R8XT	1	1	1 1/2	4	.050	4
6441869	4U80E2501R8XT	1	1	1 1/2	4	.050	6

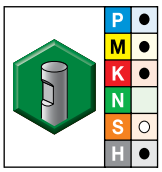
Roughers • Series 4906 • Chamfer • Metric









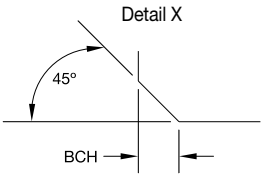


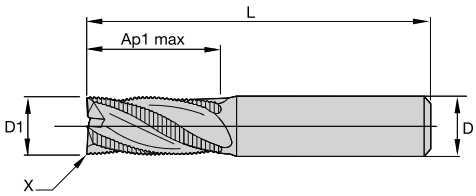
● first choice
○ alternate choice

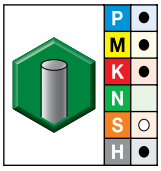
WP15PE		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
1657001	490604002RT	1657002	490604002RW	4,0	6	11,00	55	0,30	3
1657009	490605002RT	1657010	490605002RW	5,0	6	13,00	57	0,30	3
1657018	490606002RT	1657019	490606002RW	6,0	6	13,00	57	0,30	3
3133084	490607003RT	1657025	490607003RW	7,0	8	16,00	63	0,30	3
1657033	490608003RT	1657034	490608003RW	8,0	8	16,00	63	0,30	3
1657050	490610004RT	1657051	490610004RW	10,0	10	22,00	72	0,50	4
3133086	490611005RT	–		11,0	12	26,00	83	0,50	4
1657063	490612005RT	1657064	490612005RW	12,0	12	26,00	83	0,50	4
–		1657085	490614014RW	14,0	14	26,00	83	0,50	4
1657096	490616006RT	1657097	490616006RW	16,0	16	32,00	92	0,50	4
1657112	490620007RT	1657113	490620007RW	20,0	20	38,00	104	0,50	4
–		1657121	490625008RW	25,0	25	45,00	121	0,50	5

Roughers • Series 4976 • Chamfer • Metric







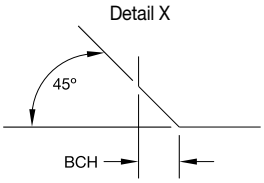


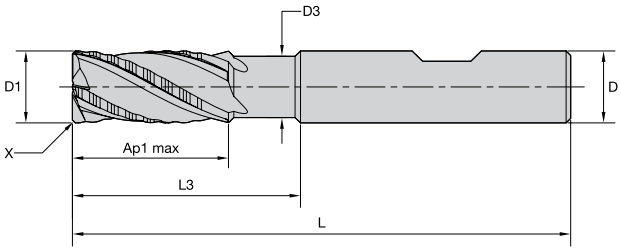
● first choice
○ alternate choice

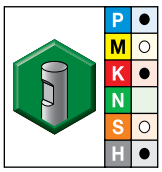
WP15PE						
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
5560708	497604002T	4,0	6	8,00	57	0,30	3
5560709	497605002T	5,0	6	13,00	57	0,30	3
5560710	497606002T	6,0	6	13,00	57	0,30	3
5560711	497608003T	8,0	8	16,00	63	0,30	3
5560712	497610004T	10,0	10	22,00	72	0,50	4
5560713	497612005T	12,0	12	26,00	83	0,50	4
5560714	497614014T	14,0	14	26,00	83	0,50	4
5560715	497616006T	16,0	16	32,00	92	0,50	4
5560717	497620007T	20,0	20	38,00	104	0,50	4

Roughers • Series 49N6 • Chamfer • Neck • Metric









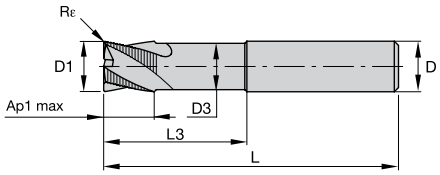
● first choice
○ alternate choice

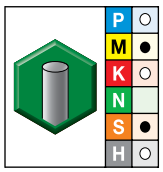
WP15PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	BCH	ZU
3474585	49N606002MW	6,0	6	5,50	13,00	21,00	57	0,30	3
3474587	49N608003MW	8,0	8	7,50	16,00	27,00	63	0,30	3
3474589	49N610004MW	10,0	10	9,50	22,00	32,00	72	0,50	4
3474591	49N612005MW	12,0	12	11,00	26,00	38,00	83	0,50	4
3474594	49N616006MW	16,0	16	15,00	32,00	44,00	92	0,50	4
3474597	49N625008MW	25,0	25	24,00	45,00	65,00	121	0,50	5

Roughers • Series 4U50 • Radius • Metric







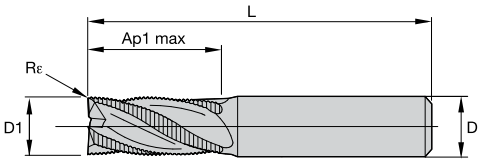
● first choice
○ alternate choice

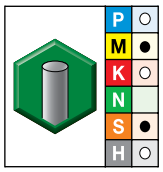
WS15PE

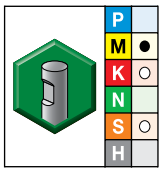
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
6431403	4U50M060R2TC	6,0	6	5,64	6,00	18,00	57	0,30	4
6431404	4U50M080R3TC	8,0	8	7,52	8,00	24,00	63	0,30	4
6431405	4U50M100R4TE	10,0	10	9,40	10,00	30,00	72	0,50	4
6431406	4U50M120R5TE	12,0	12	11,28	12,00	36,00	83	0,50	4
6431407	4U50M160R6TE	16,0	16	15,04	16,00	48,00	92	0,50	6
6431408	4U50M200R7TG	20,0	20	18,80	20,00	60,00	104	1,00	6
6431409	4U50M250R8TG	25,0	25	23,50	25,00	75,00	121	1,00	6

Roughers • Series 4U80 • Radius • Metric









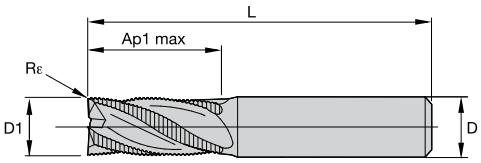
● first choice
○ alternate choice

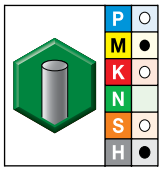
WS15PE | **AlTiN-MW**

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
6431246	4U80M060R2TC	6652714	4U80M060R2WC	6,0	6	13,00	57	0,30	4
6431247	4U80M080R3TC	6652715	4U80M080R3WC	8,0	8	16,00	63	0,30	4
6431248	4U80M100R4TE	6652716	4U80M100R4WE	10,0	10	22,00	72	0,50	4
6431249	4U80M120R5TE	6652717	4U80M120R5WE	12,0	12	26,00	83	0,50	4
6431250	4U80M160R6TE	6652718	4U80M160R6WE	16,0	16	32,00	92	0,50	6
6431401	4U80M200R7TG		–	20,0	20	38,00	104	1,00	6
6431402	4U80M250R8TG		–	25,0	25	45,00	121	1,00	6

Roughers • Series 4U40 • Radius • Metric







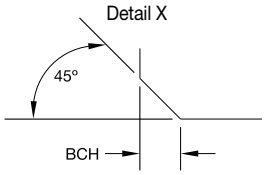
● first choice
○ alternate choice

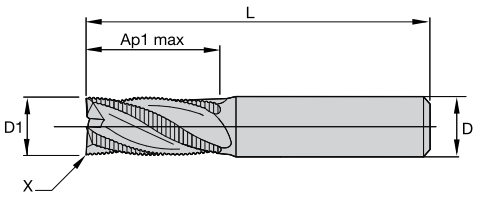
WP15PE

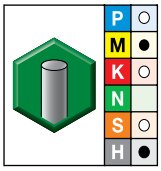
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
5583420	4U4008003T	8,0	8	8,00	63	0,75	4

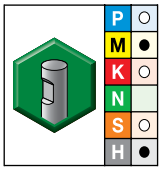
Roughers • Series 4U70 • Radius • Metric









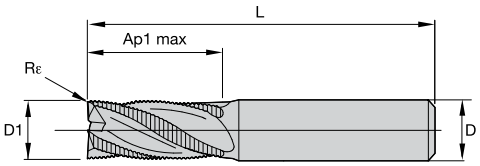


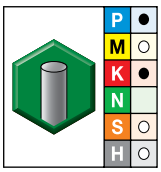
● first choice
○ alternate choice

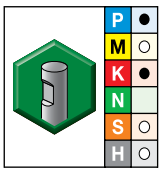
WP15PE		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
–		5583436	4U7006002W	6,0	6	13,00	57	0,30	4
–		5583437	4U7008003W	8,0	8	16,00	63	0,40	4
–		5583439	4U7012005W	12,0	12	26,00	83	0,60	4
–		5583440	4U7016006W	16,0	16	32,00	92	0,60	6
5583431	4U7016046T	–		16,0	16	32,00	92	0,60	4
5583433	4U7020047T	–		20,0	20	38,00	104	1,00	4

Roughers • Series DQ13 • Radius • Metric







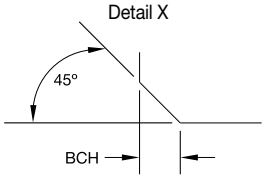


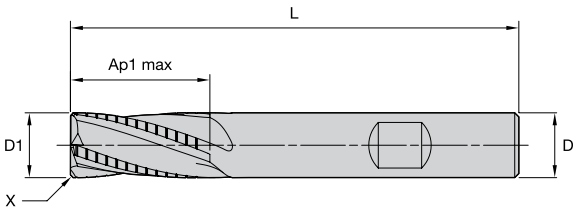
● first choice
○ alternate choice

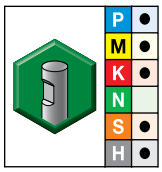
WP15PE		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
5560534	DQ1303002T	5560536	DQ1303002W	3,0	6	7,00	54	0,25	3
5560535	DQ1304002T	–		4,0	6	8,00	57	0,25	3
–		5560538	DQ1305002W	5,0	6	10,00	57	0,25	3
–		5560539	DQ1306002W	6,0	6	10,00	57	0,45	3
–		5560701	DQ1308003W	8,0	8	16,00	63	0,45	3
–		5560702	DQ1310004W	10,0	10	19,00	72	0,45	3
–		5560703	DQ1312005W	12,0	12	22,00	83	0,45	3
–		5560704	DQ1314014W	14,0	14	22,00	83	0,45	3
–		5560705	DQ1316006W	16,0	16	32,00	92	0,45	3
–		5560706	DQ1318018W	18,0	18	32,00	92	0,45	3

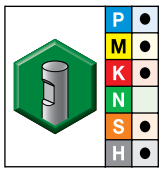
Roughers • Series 49H6 • Chamfer • Internal Coolant • Metric









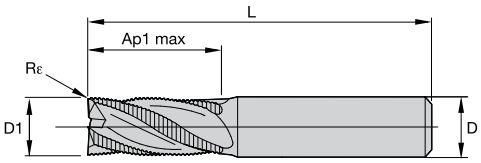


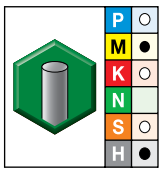
● first choice
○ alternate choice

TiAlN-LW		WP15PE							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
–		1657264	49H610004RW	10,0	10	22,00	72	0,50	4
–		1657268	49H612005RW	12,0	12	26,00	83	0,50	4
1968206	49H614014LW	–		14,0	14	26,00	83	0,50	4
–		1657274	49H616006RW	16,0	16	32,00	92	0,50	4

Roughers • Series 4940 • Radius • Metric







● first choice
○ alternate choice

TiAlN-LT

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
1846543	494006002LT	6,0	6	6,00	57	0,75	4
1846544	494008003LT	8,0	8	8,00	63	0,75	4
1846545	494010004LT	10,0	10	10,00	72	0,75	4
1846546	494012005LT	12,0	12	12,00	83	1,00	4
1846547	494016006LT	16,0	16	16,00	92	1,00	6

Roughers • Series 4S0R • Application Data • WP15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/4	3/8	1/2	5/8	3/4	1
								dec.	.2500	.3750	.5000	.6250	.7500	1.0000
P	0	1 x D	0.5 x D	0.5 x D	490	–	660	IPT	.0015	.0022	.0027	.0032	.0035	.0039
	1	1 x D	0.5 x D	0.5 x D	490	–	660	IPT	.0015	.0022	.0027	.0032	.0035	.0039
	2	1 x D	0.5 x D	0.5 x D	460	–	620	IPT	.0015	.0022	.0027	.0032	.0035	.0039
	3	1 x D	0.4 x D	0.5 x D	390	–	520	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	4	1 x D	0.3 x D	0.4 x D	300	–	490	IPT	.0011	.0016	.0021	.0024	.0027	.0031
	5	1 x D	0.4 x D	0.5 x D	200	–	330	IPT	.0010	.0015	.0019	.0022	.0025	.0029
M	1	1 x D	0.4 x D	0.5 x D	300	–	380	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	2	1 x D	0.4 x D	0.5 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0025	.0029
	3	1 x D	0.4 x D	0.5 x D	200	–	230	IPT	.0008	.0012	.0015	.0018	.0020	.0023
K	1	1 x D	0.5 x D	0.5 x D	390	–	490	IPT	.0015	.0022	.0027	.0032	.0035	.0039
	2	1 x D	0.4 x D	0.5 x D	360	–	460	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	3	1 x D	0.4 x D	0.5 x D	360	–	430	IPT	.0010	.0015	.0019	.0022	.0025	.0029
S	1	1 x D	0.5 x D	0.3 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	3	1 x D	0.5 x D	0.4 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
H	1	1 x D	0.3 x D	0.3 x D	260	–	460	IPT	.0011	.0016	.0021	.0024	.0027	.0031

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Roughers • Series 4M0R 4M4R • Application Data • WP15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/4	3/8	1/2	5/8	3/4	1
								dec.	.2500	.3750	.5000	.6250	.7500	1.0000
P	3	1 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	4	1 x D	0.3 x D	0.75 x D	300	–	490	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	5	1 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	6	1 x D	0.3 x D	0.3 x D	160	–	250	IPT	.0010	.0015	.0019	.0022	.0025	.0028
M	1	1 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	3	1 x D	0.5 x D	0.75 x D	200	–	230	IPT	.0010	.0015	.0019	.0022	.0025	.0028
K	1	1 x D	0.5 x D	1 x D	390	–	490	IPT	.0018	.0027	.0034	.0040	.0044	.0049
	2	1 x D	0.5 x D	1 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	3	1 x D	0.5 x D	1 x D	360	–	430	IPT	.0012	.0018	.0023	.0027	.0031	.0036
S	1	1 x D	0.3 x D	0.75 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	3	1 x D	0.4 x D	0.75 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	4	1 x D	0.4 x D	0.75 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028	.0033
H	1	1 x D	0.3 x D	0.3 x D	260	–	460	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	2	1 x D	0.2 x D	0.2 x D	230	–	390	IPT	.0010	.0015	.0019	.0022	.0025	.0028
	3	1 x D	0.2 x D	0.2 x D	200	–	300	IPT	.0008	.0012	.0015	.0018	.0021	.0024

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Roughers • Series 4QN3 • Application Data • TiAlN-LT • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac. dec.	D1 — Diameter 1/4 .2500	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500
P	1	1 x D	0.3 x D	0.5 x D	500	–	650	IPT	.0018	.0027	.0035	.0039	.0043
	2	1 x D	0.3 x D	0.5 x D	450	–	625	IPT	.0018	.0027	.0035	.0039	.0043
	3	1 x D	0.3 x D	0.5 x D	400	–	525	IPT	.0015	.0023	.0029	.0034	.0038
	4	1 x D	0.25 x D	0.25 x D	350	–	475	IPT	.0014	.0020	.0026	.0030	.0033
	5	1 x D	0.3 x D	0.5 x D	200	–	325	IPT	.0012	.0018	.0023	.0027	.0030
	6	1 x D	0.25 x D	0.25 x D	150	–	225	IPT	.0010	.0015	.0019	.0022	.0024
M	1	1 x D	0.3 x D	0.5 x D	250	–	325	IPT	.0015	.0023	.0029	.0034	.0038
	2	1 x D	0.3 x D	0.5 x D	190	–	260	IPT	.0012	.0018	.0023	.0027	.0030
	3	1 x D	0.3 x D	0.5 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024
K	1	1 x D	0.3 x D	0.5 x D	400	–	525	IPT	.0018	.0027	.0035	.0039	.0043
	2	1 x D	0.3 x D	0.5 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038
	3	1 x D	0.3 x D	0.5 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030
S	1	1 x D	0.25 x D	0.25 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039
	2	1 x D	0.25 x D	0.25 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021
	3	1 x D	0.3 x D	0.5 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021
	4	1 x D	0.3 x D	0.5 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028
H	1	1 x D	0.25 x D	0.25 x D	300	–	450	IPT	.0014	.0020	.0026	.0030	.0033

NOTE: Side milling applications — For longest reach (L3) tools, reduce ae by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Roughers • Series 4Q03 4Q05 4Q43 • Application Data • WP15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac. dec.	D1 — Diameter 3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	0	1 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	1	1 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	2	1 x D	0.5 x D	0.75 x D	460	–	620	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	3	1 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	1 x D	0.4 x D	0.5 x D	300	–	490	IPT	.0010	.0014	.0018	.0020	.0026	.0030	.0034	.0039
	5	1 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	6	1 x D	0.4 x D	0.5 x D	160	–	250	IPT	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
M	1	1 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.4 x D	0.75 x D	200	–	260	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	3	1 x D	0.4 x D	0.75 x D	200	–	230	IPT	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
K	1	1 x D	0.5 x D	0.75 x D	390	–	490	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	2	1 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	1 x D	0.4 x D	0.75 x D	360	–	430	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
S	1	1 x D	0.3 x D	0.4 x D	160	–	300	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	3	1 x D	0.4 x D	0.75 x D	80	–	130	IPT	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	4	1 x D	0.4 x D	0.75 x D	160	–	200	IPT	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033
H	1	1 x D	0.2 x D	0.3 x D	260	–	460	IPT	.0010	.0014	.0018	.0020	.0026	.0030	.0034	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Roughers • Series 4U50 • Application Data • WS15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — Vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/4	5/16	3/8	1/2	5/8	3/4	1
		ap	ae	ap	min		max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
M	1	1 x D	0.5 x D	0.75 x D	297	–	379.5	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	1 x D	0.5 x D	0.75 x D	198	–	264	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	3	1 x D	0.5 x D	0.75 x D	198	–	231	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
S	1	1 x D	0.3 x D	0.75 x D	160	–	300	IPT	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0010	.0012	.0015	.0018	.0021	.0026
	3	1 x D	0.4 x D	0.75 x D	80	–	130	IPT	.0008	.0010	.0012	.0015	.0018	.0021	.0026
	4	1 x D	0.4 x D	0.75 x D	160	–	200	IPT	.0011	.0014	.0017	.0021	.0025	.0028	.0033

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".

Roughers • Series 4U80 • Application Data • WS15PE • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — Vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/4	5/16	3/8	1/2	5/8	3/4	1
		ap	ae	ap	min		max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
M	1	1 x D	0.5 x D	0.75 x D	290	–	380	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	1 x D	0.5 x D	0.75 x D	200	–	265	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	3	1 x D	0.5 x D	0.75 x D	200	–	230	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
S	1	1 x D	0.3 x D	0.75 x D	160	–	300	IPT	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	3	1 x D	0.4 x D	0.75 x D	80	–	130	IPT	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	4	1 x D	0.4 x D	0.75 x D	160	–	200	IPT	.0011	.0014	.0017	.0021	.0025	.0028	.0033

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".

Roughers • Series 4906 • Application Data • WP15PE • Metric



Material Group		Side Milling (A) and Slotting (B)			WP15PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,024	0,031	0,037	0,051	0,061	0,070	0,079	0,086	0,092	0,097	0,105
	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,024	0,031	0,037	0,051	0,061	0,070	0,079	0,086	0,092	0,097	0,105
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,024	0,031	0,037	0,051	0,061	0,070	0,079	0,086	0,092	0,097	0,105
	3	1,5 x D	0,4 x D	0,75 x D	120	–	160	fz	0,020	0,025	0,031	0,043	0,051	0,060	0,067	0,074	0,080	0,086	0,097
	4	1,5 x D	0,3 x D	0,3 x D	90	–	150	fz	0,018	0,023	0,028	0,038	0,046	0,053	0,060	0,065	0,070	0,075	0,083
	5	1,5 x D	0,4 x D	0,75 x D	60	–	100	fz	0,016	0,021	0,025	0,034	0,041	0,048	0,054	0,059	0,064	0,069	0,077
M	1	1,5 x D	0,4 x D	0,75 x D	90	–	115	fz	0,020	0,025	0,031	0,043	0,051	0,060	0,067	0,074	0,080	0,086	0,097
	2	1,5 x D	0,4 x D	0,75 x D	60	–	80	fz	0,016	0,021	0,025	0,034	0,041	0,048	0,054	0,059	0,064	0,069	0,077
	3	1,5 x D	0,4 x D	0,75 x D	60	–	70	fz	0,014	0,017	0,021	0,029	0,034	0,040	0,044	0,048	0,052	0,055	0,060
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,024	0,031	0,037	0,051	0,061	0,070	0,079	0,086	0,092	0,097	0,105
	2	1,5 x D	0,4 x D	1 x D	110	–	140	fz	0,020	0,025	0,031	0,043	0,051	0,060	0,067	0,074	0,080	0,086	0,097
	3	1,5 x D	0,4 x D	1 x D	110	–	130	fz	0,016	0,021	0,025	0,034	0,041	0,048	0,054	0,059	0,064	0,069	0,077
S	1	1,5 x D	0,4 x D	0,75 x D	50	–	90	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
H	1	1,5 x D	0,3 x D	0,3 x D	80	–	140	fz	0,018	0,023	0,028	0,038	0,046	0,053	0,060	0,065	0,070	0,075	0,083

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

Roughers • Series 4976 • Application Data • WP15PE • Metric



Material Group		Side Milling (A) and Slotting (B)			WP15PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	3	1,5 x D	0,4 x D	0,75 x D	120	–	160	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	4	1,5 x D	0,4 x D	0,75 x D	90	–	150	fz	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	1,5 x D	0,4 x D	0,75 x D	60	–	100	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
M	1	1,5 x D	0,4 x D	0,75 x D	90	–	115	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,4 x D	0,75 x D	60	–	80	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	1,5 x D	0,4 x D	0,75 x D	60	–	70	fz	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	1,5 x D	0,4 x D	1 x D	110	–	140	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	1,5 x D	0,4 x D	1 x D	110	–	130	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
S	1	1,5 x D	0,3 x D	0,75 x D	50	–	90	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	1,5 x D	0,4 x D	0,75 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	1,5 x D	0,3 x D	0,75 x D	50	–	60	fz	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	1,5 x D	0,3 x D	0,3 x D	80	–	140	fz	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

Roughers • Series 49N6 • Application Data • WP15PE • Metric





Material Group		Side Milling (A) and Slotting (B)			WP15PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.											
		A		B	Cutting Speed — vc m/min				D1 — Diameter										
		ap	ae	ap	min		max	mm	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,024	0,031	0,037	0,051	0,061	0,070	0,079	0,086	0,092	0,097	0,105
	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,024	0,031	0,037	0,051	0,061	0,070	0,079	0,086	0,092	0,097	0,105
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,024	0,031	0,037	0,051	0,061	0,070	0,079	0,086	0,092	0,097	0,105
	3	1,5 x D	0,4 x D	0,75 x D	120	–	160	fz	0,020	0,025	0,031	0,043	0,051	0,060	0,067	0,074	0,080	0,086	0,097
	4	1,5 x D	0,3 x D	0,5 x D	90	–	150	fz	0,018	0,023	0,028	0,038	0,046	0,053	0,060	0,065	0,070	0,075	0,083
	5	1,5 x D	0,4 x D	0,75 x D	60	–	100	fz	0,016	0,021	0,025	0,034	0,041	0,048	0,054	0,059	0,064	0,069	0,077
M	1	1,5 x D	0,4 x D	0,75 x D	80	–	100	fz	0,020	0,025	0,031	0,043	0,051	0,060	0,067	0,074	0,080	0,086	0,097
	2	1,5 x D	0,4 x D	0,75 x D	60	–	80	fz	0,016	0,021	0,025	0,034	0,041	0,048	0,054	0,059	0,064	0,069	0,077
	3	1,5 x D	0,4 x D	0,75 x D	60	–	80	fz	0,014	0,017	0,021	0,029	0,034	0,040	0,044	0,048	0,052	0,055	0,060
K	1	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,024	0,031	0,037	0,051	0,061	0,070	0,079	0,086	0,092	0,097	0,105
	2	1,5 x D	0,4 x D	1 x D	110	–	140	fz	0,020	0,025	0,031	0,043	0,051	0,060	0,067	0,074	0,080	0,086	0,097
	3	1,5 x D	0,4 x D	1 x D	100	–	130	fz	0,016	0,021	0,025	0,034	0,041	0,048	0,054	0,059	0,064	0,069	0,077
S	1	1,5 x D	0,4 x D	0,75 x D	50	–	90	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	1,5 x D	0,4 x D	0,75 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
H	1	1,5 x D	0,3 x D	0,3 x D	80	–	140	fz	0,018	0,023	0,028	0,038	0,046	0,053	0,060	0,065	0,070	0,075	0,083

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

Roughers • Series 4U50 • Application Data • WS15PE • Metric





Material Group		Side Milling (A) and Slotting (B)			WS15PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.								
		A		B	Cutting Speed — Vc m/min				D1 — Diameter							
		ap	ae	ap	min		max	mm	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
M	1	0,8 x D	0,5 x D	0,75 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	0,8 x D	0,4 x D	0,75 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	0,8 x D	0,4 x D	0,75 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
S	1	0,8 x D	0,4 x D	0,75 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	0,8 x D	0,25 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	0,8 x D	0,4 x D	0,75 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	0,8 x D	0,3 x D	0,3 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 12mm.

Roughers • Series 4U80 • Application Data • WS15PE • Metric







Material Group		Side Milling (A) and Slotting (B)			WS15PE/AlTiN-MW			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.								
		A		B	Cutting Speed — Vc m/min				D1 — Diameter							
		ap	ae	ap	min		max	mm	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
M	1	1 x D	0,5 x D	0,75 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1 x D	0,5 x D	0,75 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	1 x D	0,5 x D	0,75 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
S	1	1 x D	0,3 x D	0,75 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	1 x D	0,3 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	1 x D	0,4 x D	0,75 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	1 x D	0,4 x D	0,75 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 12mm.

Roughers • Series 4U40 • Application Data • WP15PE • Metric





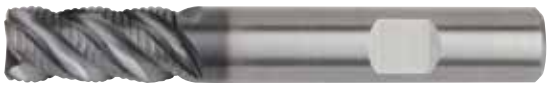


Material Group		Side Milling (A) and Slotting (B)			WP15PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.							
		A		B	Cutting Speed — vc m/min				D1 — Diameter						
		ap	ae	ap	min		max	mm	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	3	0,8 x D	0,5 x D	0,75 x D	120	–	160	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	4	0,8 x D	0,4 x D	0,5 x D	90	–	150	fz	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	5	0,8 x D	0,5 x D	0,75 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	6	0,8 x D	0,4 x D	0,5 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
M	1	0,8 x D	0,5 x D	0,75 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	0,8 x D	0,4 x D	0,75 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	3	0,8 x D	0,4 x D	0,75 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
K	1	0,8 x D	0,5 x D	0,75 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	0,8 x D	0,5 x D	0,75 x D	110	–	140	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	3	0,8 x D	0,4 x D	0,75 x D	110	–	130	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
S	1	0,8 x D	0,4 x D	0,75 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	0,8 x D	0,25 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	0,8 x D	0,4 x D	0,75 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	4	0,8 x D	0,3 x D	0,5 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	0,8 x D	0,5 x D	0,5 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	2	0,8 x D	0,2 x D	0,3 x D	70	–	120	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
	3	0,8 x D	0,15 x D	0,2 x D	60	–	90	fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For rougher tool with 6 flutes, use ap in slotting 60% of table value.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

Roughers • Series 4U70 • Application Data • WP15PE • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter 6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	3	1 x D	0,5 x D	0,75 x D	120	–	160	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	4	1 x D	0,3 x D	0,75 x D	90	–	150	fz	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	5	1 x D	0,5 x D	0,75 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	6	1 x D	0,3 x D	0,3 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
M	1	1 x D	0,5 x D	0,75 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1 x D	0,5 x D	0,75 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	3	1 x D	0,5 x D	0,75 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
K	1	1 x D	0,5 x D	1 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1 x D	0,5 x D	1 x D	110	–	140	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	3	1 x D	0,5 x D	1 x D	110	–	130	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
S	1	1 x D	0,3 x D	0,75 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1 x D	0,3 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	1 x D	0,4 x D	0,75 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	4	1 x D	0,4 x D	0,75 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	1 x D	0,3 x D	0,3 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	2	1 x D	0,2 x D	0,2 x D	70	–	120	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
	3	1 x D	0,2 x D	0,2 x D	60	–	90	fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For rougher tool with 6 flutes, use ap in slotting 60% of table value.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

Roughers • Series DQ13 • Application Data • WP15PE • Metric

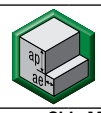


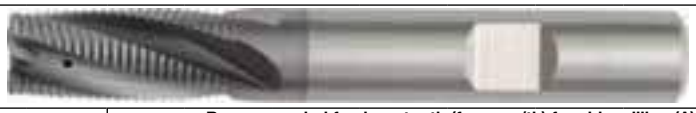


Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter 3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	1 x D	0,5 x D	0,75 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	1 x D	0,5 x D	0,75 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	1 x D	0,5 x D	0,75 x D	140	–	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	1 x D	0,5 x D	0,75 x D	120	–	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	1 x D	0,5 x D	0,5 x D	90	–	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
	5	1 x D	0,5 x D	0,75 x D	60	–	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	6	1 x D	0,4 x D	0,5 x D	50	–	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
M	1	1 x D	0,5 x D	0,75 x D	90	–	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	1 x D	0,4 x D	0,75 x D	60	–	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	3	1 x D	0,4 x D	0,75 x D	60	–	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
K	1	1 x D	0,5 x D	0,75 x D	120	–	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	1 x D	0,5 x D	0,75 x D	110	–	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	3	1 x D	0,4 x D	0,75 x D	110	–	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
S	1	1 x D	0,3 x D	0,4 x D	50	–	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	1 x D	0,3 x D	0,3 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	3	1 x D	0,4 x D	0,75 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	4	1 x D	0,4 x D	0,75 x D	50	–	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074
H	1	1 x D	0,2 x D	0,3 x D	80	–	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

Roughers • Series 49H6 • Application Data • WP15PE/TiAlN-LW • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	ae	B ap	WP15PE/TiAlN Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. mm	D1 — Diameter 8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,048	0,058	0,066	0,074	0,081	0,086	0,091
	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,048	0,058	0,066	0,074	0,081	0,086	0,091
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,048	0,058	0,066	0,074	0,081	0,086	0,091
	3	1,0 x D	0,4 x D	0,75 x D	120	–	160	fz	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	4	1,0 x D	0,3 x D	0,5 X D	90	–	150	fz	0,036	0,043	0,050	0,056	0,061	0,066	0,070
	5	1,0 x D	0,4 x D	0,75 x D	60	–	100	fz	0,032	0,039	0,045	0,051	0,056	0,060	0,065
M	1	1,0 x D	0,4 x D	0,75 x D	90	–	115	fz	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	2	1,0 x D	0,4 x D	0,75 x D	60	–	80	fz	0,032	0,039	0,045	0,051	0,056	0,060	0,065
	3	1,0 x D	0,4 x D	0,75 x D	60	–	70	fz	0,027	0,032	0,037	0,042	0,046	0,049	0,052
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,048	0,058	0,066	0,074	0,081	0,086	0,091
	2	1,5 x D	0,4 x D	1 x D	110	–	140	fz	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	3	1,5 x D	0,4 x D	1 x D	110	–	130	fz	0,032	0,039	0,045	0,051	0,056	0,060	0,065
S	1	1,5 x D	0,5 x D	0,75 x D	50	–	90	fz	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	3	1,5 x D	0,5 x D	0,75 x D	25	–	40	fz	0,026	0,032	0,037	0,042	0,046	0,050	0,054
H	1	1,0 x D	0,3 x D	0,5 x D	80	–	140	fz	0,036	0,043	0,050	0,056	0,061	0,066	0,070

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

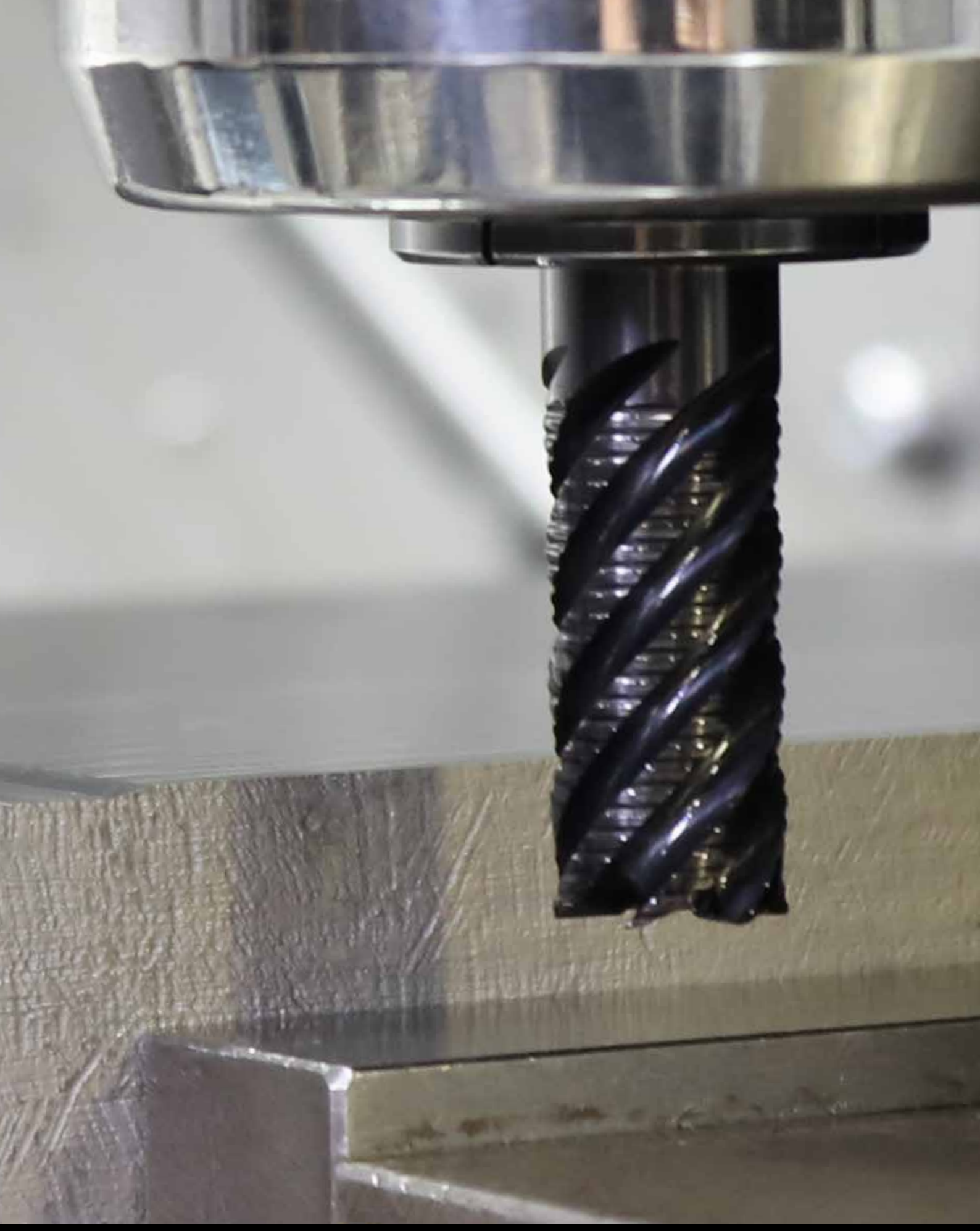
Roughers • Series 4940 • Application Data • TiAlN-LT • Metric





Material Group		A ap	ae	B ap	TiAlN Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. mm	D1 — Diameter 6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	3	0,8 x D	0,5 x D	0,75 x D	120	–	160	Fz	0,031	0,043	0,051	0,063	0,078	0,101	0,114
	4	0,8 x D	0,4 x D	0,5 x D	90	–	150	Fz	0,028	0,038	0,046	0,056	0,069	0,088	0,098
	5	0,8 x D	0,5 x D	0,75 x D	60	–	100	Fz	0,025	0,034	0,041	0,051	0,063	0,081	0,091
	6	0,8 x D	0,4 x D	0,5 x D	50	–	75	Fz	0,021	0,029	0,034	0,042	0,051	0,065	0,071
M	1	0,8 x D	0,5 x D	0,75 x D	80	–	100	Fz	0,031	0,043	0,051	0,063	0,078	0,101	0,114
	2	0,8 x D	0,4 x D	0,75 x D	60	–	80	Fz	0,025	0,034	0,041	0,051	0,063	0,081	0,091
	3	0,8 x D	0,4 x D	0,75 x D	60	–	80	Fz	0,021	0,029	0,034	0,042	0,051	0,065	0,071
K	1	0,8 x D	0,5 x D	0,75 x D	120	–	160	Fz	0,037	0,051	0,061	0,075	0,091	0,114	0,124
	2	0,8 x D	0,5 x D	0,75 x D	110	–	140	Fz	0,031	0,043	0,051	0,063	0,078	0,101	0,114
	3	0,8 x D	0,4 x D	0,75 x D	100	–	130	Fz	0,025	0,034	0,041	0,051	0,063	0,081	0,091
S	1	0,8 x D	0,4 x D	0,75 x D	50	–	90	Fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	0,8 x D	0,25 x D	0,3 x D	25	–	40	Fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	0,8 x D	0,4 x D	0,75 x D	25	–	40	Fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	4	0,8 x D	0,3 x D	0,5 x D	50	–	60	Fz	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	0,8 x D	0,5 x D	0,5 x D	80	–	140	Fz	0,028	0,038	0,046	0,056	0,069	0,088	0,098
	2	0,8 x D	0,2 x D	0,3 x D	70	–	120	Fz	0,021	0,029	0,034	0,042	0,051	0,065	0,071
	3	0,8 x D	0,2 x D	0,2 x D	60	–	90	Fz	0,017	0,023	0,027	0,034	0,041	0,052	0,057

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For rougher tool with 6 flutes, use ap in slotting 60% of table value.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 12mm.



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Use the Finishers end mill range to perform precise finishes (in both surface quality and dimension) to the final stages of component machining.

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MIRROR FINISH

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
WP15PE TiAlN	2–8

DIAMETER RANGE

INCH	METRIC
1/8–1"	1–25mm

INDUSTRY





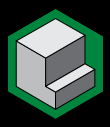




APPLICATIONS

MATERIALS

P M K S H



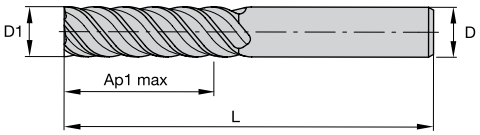
SIDE MILLING

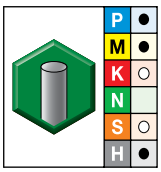


3D PROFILING

Finishers • Series 4S07 • Sharp Edge • Inch







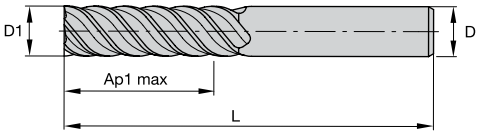
● first choice
○ alternate choice

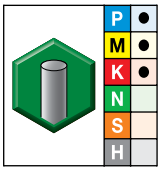
WP15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
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5577256	4S0708003ST	5/16	5/16	13/16	2 1/2	6
5577254	4S0710004ST	3/8	3/8	7/8	2 1/2	6
5577258	4S0713005ST	1/2	1/2	1	3	6
5577259	4S0716006ST	5/8	5/8	1 1/4	3 1/2	6
5577260	4S0719007ST	3/4	3/4	1 1/2	4	6
5577261	4S0725008ST	1	1	1 1/2	4	6

Finishers • Series 4S05 4S07 • Sharp Edge • Inch







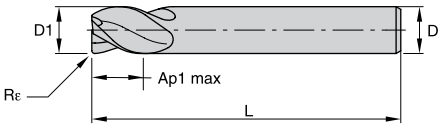
● first choice
○ alternate choice

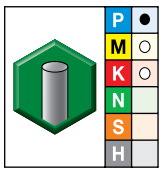
TiCN-CT

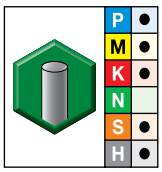
order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
2841622	TC4S0707002	1/4	1/4	3/4	2 1/2	6
2841587	TC4S0719007	3/4	3/4	1 1/2	4	6

Finishers • Series 4C03 4C43 • Radius • Inch







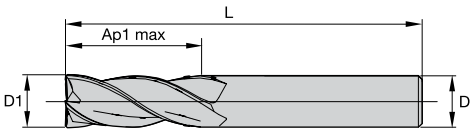


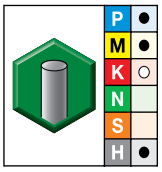
● first choice
○ alternate choice

TiCN-CT		TiAlN							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
2842506	TC4C0303001A		–	1/8	1/8	1/2	1 1/2	.010	3
2842502	TC4C0305000A		–	3/16	3/16	5/8	2	.010	3
	–	2831637	TR4C4307002A	1/4	1/4	1/2	2	.018	3
2842358	TC4C4308003A		–	5/16	5/16	7/16	2	.018	3
	–	2831761	TR4C0319007A	3/4	3/4	1 1/2	4	.030	3

Finishers • Series 4C05 4C15 • Sharp Edge • Inch





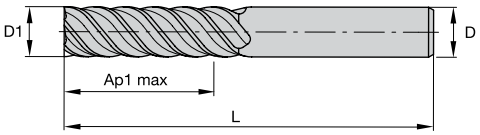


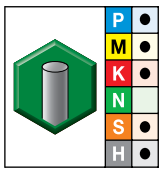
● first choice
○ alternate choice

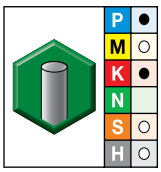
WP15PE						
order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5577187	4C0503001ST	1/8	1/8	1/2	1 1/2	5
5577188	4C0505000ST	3/16	3/16	5/8	2	5
5577189	4C0507002ST	1/4	1/4	3/4	2 1/2	5
5577247	4C1507002ST	1/4	1/4	1 1/4	4	5
5577241	4C0510004ST	3/8	3/8	7/8	2 1/2	5
5577249	4C1510004ST	3/8	3/8	1 1/2	4	5
5577242	4C0513005ST	1/2	1/2	1	3	5
5577243	4C0513015ST	1/2	1/2	1 1/4	3	5
5577250	4C1513005ST	1/2	1/2	2	4 1/2	5
5577244	4C0516006ST	5/8	5/8	1 1/4	3 1/2	5
5577245	4C0519007ST	3/4	3/4	1 1/2	4	5
5577252	4C1519007ST	3/4	3/4	2 1/4	5	5
5577253	4C1525008ST	1	1	2 1/4	5	5

Finishers • Series 4S0F • Sharp Edge • Inch







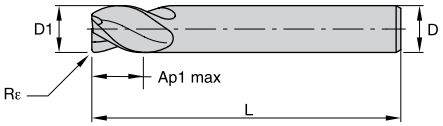


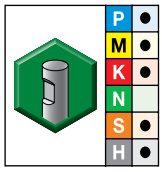
● first choice
○ alternate choice

TiAlN-RT		WP15PE						
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
–		3321647	TR4S0F19007	3/4	3/4	1 1/2	4	8

Finishers • Series DC03 • Radius • Metric





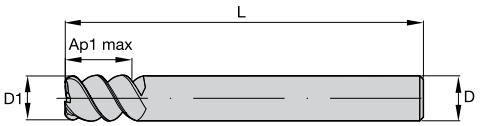


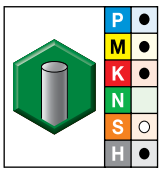
● first choice
○ alternate choice

TiAlN-LW							
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
1661856	DC0303002LW	3,0	6	4,00	50	0,25	3
1661858	DC0304002LW	4,0	6	5,00	54	0,25	3
1661862	DC0306002LW	6,0	6	7,00	54	0,45	3
1661866	DC0308003LW	8,0	8	9,00	58	0,45	3
1661868	DC0310004LW	10,0	10	11,00	66	0,45	3
1661870	DC0312005LW	12,0	12	12,00	73	0,45	3

Finishers • Series 4603 • Sharp Edge • Metric







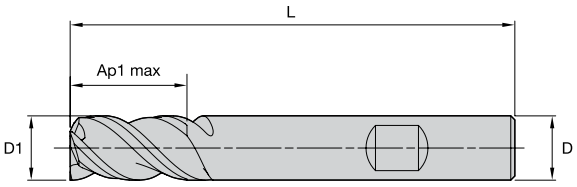
WP15PE

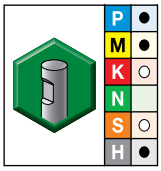
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
1656750	460303002RT	3,0	6	8,00	57	3
1656758	460304002RT	4,0	6	11,00	57	3
1656773	460306002RT	6,0	6	13,00	57	3
1656781	460308003RT	8,0	8	19,00	63	3
1656791	460310004RT	10,0	10	22,00	72	3
1656799	460312005RT	12,0	12	26,00	83	3
1656807	460316006RT	16,0	16	32,00	92	3

Finishers • Series D503 D513 • Square End • Metric







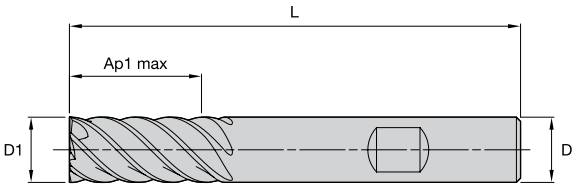
● first choice
○ alternate choice

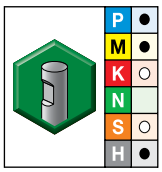
TiAlN

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
1661574	D50302002RW	2,0	6	3,00	50	3
6613012	D503025C2W	2,5	6	3,00	50	3
6613013	D503030C2W	3,0	6	4,00	50	3
1661578	D50303002RW	3,0	6	4,00	50	3
1661680	D51303002RW	3,0	6	7,00	57	3
6613014	D513035C2W	3,5	6	7,00	57	3
6613015	D503040C2W	4,0	6	5,00	54	3
1661583	D50304002RW	4,0	6	5,00	54	3
1661684	D51304002RW	4,0	6	8,00	57	3
1661588	D50305002RW	5,0	6	6,00	54	3
1661688	D51305002RW	5,0	6	10,00	57	3
6613016	D503060C2W	6,0	6	7,00	54	3
1661593	D50306002RW	6,0	6	7,00	54	3
1661692	D51306002RW	6,0	6	10,00	57	3
1661603	D50308003RW	8,0	8	9,00	58	3
6613017	D503080C3W	8,0	8	9,00	58	3
1661701	D51308003RW	8,0	8	16,00	63	3
6613018	D503100C4W	10,0	10	11,00	66	3
1661710	D51310004RW	10,0	10	19,00	72	3
6613019	D503120C5W	12,0	12	12,00	73	3
1661715	D51312005RW	12,0	12	22,00	83	3
1661720	D51314014RW	14,0	14	22,00	83	3
1661725	D51316006RW	16,0	16	26,00	92	3

Finishers • Series D507 D517 • Sharp Edge • Metric







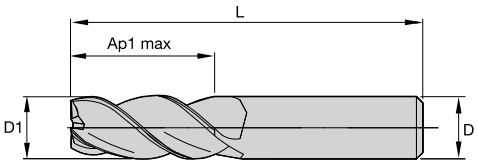
● first choice
○ alternate choice

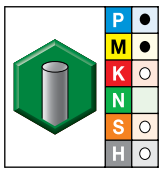
WP15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
5559100	D50706002W	6,0	6	10,00	54	6
5559108	D51706002W	6,0	6	13,00	57	6
5559101	D50708003W	8,0	8	12,00	58	6
5559109	D51708003W	8,0	8	19,00	63	6
5559102	D50710004W	10,0	10	14,00	66	6
5559110	D51710004W	10,0	10	22,00	72	6
5559103	D50712005W	12,0	12	16,00	73	6
5559111	D51712005W	12,0	12	26,00	83	6
5559112	D51714014W	14,0	14	26,00	83	6
5559105	D50716006W	16,0	16	22,00	82	6
5559113	D51716006W	16,0	16	32,00	92	6
5559114	D51718018W	18,0	18	32,00	92	6
5559107	D50720007W	20,0	20	26,00	92	6
5559115	D51720007W	20,0	20	38,00	104	6

Finishers • Series 4503 JJ • Sharp Edge • JIS







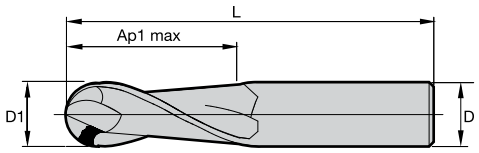
● first choice
○ alternate choice

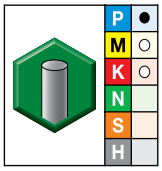
WP15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
5559170	450301001T	1,0	4	3,00	50	3
5559171	450301501T	1,5	4	3,00	50	3
5559172	450302001T	2,0	4	3,00	50	3
5559173	450302501T	2,5	4	4,00	50	3
5559174	450302511T	2,5	4	5,00	50	3
5559175	450303002T	3,0	6	8,00	50	3
5559176	450303502T	3,5	6	12,00	50	3
5559177	450304002T	4,0	6	12,00	50	3
5559178	450304502T	4,5	6	14,00	50	3
5559179	450305002T	5,0	6	14,00	50	3
5559180	450306002T	6,0	6	16,00	50	3
5559181	450308003T	8,0	8	20,00	63	3
5559182	450310004T	10,0	10	22,00	76	3
5559183	450312005T	12,0	12	25,00	76	3
5559184	450316006T	16,0	16	32,00	89	3
5559185	450320007T	20,0	20	38,00	104	3

Finishers • Series 4001 JJ • Ball Nose • JIS







● first choice
○ alternate choice

WP15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5559146	400101001T	1,0	4	3,00	50	2
5559147	400101501T	1,5	4	3,00	50	2
5559148	400102001T	2,0	4	3,00	50	2
5559149	400103002T	3,0	6	9,50	58	2
5559160	400104002T	4,0	6	12,00	76	2
5559161	400105002T	5,0	6	14,00	76	2
5559162	400106002T	6,0	6	16,00	100	2
5559163	400108003T	8,0	8	20,00	100	2
5559164	400110004T	10,0	10	22,00	100	2
5559165	400112005T	12,0	12	25,00	125	2
5559167	400116006T	16,0	16	32,00	150	2

Finishers • Series 4S07 • Application Data • WP15PE • Inch





Material Group		Side Milling (A) A		WP15PE Cutting Speed — vc SFM			Recommended feed per tooth (IPT = inch/th) for side milling (A).									
								D1 — Diameter								
							frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
		ap	ae	min		max	dec.	.1250	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500	1.0000
P	0	1 x D	0.2 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	1	1 x D	0.2 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	1 x D	0.2 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	3	1 x D	0.1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	4	1 x D	0.1 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	5	1 x D	0.1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
	6	1 x D	0.1 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
M	1	1 x D	0.1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	1 x D	0.1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
	3	1 x D	0.1 x D	200	–	230	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
K	1	1 x D	0.1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	1 x D	0.1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	3	1 x D	0.1 x D	360	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
S	1	1 x D	0.1 x D	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	1 x D	0.1 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	3	1 x D	0.15 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	4	1 x D	0.15 x D	160	–	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033
H	1	1 x D	0.1 x D	260	–	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Finishers • Series 4S05 4S07 • Application Data • TICN-CT • Inch





Material Group		Side Milling (A)		Uncoated			TiCN			TiAlN			AlTiN			Recommended feed per tooth (IPT = inch/th) for side milling (A).								
				Cutting Speed — vc SFM			Cutting Speed — vc SFM			Cutting Speed — vc SFM			Cutting Speed — vc SFM				D1 — Diameter							
		ap	ae	min	–	max	min	–	max	min	–	max	min	–	max	frac.	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
																dec.	.1880	.2500	.3130	.3750	.5000	.6250	.7500	1.000
P	1	1 x D	0.2 x D	200	–	260	400	–	520	500	–	650	590	–	720	Fz	.0014	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	2	1 x D	0.2 x D	180	–	250	360	–	500	450	–	625	520	–	660	Fz	.0014	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	3	1 x D	0.1 x D	160	–	210	320	–	420	400	–	525	520	–	590	Fz	.0011	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	4	1 x D	0.1 x D	–	–	–	240	–	380	300	–	475	460	–	520	Fz	.0010	.0014	.0018	.0020	.0026	.0030	.0033	.0039
	5	1 x D	0.1 x D	–	–	–	160	–	260	200	–	325	200	–	330	Fz	.0009	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	6	1 x D	0.1 x D	–	–	–	120	–	180	150	–	225	160	–	260	Fz	.0008	.0010	.0013	.0015	.0019	.0022	.0024	.0028
M	1	1 x D	0.1 x D	100	–	130	200	–	265	260	–	330	260	–	330	Fz	.0011	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	1 x D	0.1 x D	–	–	–	160	–	210	200	–	260	200	–	260	Fz	.0009	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	3	1 x D	0.1 x D	–	–	–	160	–	210	200	–	260	200	–	260	Fz	.0008	.0010	.0013	.0015	.0019	.0022	.0024	.0028
K	1	1 x D	0.1 x D	160	–	210	300	–	420	390	–	520	390	–	520	Fz	.0014	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	2	1 x D	0.1 x D	–	–	–	300	–	370	360	–	460	360	–	460	Fz	.0011	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	3	1 x D	0.1 x D	–	–	–	265	–	345	330	–	430	330	–	430	Fz	.0009	.0012	.0016	.0018	.0023	.0027	.0030	.0036
S	1	1 x D	0.1 x D	–	–	–	120	–	220	160	–	300	300	–	380	Fz	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.1 x D	–	–	–	50	–	100	80	–	130	70	–	130	Fz	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	3	1 x D	0.15 x D	–	–	–	130	–	208	80	–	130	160	–	260	Fz	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	4	1 x D	0.15 x D	–	–	–	120	–	170	160	–	200	150	–	210	Fz	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033
H	1	1 x D	0.1 x D	–	–	–	210	–	360	260	–	450	330	–	460	Fz	.0010	.0014	.0018	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For tools 2 x D < LOC < 3 x D ae =0.25 x D , for tools with LOC longer than 3 x D ae=0.1 x D .

Finishers • Series 4C03 • Application Data • TICN-CT • TiAlN • Inch





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc SFM min		max	TiCN Cutting Speed — vc SFM min		max	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
														dec.	.1250	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500	1.0000
P	0	1.5 x D	0.3 x D	0.5 x D	245	–	330	392	–	528	490	–	660	IPT	.0088	.0135	.0183	.0234	.0273	.0308	.0340	.0395	.0438	.0489
	1	1.5 x D	0.3 x D	0.5 x D	245	–	330	392	–	528	490	–	660	IPT	.0088	.0135	.0183	.0234	.0273	.0308	.0340	.0395	.0438	.0489
	2	1.5 x D	0.3 x D	0.5 x D	230	–	310	368	–	496	460	–	620	IPT	.0088	.0135	.0183	.0234	.0273	.0308	.0340	.0395	.0438	.0489
	3	1.5 x D	0.3 x D	0.5 x D	195	–	260	312	–	416	390	–	520	IPT	.0072	.0111	.0152	.0195	.0229	.0260	.0289	.0341	.0386	.0451
	4	1.5 x D	0.3 x D	0.3 x D	150	–	245	240	–	392	300	–	490	IPT	.0066	.0101	.0138	.0175	.0204	.0231	.0257	.0301	.0337	.0386
	5	1.5 x D	0.3 x D	0.5 x D	100	–	165	160	–	264	200	–	330	IPT	.0059	.0091	.0123	.0156	.0183	.0208	.0231	.0273	.0309	.0361
	6	1.5 x D	0.3 x D	0.3 x D	80	–	125	128	–	200	160	–	250	IPT	.0050	.0076	.0103	.0131	.0153	.0173	.0191	.0223	.0249	.0281
M	1	1.5 x D	0.3 x D	0.5 x D	150	–	190	240	–	304	300	–	380	IPT	.0072	.0111	.0152	.0195	.0229	.0260	.0289	.0341	.0386	.0451
	2	1.5 x D	0.3 x D	0.5 x D	100	–	130	160	–	208	200	–	260	IPT	.0059	.0091	.0123	.0156	.0183	.0208	.0231	.0273	.0309	.0361
	3	1.5 x D	0.3 x D	0.5 x D	100	–	115	160	–	184	200	–	230	IPT	.0050	.0076	.0103	.0131	.0153	.0173	.0191	.0223	.0249	.0281
K	1	1.5 x D	0.3 x D	0.5 x D	195	–	245	312	–	392	390	–	490	IPT	.0088	.0135	.0183	.0234	.0273	.0308	.0340	.0395	.0438	.0489
	2	1.5 x D	0.3 x D	0.5 x D	180	–	230	288	–	368	360	–	460	IPT	.0072	.0111	.0152	.0195	.0229	.0260	.0289	.0341	.0386	.0451
	3	1.5 x D	0.3 x D	0.5 x D	180	–	215	288	–	344	360	–	430	IPT	.0059	.0091	.0123	.0156	.0183	.0208	.0231	.0273	.0309	.0361
S	1	1.5 x D	0.3 x D	0.3 x D	80	–	150	128	–	240	160	–	300	IPT	.0072	.0111	.0152	.0195	.0229	.0260	.0289	.0341	.0386	.0451
	2	1.5 x D	0.3 x D	0.3 x D	40	–	65	64	–	104	80	–	130	IPT	.0039	.0060	.0081	.0103	.0121	.0138	.0153	.0182	.0206	.0243
	3	1.5 x D	0.3 x D	0.3 x D	40	–	65	64	–	104	80	–	130	IPT	.0039	.0060	.0081	.0103	.0121	.0138	.0153	.0182	.0206	.0243
	4	1.5 x D	0.3 x D	0.5 x D	80	–	100	128	–	160	160	–	200	IPT	.0048	.0077	.0108	.0143	.0168	.0191	.0213	.0251	.0284	.0331
H	1	1.5 x D	0.3 x D	0.3 x D	130	–	230	208	–	368	260	–	460	IPT	.0066	.0101	.0138	.0175	.0204	.0231	.0257	.0301	.0337	.0386

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Finishers • Series 4C43 • Application Data • TICN-CT • TiAlN • Inch





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc SFM min		max	TiCN Cutting Speed — vc SFM min		max	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
														dec.	.1250	.1880	.2500	.3130	.3750	.5000	.6250	.7500	1.000
P	0	1.25 x D	0.3 x D	0.5 x D	245	–	330	392	–	528	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	1.25 x D	0.3 x D	0.5 x D	245	–	330	392	–	528	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	1.25 x D	0.3 x D	0.5 x D	230	–	310	368	–	496	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	1.25 x D	0.3 x D	0.5 x D	195	–	260	312	–	416	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	1.25 x D	0.3 x D	0.3 x D	150	–	245	240	–	392	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
	5	1.25 x D	0.3 x D	0.5 x D	100	–	165	160	–	264	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	6	1.25 x D	0.3 x D	0.3 x D	80	–	125	128	–	200	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
M	1	1.25 x D	0.3 x D	0.5 x D	150	–	190	240	–	304	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1.25 x D	0.3 x D	0.5 x D	100	–	130	160	–	208	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	3	1.25 x D	0.3 x D	0.5 x D	100	–	115	160	–	184	200	–	230	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
K	1	1.25 x D	0.3 x D	0.5 x D	195	–	245	312	–	392	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	1.25 x D	0.3 x D	0.5 x D	180	–	230	288	–	368	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	1.25 x D	0.3 x D	0.5 x D	180	–	215	288	–	344	360	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
S	1	1.25 x D	0.3 x D	0.3 x D	80	–	150	128	–	240	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1.25 x D	0.3 x D	0.3 x D	40	–	65	64	–	104	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	3	1.25 x D	0.3 x D	0.3 x D	40	–	65	64	–	104	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	4	1.25 x D	0.3 x D	0.5 x D	80	–	100	128	–	160	160	–	200	IPT	.0005	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033
H	1	1.25 x D	0.3 x D	0.3 x D	130	–	230	208	–	368	260	–	460	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Finishers • Series 4C05 4C15 • Application Data • WP15PE • Inch





Material Group		Side Milling (A)		WP15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).								
		A		Cutting Speed — vc SFM				D1 — Diameter							
		ap	ae	min		max	frac. dec.	1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
	5	Ap1 max	0.1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	6	Ap1 max	0.1 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
M	1	Ap1 max	0.1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	3	Ap1 max	0.1 x D	200	–	230	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
K	1	Ap1 max	0.1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	Ap1 max	0.1 x D	360	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
H	1	Ap1 max	0.1 x D	260	–	460	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
	2	Ap1 max	0.1 x D	230	–	390	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Finishers • Series 4S0F 4S1F • Application Data • WP15PE • TiAlN-RT • Inch





Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A).						
		A		Cutting Speed — vc SFM				D1 — Diameter					
		ap	ae	min		max	frac. dec.	1/4 .2500	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.000
P	1	1.5 x D	0.07 x D	500	–	650	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	1.5 x D	0.07 x D	450	–	625	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	1.5 x D	0.07 x D	400	–	525	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	1.5 x D	0.03 x D	300	–	475	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	1.5 x D	0.05 x D	200	–	325	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	1.5 x D	0.03 x D	150	–	225	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	1.5 x D	0.07 x D	260	–	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	1.5 x D	0.07 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	1.5 x D	0.05 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	1.5 x D	0.07 x D	390	–	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	1.5 x D	0.07 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	1.5 x D	0.05 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	1.5 x D	0.03 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	1.5 x D	0.02 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	3	1.5 x D	0.05 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	4	1.5 x D	0.05 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028	.0033
H	1	1.5 x D	0.03 x D	260	–	450	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Finishers • Series DC03 • Application Data • TiAlN-LW • Metric







Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	0,75 x D	0,4 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	0,75 x D	0,4 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	0,75 x D	0,4 x D	0,5 x D	140	–	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	0,75 x D	0,4 x D	0,5 x D	120	–	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	0,75 x D	0,4 x D	0,3 x D	90	–	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
	5	0,75 x D	0,4 x D	0,5 x D	60	–	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	6	0,75 x D	0,4 x D	0,3 x D	50	–	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
M	1	0,75 x D	0,4 x D	0,5 x D	90	–	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	0,75 x D	0,4 x D	0,5 x D	60	–	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	3	0,75 x D	0,4 x D	0,5 x D	60	–	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
K	1	0,75 x D	0,4 x D	0,5 x D	120	–	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	0,75 x D	0,4 x D	0,5 x D	110	–	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	3	0,75 x D	0,4 x D	0,5 x D	110	–	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
S	1	0,75 x D	0,4 x D	0,3 x D	50	–	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	0,75 x D	0,4 x D	0,3 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	3	0,75 x D	0,4 x D	0,3 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	4	0,75 x D	0,4 x D	0,5 x D	50	–	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074
H	1	0,75 x D	0,4 x D	0,3 x D	80	–	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

Finishers • Series 4603 • Application Data • WP15PE • Metric







Material Group		Side Milling (A) and Slotting (B)			WP15PE/TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	16,0	18,0	20,0
P	0	1,5 x D	0,3 x D	0,5 x D	150	–	200	fz	0,017	0,023	0,029	0,035	0,048	0,058	0,066	0,081	0,086	0,091
	1	1,5 x D	0,3 x D	0,5 x D	150	–	200	fz	0,017	0,023	0,029	0,035	0,048	0,058	0,066	0,081	0,086	0,091
	2	1,5 x D	0,3 x D	0,5 x D	140	–	190	fz	0,017	0,023	0,029	0,035	0,048	0,058	0,066	0,081	0,086	0,091
	3	1,5 x D	0,3 x D	0,5 x D	120	–	160	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,070	0,076	0,081
	4	1,5 x D	0,3 x D	0,3 x D	90	–	150	fz	0,013	0,017	0,022	0,026	0,036	0,043	0,050	0,061	0,066	0,070
	5	1,5 x D	0,3 x D	0,5 x D	60	–	100	fz	0,011	0,015	0,019	0,024	0,032	0,039	0,045	0,056	0,060	0,065
	6	1,5 x D	0,3 x D	0,3 x D	50	–	75	fz	0,010	0,013	0,016	0,020	0,027	0,032	0,037	0,046	0,049	0,052
M	1	1,5 x D	0,3 x D	0,5 x D	90	–	115	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,070	0,076	0,081
	2	1,5 x D	0,3 x D	0,5 x D	60	–	80	fz	0,011	0,015	0,019	0,024	0,032	0,039	0,045	0,056	0,060	0,065
	3	1,5 x D	0,3 x D	0,5 x D	60	–	70	fz	0,010	0,013	0,016	0,020	0,027	0,032	0,037	0,046	0,049	0,052
K	1	1,5 x D	0,3 x D	0,5 x D	120	–	150	fz	0,017	0,023	0,029	0,035	0,048	0,058	0,066	0,081	0,086	0,091
	2	1,5 x D	0,3 x D	0,5 x D	110	–	140	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,070	0,076	0,081
	3	1,5 x D	0,3 x D	0,5 x D	110	–	130	fz	0,011	0,015	0,019	0,024	0,032	0,039	0,045	0,056	0,060	0,065
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,087	0,095	0,101
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,046	0,050	0,054
	3	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,046	0,050	0,054
	4	1,5 x D	0,3 x D	0,5 x D	50	–	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,064	0,069	0,074
H	1	1,5 x D	0,3 x D	0,3 x D	80	–	140	fz	0,013	0,017	0,022	0,026	0,036	0,043	0,050	0,061	0,066	0,070

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

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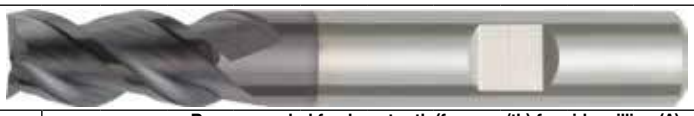


Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	0,75 x D	0,4 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	0,75 x D	0,4 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	0,75 x D	0,4 x D	0,5 x D	140	–	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	0,75 x D	0,4 x D	0,5 x D	120	–	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	0,75 x D	0,4 x D	0,3 x D	90	–	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
	5	0,75 x D	0,4 x D	0,5 x D	60	–	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	6	0,75 x D	0,4 x D	0,3 x D	50	–	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
M	1	0,75 x D	0,4 x D	0,5 x D	90	–	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	0,75 x D	0,4 x D	0,5 x D	60	–	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	3	0,75 x D	0,4 x D	0,5 x D	60	–	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
K	1	0,75 x D	0,4 x D	0,5 x D	120	–	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	0,75 x D	0,4 x D	0,5 x D	110	–	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	3	0,75 x D	0,4 x D	0,5 x D	110	–	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
S	1	0,75 x D	0,4 x D	0,3 x D	50	–	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	0,75 x D	0,4 x D	0,3 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	3	0,75 x D	0,4 x D	0,3 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	4	0,75 x D	0,4 x D	0,5 x D	50	–	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074
H	1	0,75 x D	0,4 x D	0,3 x D	80	–	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on greater than 12mm diameters.

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Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	1,25 x D	0,2 x D	0,25 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	1,25 x D	0,2 x D	0,25 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	1,25 x D	0,2 x D	0,25 x D	140	–	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	1,25 x D	0,2 x D	0,25 x D	120	–	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	1,25 x D	0,2 x D	0,25 x D	90	–	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
	5	1,25 x D	0,2 x D	0,25 x D	60	–	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	6	1,25 x D	0,2 x D	0,25 x D	50	–	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
M	1	1,25 x D	0,2 x D	0,25 x D	90	–	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	1,25 x D	0,2 x D	0,25 x D	60	–	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	3	1,25 x D	0,2 x D	0,25 x D	60	–	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
K	1	1,25 x D	0,2 x D	0,25 x D	120	–	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	1,25 x D	0,2 x D	0,25 x D	110	–	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	3	1,25 x D	0,2 x D	0,25 x D	110	–	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
S	1	1,25 x D	0,2 x D	0,25 x D	50	–	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	1,25 x D	0,2 x D	0,25 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	3	1,25 x D	0,2 x D	0,25 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	4	1,25 x D	0,2 x D	0,25 x D	50	–	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074
H	1	1,25 x D	0,2 X D	0,25 x D	80	–	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

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Material Group		Side Milling (A)		WP15PE			Recommended feed per tooth (fz = mm/th) for side milling (A).								
		A		Cutting Speed — vc m/min			D1 — Diameter								
		ap	ae	min		max	mm	4,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	1,0 x D	0,2 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	1,0 x D	0,2 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	1,0 x D	0,2 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	1,0 x D	0,1 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	1,0 x D	0,1 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
	5	1,0 x D	0,1 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	6	1,0 x D	0,1 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
M	1	1,0 x D	0,1 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	1,0 x D	0,1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	3	1,0 x D	0,1 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
K	1	1,0 x D	0,1 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	1,0 x D	0,1 x D	110	–	140	fz	0,023	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	3	1,0 x D	0,1 x D	110	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
S	1	1,0 x D	0,1 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	1,0 x D	0,1 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	3	1,0 x D	0,15 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	4	1,0 x D	0,15 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074
H	1	1,0 x D	0,1 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

Finishers • Series D517 • Application Data • WP15PE • Metric





Material Group		Side Milling (A)		WP15PE			Recommended feed per tooth (fz = mm/th) for side milling (A).								
		A		Cutting Speed — vc m/min			D1 — Diameter								
		ap	ae	min		max	mm	4,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,05 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,05 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,05 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,05 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,05 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
	5	Ap1 max	0,05 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	6	Ap1 max	0,05 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
M	1	Ap1 max	0,05 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,05 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
	3	Ap1 max	0,05 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
K	1	Ap1 max	0,05 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,05 x D	110	–	140	fz	0,023	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	3	Ap1 max	0,05 x D	110	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
S	1	Ap1 max	0,04 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,04 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	3	Ap1 max	0,05 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	4	Ap1 max	0,05 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074
H	1	Ap1 max	0,04 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

Finishers • Series 4503 JJ • Application Data • WP15PE • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed – vc m/min min	–	max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. mm	D1 – Diameter 3,0	4,0	5,0	6,0	8,0	10,0	12,0	16,0	18,0	20,0
P	0	1,5 x D	0,3 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,101	0,108	0,114
	1	1,5 x D	0,3 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,101	0,108	0,114
	2	1,5 x D	0,3 x D	0,5 x D	140	–	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,101	0,108	0,114
	3	1,5 x D	0,3 x D	0,5 x D	120	–	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,087	0,095	0,101
	4	1,5 x D	0,3 x D	0,3 x D	90	–	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,077	0,083	0,088
	5	1,5 x D	0,3 x D	0,5 x D	60	–	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,070	0,076	0,081
	6	1,5 x D	0,3 x D	0,3 x D	50	–	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,057	0,061	0,065
M	1	1,5 x D	0,3 x D	0,5 x D	90	–	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,087	0,095	0,101
	2	1,5 x D	0,3 x D	0,5 x D	60	–	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,070	0,076	0,081
	3	1,5 x D	0,3 x D	0,5 x D	60	–	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,057	0,061	0,065
K	1	1,5 x D	0,3 x D	0,5 x D	120	–	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,101	0,108	0,114
	2	1,5 x D	0,3 x D	0,5 x D	110	–	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,087	0,095	0,101
	3	1,5 x D	0,3 x D	0,5 x D	110	–	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,070	0,076	0,081
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,087	0,095	0,101
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,046	0,050	0,054
	3	1,5 x D	0,3 x D	0,5 x D	25	–	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,046	0,050	0,054
	4	1,5 x D	0,3 x D	0,5 x D	50	–	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,064	0,069	0,074
H	1	1,5 x D	0,3 x D	0,3 x D	80	–	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,077	0,083	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

Finishers • Series 4001 JJ • Application Data • WP15PE • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed – vc m/min min	–	max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. mm	D1 – Diameter 2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	1,25 x D	0,25 x D	0,5 x D	150	–	200	fz	0,012	0,019	0,026	0,032	0,039	0,054	0,065	0,075	0,083	0,091	0,097	0,103	0,111
	1	1,25 x D	0,25 x D	0,5 x D	150	–	200	fz	0,012	0,019	0,026	0,032	0,039	0,054	0,065	0,075	0,083	0,091	0,097	0,103	0,111
	2	1,25 x D	0,25 x D	0,5 x D	140	–	190	fz	0,012	0,019	0,026	0,032	0,039	0,054	0,065	0,075	0,083	0,091	0,097	0,103	0,111
	3	1,25 x D	0,25 x D	0,5 x D	120	–	160	fz	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,063	0,071	0,078	0,085	0,091	0,102
	4	1,25 x D	0,25 x D	0,3 x D	90	–	150	fz	0,009	0,014	0,019	0,024	0,030	0,040	0,049	0,056	0,063	0,069	0,075	0,079	0,088
M	1	1,25 x D	0,25 x D	0,5 x D	90	–	115	fz	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,063	0,071	0,078	0,085	0,091	0,102
	2	1,25 x D	0,25 x D	0,5 x D	60	–	80	fz	0,008	0,013	0,017	0,022	0,026	0,036	0,044	0,051	0,057	0,063	0,068	0,073	0,082
K	1	1,25 x D	0,25 x D	0,5 x D	120	–	150	fz	0,012	0,019	0,026	0,032	0,039	0,054	0,065	0,075	0,083	0,091	0,097	0,103	0,111
	2	1,25 x D	0,25 x D	0,5 x D	110	–	140	fz	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,063	0,071	0,078	0,085	0,091	0,102
N	1	1,25 x D	0,25 x D	0,5 x D	500	–	2000	fz	0,018	0,027	0,036	0,045	0,054	0,072	0,090	0,108	0,126	0,144	0,162	0,180	0,225
	2	1,25 x D	0,25 x D	0,5 x D	500	–	1500	fz	0,016	0,024	0,032	0,041	0,049	0,065	0,081	0,097	0,113	0,130	0,146	0,162	0,203
	3	1,25 x D	0,25 x D	0,5 x D	250	–	1000	fz	0,016	0,024	0,032	0,041	0,049	0,065	0,081	0,097	0,113	0,130	0,146	0,162	0,203
	4	1,25 x D	0,25 x D	0,5 x D	100	–	750	fz	0,018	0,027	0,036	0,045	0,054	0,072	0,090	0,108	0,126	0,144	0,162	0,180	0,225

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

ALUFLASH™

High-Performance Solid End Milling

ALUFLASH end mills are for machining companies seeking a vibration-free tool capable of achieving advanced milling applications at accelerated RPMs.

Features and Benefits

Balanced by design to significantly limit vibrations at high RPMs.

"W" flute shape form evacuates chips to increase process security.

Parabolic core for increased tool stability and reduced deflection and risk of breakage.

Double rake gashing for improved chip evacuation and higher ramping capabilities and Z-axis machining.



ALUFLASH end mills will drill into the full material and execute advanced ramping angles at high-feed rates without RPM limitations.

SAFE

The ALUFLASH end mills' balanced design obliterates any apprehension of spindle damage.

ADVANCED

ALUFLASH provides advanced milling capabilities with steep ramping angles, drilling into the full material and cornering without vibration marks.

ACCELERATED

The ALUFLASH end mills enable machinists to increase cutting speeds to the machine capacity, creating limitless performance in any aluminum application.

ACCELERATED ALUMINUM MACHINING

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
UNCOATED	2 & 3

DIAMETER RANGE

INCH	METRIC
1/8–1"	3–20mm

INDUSTRY

GENERAL ENGINEERING

AEROSPACE

APPLICATIONS

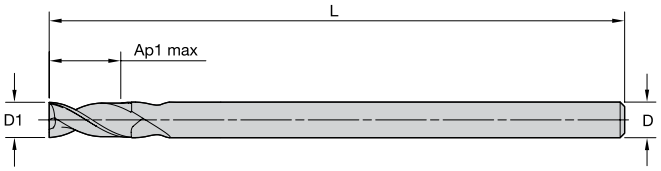
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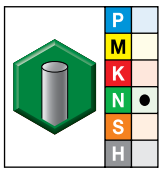
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- SIDE MILLING
- SLOTTING
- HELICAL INTERPOLATION
- RAMPING
- DYNAMIC MILLING
- PLUNGING
- DRILLING

ALUFLASH • Series 2A09 • Square End • 2 Flute • Regular Length • Cylindrical Shank • Inch







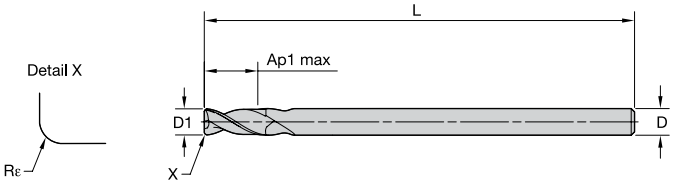
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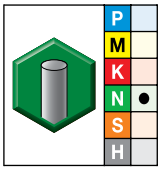
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6853394	2A09E03000SZT	1/8	1/8	1/4	2	2
6853396	2A09E05001SZT	3/16	3/16	5/16	2	2
6853398	2A09E07003SZT	1/4	1/4	3/8	2	2
6853421	2A09E08004SZT	5/16	5/16	5/8	2 1/2	2
6853423	2A09E10005SZT	3/8	3/8	1	3	2
6853426	2A09E13006SZT	1/2	1/2	1 1/4	3 1/2	2
6853431	2A09E19009SZT	3/4	3/4	1 5/8	4 1/4	2
6853435	2A09E2500ASZT	1	1	2 1/2	5 1/2	2

ALUFLASH • Series 2A09 • Radius • 2 Flute • Regular Length • Cylindrical Shank • Inch







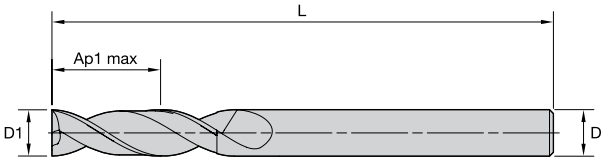
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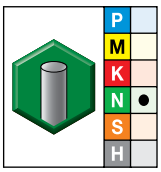
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6853395	2A09E03000RAT	1/8	1/8	1/4	2	.015	2
6853397	2A09E05001RAT	3/16	3/16	5/16	2	.015	2
6853399	2A09E07003RAT	1/4	1/4	3/8	2	.015	2
6853400	2A09E07003RET	1/4	1/4	3/8	2	.030	2
6853422	2A09E08004RAT	5/16	5/16	5/8	2 1/2	.015	2
6853424	2A09E10005RAT	3/8	3/8	1	3	.015	2
6853425	2A09E10005RET	3/8	3/8	1	3	.030	2
6853427	2A09E13006RAT	1/2	1/2	1 1/4	3 1/2	.015	2
6853428	2A09E13006RET	1/2	1/2	1 1/4	3 1/2	.030	2
6853429	2A09E13006RGT	1/2	1/2	1 1/4	3 1/2	.060	2
6853430	2A09E13006RKT	1/2	1/2	1 1/4	3 1/2	.120	2
6853432	2A09E19009RET	3/4	3/4	1 5/8	4 1/4	.030	2
6853433	2A09E19009RGT	3/4	3/4	1 5/8	4 1/4	.060	2
6853434	2A09E19009RKT	3/4	3/4	1 5/8	4 1/4	.120	2
6853436	2A09E2500ARET	1	1	2 1/2	5 1/2	.030	2
6853437	2A09E2500ARGT	1	1	2 1/2	5 1/2	.060	2
6853438	2A09E2500ARKT	1	1	2 1/2	5 1/2	.120	2

ALUFLASH • Series 2A19 • Square End • 2 Flute • Long Length • Cylindrical Shank • Inch







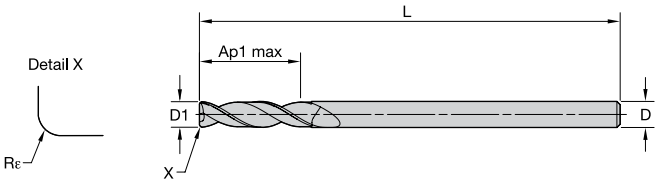
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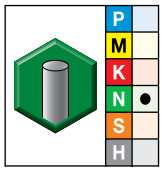
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6853379	2A19E03010SZT	1/8	1/8	1/2	2	2
6853381	2A19E05011SZT	3/16	3/16	5/8	2	2
6853383	2A19E07013SZT	1/4	1/4	3/4	2 1/2	2
6853386	2A19E08014SZT	5/16	5/16	1 1/4	3	2
6853388	2A19E10015SZT	3/8	3/8	1 1/2	4	2
6853391	2A19E13016SZT	1/2	1/2	2	4	2

ALUFLASH • Series 2A19 • Radius • 2 Flute • Long Length • Cylindrical Shank • Inch







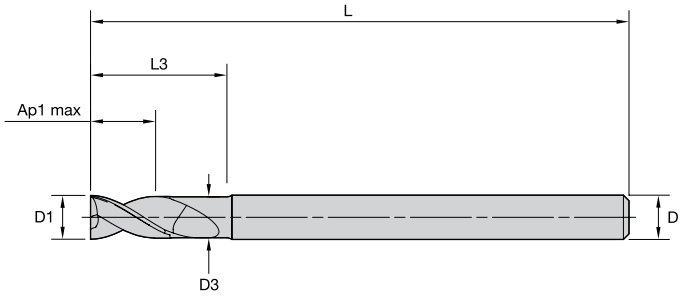
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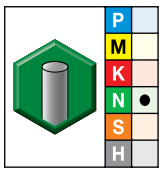
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6853380	2A19E03010RAT	1/8	1/8	1/2	2	.015	2
6853382	2A19E05011RAT	3/16	3/16	5/8	2	.015	2
6853384	2A19E07013RAT	1/4	1/4	3/4	2 1/2	.015	2
6853385	2A19E07013RET	1/4	1/4	3/4	2 1/2	.030	2
6853387	2A19E08014RAT	5/16	5/16	1 1/4	3	.015	2
6853389	2A19E10015RAT	3/8	3/8	1 1/2	4	.015	2
6853390	2A19E10015RET	3/8	3/8	1 1/2	4	.030	2
6853392	2A19E13016RAT	1/2	1/2	2	4	.015	2
6853393	2A19E13016RET	1/2	1/2	2	4	.030	2

ALUFLASH • Series 2AN9 • Square End • 2 Flute • Regular Length • Regular Neck • Cylindrical Shank • Inch







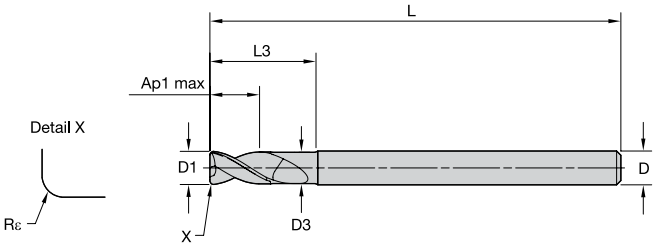
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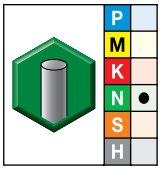
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6859874	2AN9E03000SZT	1/8	1/8	.118	3/16	1 1/2	3/8	2
6859876	2AN9E05001SZT	3/16	3/16	.176	1/4	2 1/4	9/16	2
6859878	2AN9E07003SZT	1/4	1/4	.235	5/16	2 1/2	3/4	2
6859883	2AN9E08004SZT	5/16	5/16	.294	3/8	2 1/2	1	2
6859886	2AN9E10005SZT	3/8	3/8	.353	1/2	3	1 1/4	2
6859889	2AN9E13006SZT	1/2	1/2	.470	5/8	3 1/2	1 1/2	2
6859892	2AN9E16008SZT	5/8	5/8	.588	3/4	4	2	2
6859895	2AN9E19009SZT	3/4	3/4	.705	1	5	2 1/4	2
6859898	2AN9E2500ASZT	1	1	.940	1 1/4	5 1/2	2 1/2	2

ALUFLASH • Series 2AN9 • Radius • 2 Flute • Regular Length • Regular Neck • Cylindrical Shank • Inch







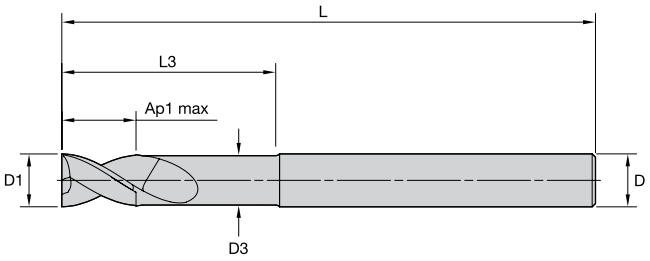
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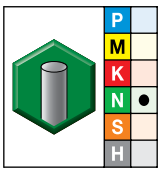
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6859875	2AN9E03000RAT	1/8	1/8	.118	3/16	1 1/2	3/8	.015	2
6859877	2AN9E05001RAT	3/16	3/16	.176	1/4	2 1/4	9/16	.015	2
6859881	2AN9E07003RET	1/4	1/4	.235	5/16	2 1/2	3/4	.030	2
6859882	2AN9E07003RGT	1/4	1/4	.235	5/16	2 1/2	3/4	.060	2
6859884	2AN9E08004RET	5/16	5/16	.294	3/8	2 1/2	1	.030	2
6859885	2AN9E08004RGT	5/16	5/16	.294	3/8	2 1/2	1	.060	2
6859887	2AN9E10005RET	3/8	3/8	.353	1/2	3	1 1/4	.030	2
6859888	2AN9E10005RGT	3/8	3/8	.353	1/2	3	1 1/4	.060	2
6859890	2AN9E13006RET	1/2	1/2	.470	5/8	3 1/2	1 1/2	.030	2
6859891	2AN9E13006RGT	1/2	1/2	.470	5/8	3 1/2	1 1/2	.060	2
6859893	2AN9E16008RET	5/8	5/8	.588	3/4	4	2	.030	2
6859894	2AN9E16008RGT	5/8	5/8	.588	3/4	4	2	.060	2
6859896	2AN9E19009RET	3/4	3/4	.705	1	5	2 1/4	.030	2
6859897	2AN9E19009RGT	3/4	3/4	.705	1	5	2 1/4	.060	2
6859899	2AN9E2500ARET	1	1	.940	1 1/4	5 1/2	2 1/2	.030	2
6859900	2AN9E2500ARGT	1	1	.940	1 1/4	5 1/2	2 1/2	.060	2

ALUFLASH • Series 2AL9 • Square End • 2 Flute • Regular Length • Medium Neck • Cylindrical Shank • Inch







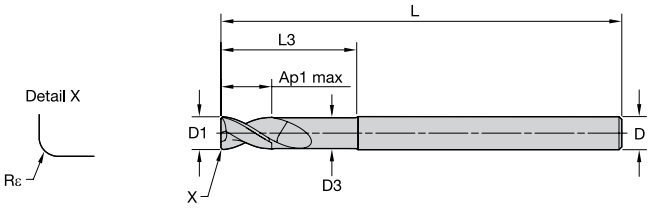
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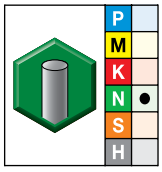
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6859607	2AL9E07013SZT	1/4	1/4	.235	5/16	2 1/2	1	2
6859651	2AL9E08014SZT	5/16	5/16	.294	3/8	3	1 1/4	2
6859654	2AL9E10015SZT	3/8	3/8	.353	1/2	3	1 1/2	2
6859657	2AL9E13016SZT	1/2	1/2	.470	5/8	4	2	2
6859660	2AL9E16018SZT	5/8	5/8	.588	3/4	5	2 1/2	2
6859673	2AL9E19019SZT	3/4	3/4	.705	1	5	3	2
6859676	2AL9E2501ASZT	1	1	.940	1 1/4	5 1/2	3	2

ALUFLASH • Series 2AL9 • Radius • 2 Flute • Regular Length • Medium Neck • Cylindrical Shank • Inch







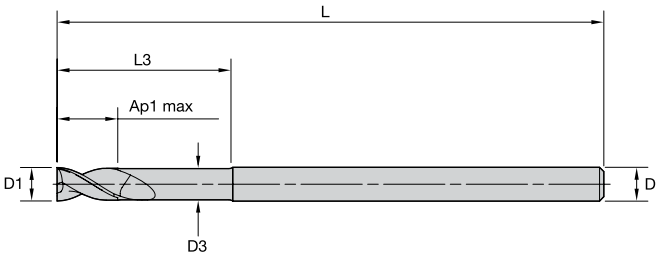
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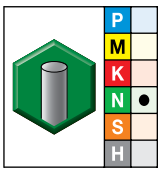
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6859606	2AL9E05011RAT	3/16	3/16	.176	1/4	2 1/4	3/4	.015	2
6859608	2AL9E07013RET	1/4	1/4	.235	5/16	2 1/2	1	.030	2
6859610	2AL9E07013RGT	1/4	1/4	.235	5/16	2 1/2	1	.060	2
6859652	2AL9E08014RET	5/16	5/16	.294	3/8	3	1 1/4	.030	2
6859653	2AL9E08014RGT	5/16	5/16	.294	3/8	3	1 1/4	.060	2
6859655	2AL9E10015RET	3/8	3/8	.353	1/2	3	1 1/2	.030	2
6859656	2AL9E10015RGT	3/8	3/8	.353	1/2	3	1 1/2	.060	2
6859658	2AL9E13016RET	1/2	1/2	.470	5/8	4	2	.030	2
6859659	2AL9E13016RGT	1/2	1/2	.470	5/8	4	2	.060	2
6859671	2AL9E16018RET	5/8	5/8	.588	3/4	5	2 1/2	.030	2
6859672	2AL9E16018RGT	5/8	5/8	.588	3/4	5	2 1/2	.060	2
6859674	2AL9E19019RET	3/4	3/4	.705	1	5	3	.030	2
6859675	2AL9E19019RGT	3/4	3/4	.705	1	5	3	.060	2
6859677	2AL9E2501ARET	1	1	.940	1 1/4	5 1/2	3	.030	2
6859678	2AL9E2501ARGT	1	1	.940	1 1/4	5 1/2	3	.060	2

ALUFLASH • Series 2AF9 • Square End • 2 Flute • Regular Length • Long Neck • Cylindrical Shank • Inch







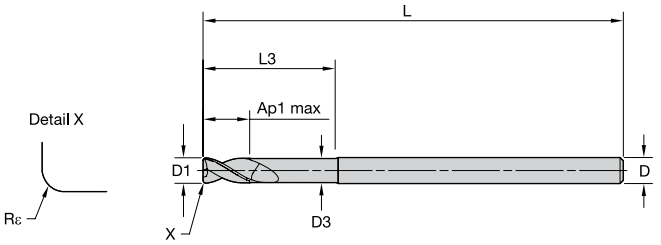
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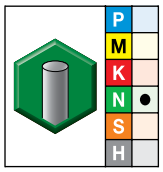
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6859680	2AF9E03020SZT	1/8	1/8	.118	3/16	2	5/8	2
6859682	2AF9E05021SZT	3/16	3/16	.176	1/4	2 1/4	1	2
6859684	2AF9E07023SZT	1/4	1/4	.235	5/16	3	1 1/4	2
6859687	2AF9E08024SZT	5/16	5/16	.294	3/8	3	1 1/2	2
6859690	2AF9E10025SZT	3/8	3/8	.353	1/2	3 1/2	2	2
6859693	2AF9E13026SZT	1/2	1/2	.470	5/8	4 1/2	2 1/2	2
6859696	2AF9E16028SZT	5/8	5/8	.588	3/4	5	3 1/4	2
6859699	2AF9E19029SZT	3/4	3/4	.705	1	5 1/2	3 1/2	2
6859702	2AF9E2502ASZT	1	1	.940	1 1/4	6 1/2	3 3/4	2

ALUFLASH • Series 2AF9 • Radius • 2 Flute • Regular Length • Long Neck • Cylindrical Shank • Inch







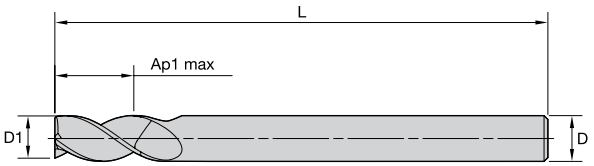
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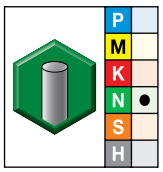
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6859681	2AF9E03020RAT	1/8	1/8	.118	3/16	2	5/8	.015	2
6859683	2AF9E05021RAT	3/16	3/16	.176	1/4	2 1/4	1	.015	2
6859685	2AF9E07023RET	1/4	1/4	.235	5/16	3	1 1/4	.030	2
6859686	2AF9E07023RGT	1/4	1/4	.235	5/16	3	1 1/4	.060	2
6859688	2AF9E08024RET	5/16	5/16	.176	3/8	3	1 1/2	.030	2
6859689	2AF9E08024RGT	5/16	5/16	.294	3/8	3	1 1/2	.060	2
6859691	2AF9E10025RET	3/8	3/8	.353	1/2	3 1/2	2	.030	2
6859692	2AF9E10025RGT	3/8	3/8	.353	1/2	3 1/2	2	.060	2
6859694	2AF9E13026RET	1/2	1/2	.470	5/8	4 1/2	2 1/2	.030	2
6859695	2AF9E13026RGT	1/2	1/2	.470	5/8	4 1/2	2 1/2	.060	2
6859697	2AF9E16028RET	5/8	5/8	.588	3/4	5	3 1/4	.030	2
6859698	2AF9E16028RGT	5/8	5/8	.588	3/4	5	3 1/4	.060	2
6859700	2AF9E19029RET	3/4	3/4	.705	1	5 1/2	3 1/2	.030	2
6859701	2AF9E19029RGT	3/4	3/4	.705	1	5 1/2	3 1/2	.060	2
6859703	2AF9E2502ARET	1	1	.940	1 1/4	6 1/2	3 3/4	.030	2
6859704	2AF9E2502ARGT	1	1	.940	1 1/4	6 1/2	3 3/4	.060	2

ALUFLASH • Series 3A09 • Square End • 3 Flute • Regular Length • Cylindrical Shank • Inch







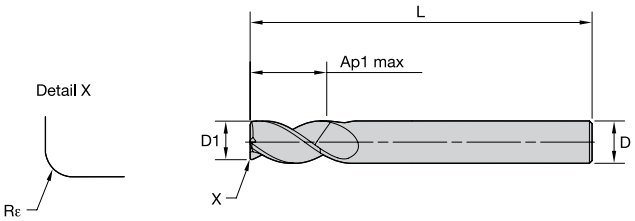
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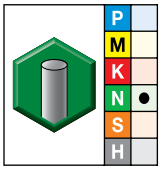
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6853347	3A09E05001SZT	3/16	3/16	5/16	2	3
6853349	3A09E07003SZT	1/4	1/4	3/8	2	3
6853352	3A09E08004SZT	5/16	5/16	5/8	2 1/2	3
6853354	3A09E10005SZT	3/8	3/8	1	3	3
6853358	3A09E13006SZT	1/2	1/2	1 1/4	3 1/2	3
6853363	3A09E16008SZT	5/8	5/8	1 1/2	3 1/2	3
6853366	3A09E19009SZT	3/4	3/4	1 5/8	4	3
6853371	3A09E2500ASZT	1	1	2 1/2	5 1/2	3

ALUFLASH • Series 3A09 • Radius • 3 Flute • Regular Length • Cylindrical Shank • Inch







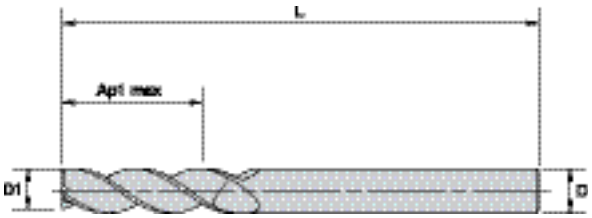
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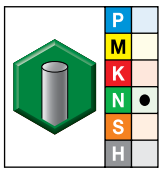
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6853348	3A09E05001RAT	3/16	3/16	5/16	2	.015	3
6853350	3A09E07003RAT	1/4	1/4	3/8	2	.015	3
6853351	3A09E07003RET	1/4	1/4	3/8	2	.030	3
6853353	3A09E08004RAT	5/16	5/16	5/8	2 1/2	.015	3
6853355	3A09E10005RAT	3/8	3/8	1	3	.015	3
6853356	3A09E10005RET	3/8	3/8	1	3	.030	3
6853357	3A09E10005RGT	3/8	3/8	1	3	.060	3
6853359	3A09E13006RAT	1/2	1/2	1 1/4	3 1/2	.015	3
6853360	3A09E13006RET	1/2	1/2	1 1/4	3 1/2	.030	3
6853361	3A09E13006RGT	1/2	1/2	1 1/4	3 1/2	.060	3
6853362	3A09E13006RKT	1/2	1/2	1 1/4	3 1/2	.120	3
6853364	3A09E16008RGT	5/8	5/8	1 1/2	3 1/2	.060	3
6853365	3A09E16008RKT	5/8	5/8	1 1/2	3 1/2	.120	3
6853367	3A09E19009RET	3/4	3/4	1 5/8	4	.030	3
6853368	3A09E19009RGT	3/4	3/4	1 5/8	4	.060	3
6853369	3A09E19009RKT	3/4	3/4	1 5/8	4	.120	3
6853370	3A09E19009RPT	3/4	3/4	1 5/8	4	.190	3
6853372	3A09E2500ARET	1	1	2 1/2	5 1/2	.030	3
6853373	3A09E2500ARGT	1	1	2 1/2	5 1/2	.060	3
6853374	3A09E2500ARJT	1	1	2 1/2	5 1/2	.090	3
6853375	3A09E2500ARKT	1	1	2 1/2	5 1/2	.120	3
6853376	3A09E2500ARPT	1	1	2 1/2	5 1/2	.190	3
6853377	3A09E2500ARQT	1	1	2 1/2	5 1/2	.250	3

ALUFLASH • Series 3A19 • Square End • 3 Flute • Medium Length • Cylindrical Shank • Inch







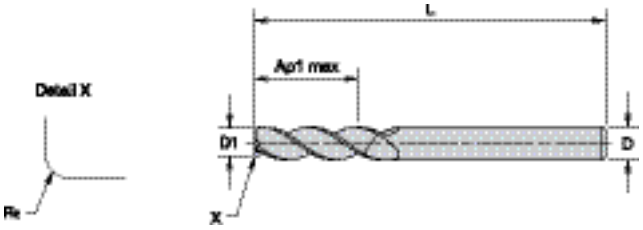
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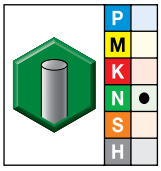
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6853307	3A19E05011SZT	3/16	3/16	5/8	2	3
6853309	3A19E07013SZT	1/4	1/4	3/4	2 1/2	3
6853323	3A19E10015SZT	3/8	3/8	1 1/2	4	3
6853327	3A19E13016SZT	1/2	1/2	2	4	3
6853331	3A19E16018SZT	5/8	5/8	2	5	3
6853335	3A19E19019SZT	3/4	3/4	2 1/2	5	3
6853339	3A19E2501ASZT	1	1	3 1/4	6 1/2	3

ALUFLASH • Series 3A19 • Radius • 3 Flute • Medium Length • Cylindrical Shank • Inch







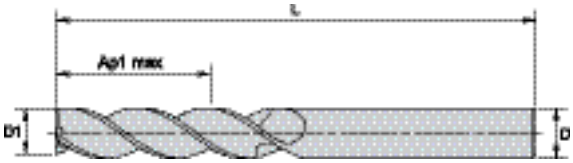
UNCOATED

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6853308	3A19E05011RAT	3/16	3/16	5/8	2	.015	3
6853310	3A19E07013RAT	1/4	1/4	3/4	2 1/2	.015	3
6853321	3A19E07013RET	1/4	1/4	3/4	2 1/2	.030	3
6853322	3A19E07013RGT	1/4	1/4	3/4	2 1/2	.060	3
6853324	3A19E10015RAT	3/8	3/8	1 1/2	4	.015	3
6853325	3A19E10015RET	3/8	3/8	1 1/2	4	.030	3
6853326	3A19E10015RGT	3/8	3/8	1 1/2	4	.060	3
6853328	3A19E13016RET	1/2	1/2	2	4	.030	3
6853329	3A19E13016RGT	1/2	1/2	2	4	.060	3
6853330	3A19E13016RKT	1/2	1/2	2	4	.120	3
6853332	3A19E16018RET	5/8	5/8	2	5	.030	3
6853333	3A19E16018RGT	5/8	5/8	2	5	.060	3
6853334	3A19E16018RKT	5/8	5/8	2	5	.120	3
6853336	3A19E19019RET	3/4	3/4	2 1/2	5	.030	3
6853337	3A19E19019RGT	3/4	3/4	2 1/2	5	.060	3
6853338	3A19E19019RKT	3/4	3/4	2 1/2	5	.120	3
6853340	3A19E2501ARET	1	1	3 1/4	6 1/2	.030	3
6853341	3A19E2501ARGT	1	1	3 1/4	6 1/2	.060	3
6853342	3A19E2501ARJT	1	1	3 1/4	6 1/2	.090	3
6853343	3A19E2501ARKT	1	1	3 1/4	6 1/2	.120	3
6853344	3A19E2501ARPT	1	1	3 1/4	6 1/2	.190	3
6853345	3A19E2501ARQT	1	1	3 1/4	6 1/2	.250	3

ALUFLASH • Series 3A29 • Square End • 3 Flute • Long Length • Cylindrical Shank • Inch







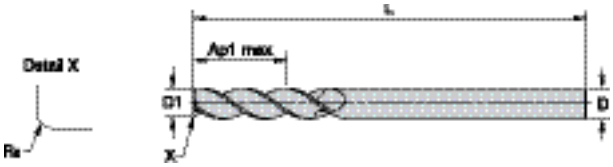
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● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6853216	3A29E07023SZT	1/4	1/4	1	3 1/4	3
6853220	3A29E08024SZT	5/16	5/16	1 1/4	3	3
6853282	3A29E10025SZT	3/8	3/8	1 3/4	4	3
6853285	3A29E13026SZT	1/2	1/2	2 1/4	4 1/2	3
6853289	3A29E19029SZT	3/4	3/4	3	5 1/2	3
6853303	3A29E2502ASZT	1	1	4	7	3

ALUFLASH • Series 3A29 • Radius • 3 Flute • Long Length • Cylindrical Shank • Inch







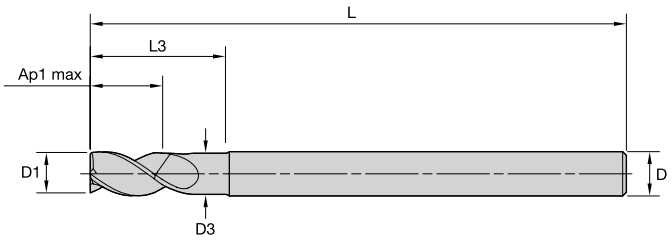
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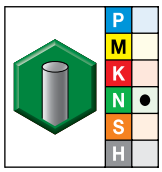
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6853217	3A29E07023RAT	1/4	1/4	1	3 1/4	.015	3
6853218	3A29E07023RET	1/4	1/4	1	3 1/4	.030	3
6853219	3A29E07023RGT	1/4	1/4	1	3 1/4	.060	3
6853281	3A29E08024RAT	5/16	5/16	1 1/4	3	.015	3
6853283	3A29E10025RET	3/8	3/8	1 3/4	4	.030	3
6853284	3A29E10025RGT	3/8	3/8	1 3/4	4	.060	3
6853286	3A29E13026RET	1/2	1/2	2 1/4	4 1/2	.030	3
6853287	3A29E13026RGT	1/2	1/2	2 1/4	4 1/2	.060	3
6853288	3A29E13026RKT	1/2	1/2	2 1/4	4 1/2	.120	3
6853290	3A29E19029RET	3/4	3/4	3	5 1/2	.030	3
6853301	3A29E19029RGT	3/4	3/4	3	5 1/2	.060	3
6853302	3A29E19029RKT	3/4	3/4	3	5 1/2	.120	3
6853304	3A29E2502ARET	1	1	4	7	.030	3
6853305	3A29E2502ARGT	1	1	4	7	.060	3
6853306	3A29E2502ARKT	1	1	4	7	.120	3

ALUFLASH • Series 3AN9 • Square End • 3 Flute • Regular Length • Regular Neck • Cylindrical Shank • Inch







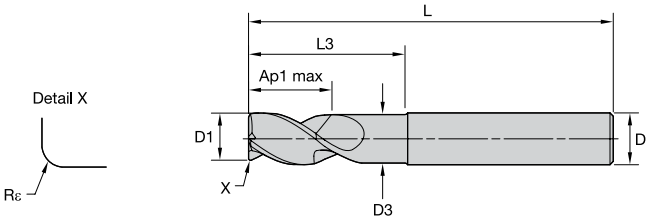
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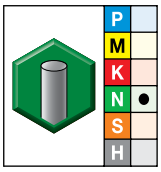
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6859706	3AN9E05001SZT	3/16	3/16	.176	1/4	2 1/4	9/16	3
6859708	3AN9E07003SZT	1/4	1/4	.235	5/16	2 1/2	3/4	3
6859711	3AN9E08004SZT	5/16	5/16	.294	3/8	2 1/2	1	3
6859715	3AN9E10005SZT	3/8	3/8	.353	1/2	3	1 1/4	3
6859718	3AN9E13006SZT	1/2	1/2	.470	5/8	3 1/2	1 1/2	3
6859721	3AN9E16008SZT	5/8	5/8	.588	3/4	4	2	3
6859724	3AN9E19009SZT	3/4	3/4	.705	1	5	2 1/4	3
6859727	3AN9E2500ASZT	1	1	.940	1 1/4	5 1/2	2 1/2	3

ALUFLASH • Series 3AN9 • Radius • 3 Flute • Regular Length • Regular Neck • Cylindrical Shank • Inch







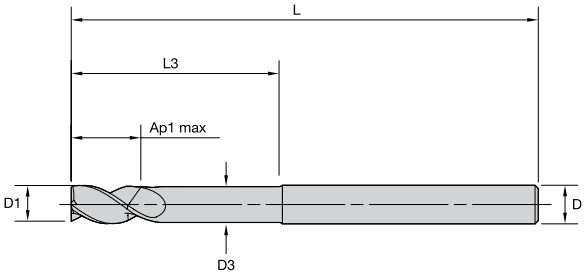
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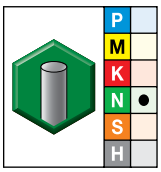
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6859707	3AN9E05001RAT	3/16	3/16	.176	1/4	2 1/4	9/16	.015	3
6859709	3AN9E07003RET	1/4	1/4	.235	5/16	2 1/2	3/4	.030	3
6859710	3AN9E07003RGT	1/4	1/4	.235	5/16	2 1/2	3/4	.060	3
6859712	3AN9E08004RET	5/16	5/16	.294	3/8	2 1/2	1	.030	3
6859714	3AN9E08004RGT	5/16	5/16	.294	3/8	2 1/2	1	.060	3
6859716	3AN9E10005RET	3/8	3/8	.353	1/2	3	1 1/4	.030	3
6859717	3AN9E10005RGT	3/8	3/8	.353	1/2	3	1 1/4	.060	3
6859719	3AN9E13006RET	1/2	1/2	.470	5/8	3 1/2	1 1/2	.030	3
6859720	3AN9E13006RGT	1/2	1/2	.470	5/8	3 1/2	1 1/2	.060	3
6859722	3AN9E16008RET	5/8	5/8	.588	3/4	4	2	.030	3
6859723	3AN9E16008RGT	5/8	5/8	.588	3/4	4	2	.060	3
6859725	3AN9E19009RET	3/4	3/4	.705	1	5	2 1/4	.030	3
6859726	3AN9E19009RGT	3/4	3/4	.705	1	5	2 1/4	.060	3
6859728	3AN9E2500ARET	1	1	.940	1 1/4	5 1/2	2 1/2	.030	3
6859729	3AN9E2500ARGT	1	1	.940	1 1/4	5 1/2	2 1/2	.060	3

ALUFLASH • Series 3AF9 • Square End • 3 Flute • Regular Length • Long Neck • Cylindrical Shank • Inch







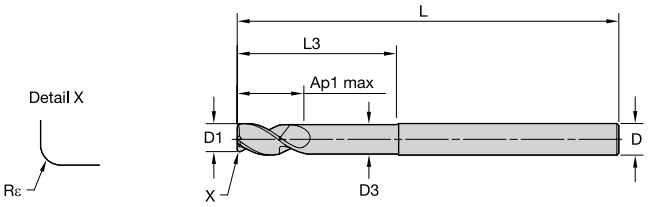
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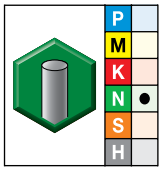
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6859818	3AF9E05021SZT	3/16	3/16	.176	1/4	2 1/4	1	3
6859820	3AF9E07023SZT	1/4	1/4	.235	5/16	3	1 1/4	3
6859843	3AF9E08024SZT	5/16	5/16	.294	3/8	3	1 1/2	3
6859846	3AF9E10025SZT	3/8	3/8	.353	1/2	3 1/2	2	3
6859849	3AF9E13026SZT	1/2	1/2	.470	5/8	4 1/2	2 1/2	3
6859862	3AF9E16028SZT	5/8	5/8	.588	3/4	5	3 1/4	3
6859866	3AF9E19029SZT	3/4	3/4	.705	1	5 1/2	3 1/2	3
6859869	3AF9E2502ASZT	1	1	.940	1 1/4	6 1/2	3 3/4	3

ALUFLASH • Series 3AF9 • Radius • 3 Flute • Regular Length • Long Neck • Cylindrical Shank • Inch







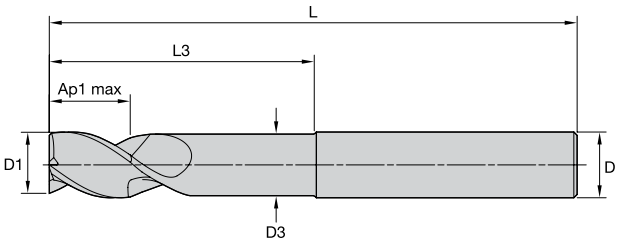
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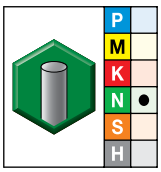
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6859819	3AF9E05021RAT	3/16	3/16	.176	1/4	2 1/4	1	.015	3
6859841	3AF9E07023RET	1/4	1/4	.235	5/16	3	1 1/4	.030	3
6859842	3AF9E07023RGT	1/4	1/4	.235	5/16	3	1 1/4	.060	3
6859844	3AF9E08024RET	5/16	5/16	.294	3/8	3	1 1/2	.030	3
6859845	3AF9E08024RGT	5/16	5/16	.294	3/8	3	1 1/2	.060	3
6859847	3AF9E10025RET	3/8	3/8	.353	1/2	3 1/2	2	.030	3
6859848	3AF9E10025RGT	3/8	3/8	.353	1/2	3 1/2	2	.060	3
6859850	3AF9E13026RET	1/2	1/2	.470	5/8	4 1/2	2 1/2	.030	3
6859861	3AF9E13026RGT	1/2	1/2	.470	5/8	4 1/2	2 1/2	.060	3
6859864	3AF9E16028RET	5/8	5/8	.588	3/4	5	3 1/4	.030	3
6859865	3AF9E16028RGT	5/8	5/8	.588	3/4	5	3 1/4	.060	3
6859867	3AF9E19029RET	3/4	3/4	.705	1	5 1/2	3 1/2	.030	3
6859868	3AF9E19029RGT	3/4	3/4	.705	1	5 1/2	3 1/2	.060	3
6859870	3AF9E2502ARET	1	1	.940	1 1/4	6 1/2	3 3/4	.030	3
6859871	3AF9E2502ARGT	1	1	.940	1 1/4	6 1/2	3 3/4	.060	3

ALUFLASH • Series 3AL9 • Square End • 3 Flute • Regular Length • Medium Neck • Cylindrical Shank • Inch







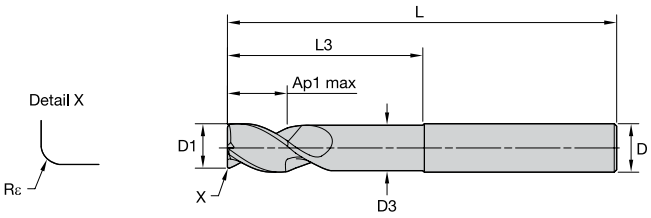
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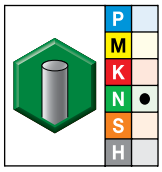
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6859740	3AL9E05011SZT	3/16	3/16	.176	1/4	2 1/4	3/4	3
6859783	3AL9E07013SZT	1/4	1/4	.235	5/16	2 1/2	1	3
6859786	3AL9E08014SZT	5/16	5/16	.294	3/8	3	1 1/4	3
6859789	3AL9E10015SZT	3/8	3/8	.353	1/2	3	1 1/2	3
6859802	3AL9E13016SZT	1/2	1/2	.470	5/8	4	2	3
6859805	3AL9E16018SZT	5/8	5/8	.588	3/4	5	2 1/2	3
6859808	3AL9E19019SZT	3/4	3/4	.705	1	5	3	3
6859811	3AL9E2501ASZT	1	1	.940	1 1/4	5 1/2	3	3

ALUFLASH • Series 3AL9 • Radiused • 3 Flute • Regular Length • Medium Neck • Cylindrical Shank • Inch







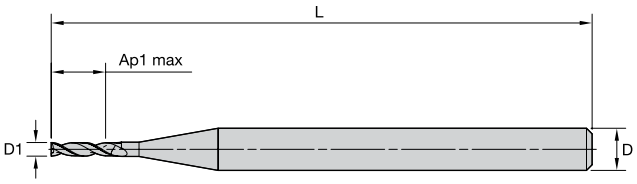
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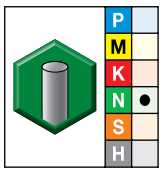
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6859781	3AL9E05011RAT	3/16	3/16	.176	1/4	2 1/4	3/4	.015	3
6859784	3AL9E07013RET	1/4	1/4	.235	5/16	2 1/2	1	.030	3
6859785	3AL9E07013RGT	1/4	1/4	.235	5/16	2 1/2	1	.060	3
6859787	3AL9E08014RET	5/16	5/16	.294	3/8	3	1 1/4	.030	3
6859788	3AL9E08014RGT	5/16	5/16	.294	3/8	3	1 1/4	.060	3
6859790	3AL9E10015RET	3/8	3/8	.353	1/2	3	1 1/2	.030	3
6859801	3AL9E10015RGT	3/8	3/8	.353	1/2	3	1 1/2	.060	3
6859803	3AL9E13016RET	1/2	1/2	.470	5/8	4	2	.030	3
6859804	3AL9E13016RGT	1/2	1/2	.470	5/8	4	2	.060	3
6859806	3AL9E16018RET	5/8	5/8	.588	3/4	5	2 1/2	.030	3
6859807	3AL9E16018RGT	5/8	5/8	.588	3/4	5	2 1/2	.060	3
6859809	3AL9E19019RET	3/4	3/4	.705	1	5	3	.030	3
6859810	3AL9E19019RGT	3/4	3/4	.705	1	5	3	.060	3
6859812	3AL9E2501ARET	1	1	.940	1 1/4	5 1/2	3	.030	3
6859813	3AL9E2501ARGT	1	1	.940	1 1/4	5 1/2	3	.060	3

ALUFLASH • Series 2A09 • Square End • 2 Flute • Regular Length • Cylindrical Shank • Metric







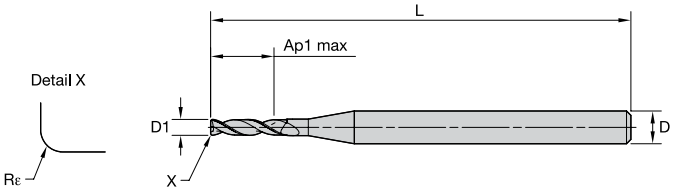
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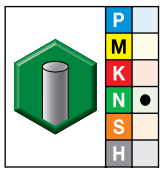
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6853514	2A09M01000SZT	1,0	3	4,00	38	2
6853515	2A09M01500SZT	1,5	3	6,00	38	2
6853517	2A09M02000SZT	2,0	3	8,00	38	2
6853519	2A09M02500SZT	2,5	3	9,00	38	2
6853542	2A09M04001SZT	4,0	4	12,00	50	2
6853544	2A09M05002SZT	5,0	5	14,00	50	2
6853547	2A09M06003SZT	6,0	6	16,00	50	2
6853549	2A09M08004SZT	8,0	8	20,00	63	2
6853552	2A09M12006SZT	12,0	12	25,00	76	2
6853554	2A09M16008SZT	16,0	16	32,00	89	2
6853556	2A09M20009SZT	20,0	20	40,00	104	2

ALUFLASH • Series 2A09 • Radius • 2 Flute • Regular Length • Cylindrical Shank • Metric







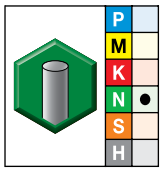
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● first choice
○ alternate choice

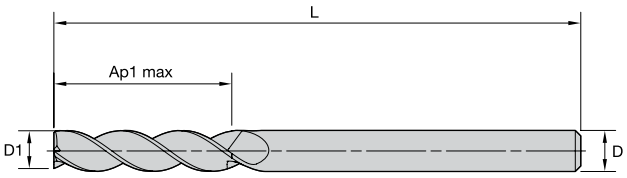
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6853516	2A09M01500RAT	1,5	3	6,00	38	0,20	2
6853518	2A09M02000RAT	2,0	3	8,00	38	0,20	2
6853520	2A09M02500RAT	2,5	3	9,00	38	0,20	2
6853541	2A09M03000RAT	3,0	3	12,00	38	0,20	2
6853543	2A09M04001RAT	4,0	4	12,00	50	0,20	2
6853546	2A09M05002RAT	5,0	5	14,00	50	0,20	2
6853548	2A09M06003RET	6,0	6	16,00	50	0,50	2
6853550	2A09M08004RET	8,0	8	20,00	63	0,50	2
6853551	2A09M10005RJT	10,0	10	22,00	76	1,00	2
6853553	2A09M12006RJT	12,0	12	25,00	76	1,00	2
6853555	2A09M16008RJT	16,0	16	32,00	89	1,00	2
6853557	2A09M20009RJT	20,0	20	40,00	104	1,00	2

ALUFLASH • Series 3A09 • Square End • 3 Flute • Regular Length • Cylindrical Shank • Metric





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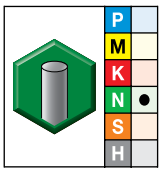


● first choice
○ alternate choice

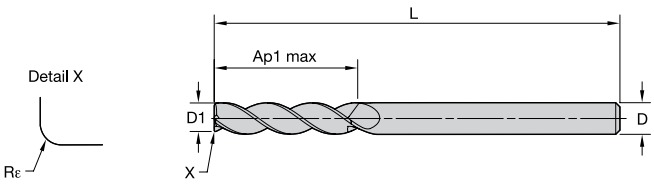
order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6853511	3A09M03000SZT	3,0	3	12,00	38	3

ALUFLASH • Series 3A09 • Radius • 3 Flute • Regular Length • Cylindrical Shank • Metric





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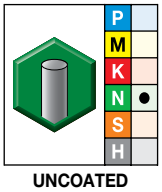


● first choice
○ alternate choice

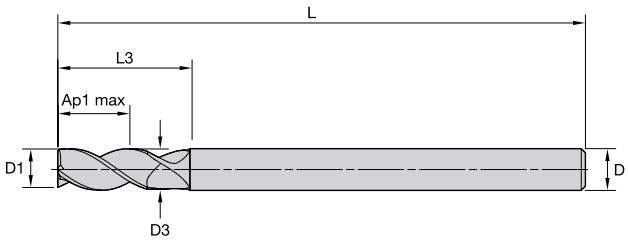
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6853512	3A09M03000RAT	3,0	3	12,00	38	0,20	3
6853513	3A09M04001RET	4,0	4	12,00	63	0,50	3

ALUFLASH • Series 3AN9 • Square End • 3 Flute • Regular Length • Regular Neck • Cylindrical Shank • Metric





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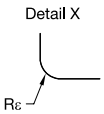


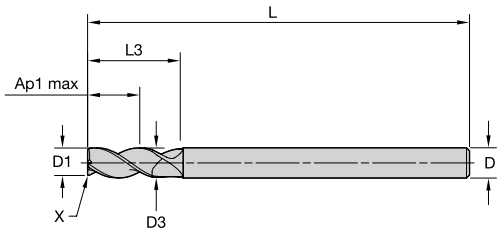
● first choice
○ alternate choice

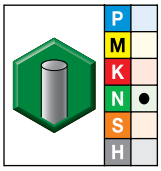
order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6853460	3AN9M04001SZT	4,0	4	3,76	8,00	50	12,00	3
6853462	3AN9M05002SZT	5,0	5	4,70	10,00	63	15,00	3
6853465	3AN9M06003SZT	6,0	6	5,64	13,00	63	18,00	3
6853469	3AN9M08004SZT	8,0	8	7,52	18,00	76	24,00	3
6853474	3AN9M10005SZT	10,0	10	9,40	22,00	76	30,00	3
6853479	3AN9M12006SZT	12,0	12	11,28	25,00	76	36,00	3
6853486	3AN9M16008SZT	16,0	16	15,04	32,00	89	48,00	3
6853494	3AN9M20009SZT	20,0	20	18,80	40,00	115	60,00	3

ALUFLASH • Series 3AN9 • Radius • 3 Flute • Regular Length • Regular Neck • Cylindrical Shank • Metric









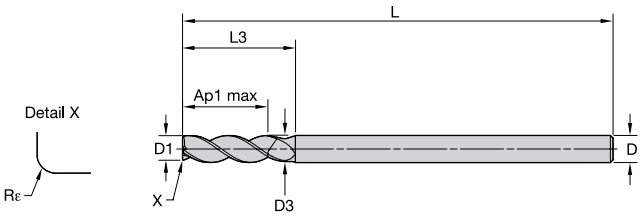
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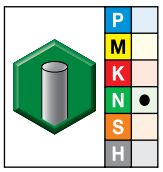
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6853461	3AN9M04001RAT	4,0	4	3,76	8,00	50	12,00	0,20	3
6853463	3AN9M05002RAT	5,0	5	4,70	10,00	63	15,00	0,20	3
6853464	3AN9M05002RET	5,0	5	4,70	10,00	63	15,00	0,50	3
6853466	3AN9M06003RAT	6,0	6	5,64	13,00	63	18,00	0,20	3
6853467	3AN9M06003RET	6,0	6	5,64	13,00	63	18,00	0,50	3
6853468	3AN9M06003RJT	6,0	6	5,64	13,00	63	18,00	1,00	3
6853470	3AN9M08004RAT	8,0	8	7,52	18,00	76	24,00	0,20	3
6853471	3AN9M08004RET	8,0	8	7,52	18,00	76	24,00	0,50	3
6853473	3AN9M08004RHT	8,0	8	7,52	18,00	76	24,00	1,50	3
6853472	3AN9M08004RJT	8,0	8	7,52	18,00	76	24,00	1,00	3
6853475	3AN9M10005RAT	10,0	10	9,40	22,00	76	30,00	0,20	3
6853476	3AN9M10005RET	10,0	10	9,40	22,00	76	30,00	0,50	3
6853478	3AN9M10005RHT	10,0	10	9,40	22,00	76	30,00	1,50	3
6853477	3AN9M10005RJT	10,0	10	9,40	22,00	76	30,00	1,00	3
6853480	3AN9M12006RAT	12,0	12	11,28	25,00	76	36,00	0,20	3
6853481	3AN9M12006RET	12,0	12	11,28	25,00	76	36,00	0,50	3
6853483	3AN9M12006RHT	12,0	12	11,28	25,00	76	36,00	1,50	3
6853482	3AN9M12006RJT	12,0	12	11,28	25,00	76	36,00	1,00	3
6853484	3AN9M12006RKT	12,0	12	11,28	25,00	76	36,00	2,00	3
6853485	3AN9M12006RPT	12,0	12	11,28	25,00	76	36,00	3,00	3
6853487	3AN9M16008RAT	16,0	16	15,04	32,00	89	48,00	0,20	3
6853488	3AN9M16008RET	16,0	16	15,04	32,00	89	48,00	0,50	3
6853490	3AN9M16008RHT	16,0	16	15,04	32,00	89	48,00	1,50	3
6853489	3AN9M16008RJT	16,0	16	15,04	32,00	89	48,00	1,00	3
6853491	3AN9M16008RMT	16,0	16	15,04	32,00	89	48,00	2,50	3
6853492	3AN9M16008RPT	16,0	16	15,04	32,00	89	48,00	3,00	3
6853493	3AN9M16008RQT	16,0	16	15,04	32,00	89	48,00	4,00	3
6853495	3AN9M20009RAT	20,0	20	18,80	40,00	115	60,00	0,20	3
6853496	3AN9M20009RHT	20,0	20	18,80	40,00	115	60,00	1,50	3
6853497	3AN9M20009RKT	20,0	20	18,80	40,00	115	60,00	2,00	3
6853498	3AN9M20009RPT	20,0	20	18,80	40,00	115	60,00	3,00	3
6853499	3AN9M20009RQT	20,0	20	18,80	40,00	115	60,00	4,00	3
6853500	3AN9M20009RRT	20,0	20	18,80	40,00	115	60,00	5,00	3

ALUFLASH • Series 3AP9 • Radius • 3 Flute • Long Length • Regular Neck • Cylindrical Shank • Metric







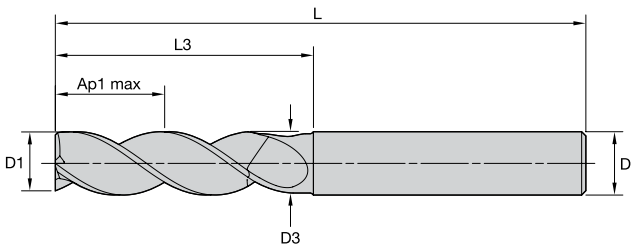
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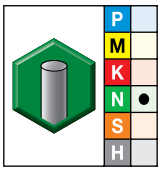
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6853439	3AP9M04011RAT	4,0	4	3,76	12,00	63	16,00	0,20	3
6853440	3AP9M05002RAT	5,0	5	4,70	15,00	63	20,00	0,20	3
6853441	3AP9M06013RET	6,0	6	5,64	18,00	76	24,00	0,50	3
6853442	3AP9M06013RJT	6,0	6	5,64	18,00	76	24,00	1,00	3
6853443	3AP9M08014RET	8,0	8	7,52	24,00	76	32,00	0,50	3
6853444	3AP9M08014RJT	8,0	8	7,52	24,00	76	32,00	1,00	3
6853445	3AP9M10015RET	10,0	10	9,40	30,00	89	40,00	0,50	3
6853446	3AP9M10015RHT	10,0	10	9,40	30,00	89	40,00	1,50	3
6853447	3AP9M10015RKT	10,0	10	9,40	30,00	89	40,00	2,00	3
6853449	3AP9M12016RET	12,0	12	11,28	36,00	100	48,00	0,50	3
6853450	3AP9M12016RHT	12,0	12	11,28	36,00	100	48,00	1,50	3
6853451	3AP9M12016RPT	12,0	12	11,28	36,00	100	48,00	3,00	3
6853452	3AP9M16018RET	16,0	16	15,04	48,00	110	64,00	0,50	3
6853453	3AP9M16018RHT	16,0	16	15,04	48,00	110	64,00	1,50	3
6853454	3AP9M16018RPT	16,0	16	15,04	48,00	110	64,00	3,00	3
6853455	3AP9M20019RET	20,0	20	18,80	60,00	150	80,00	0,50	3
6853456	3AP9M20019RHT	20,0	20	18,80	60,00	150	80,00	1,50	3
6853457	3AP9M20019RKT	20,0	20	18,80	60,00	150	80,00	2,00	3
6853458	3AP9M20019RPT	20,0	20	18,80	60,00	150	80,00	3,00	3
6853459	3AP9M20019RQT	20,0	20	18,80	60,00	150	80,00	4,00	3

ALUFLASH • Series 3AP9 • Square End • 3 Flute • Long Length • Regular Neck • Cylindrical Shank • Metric





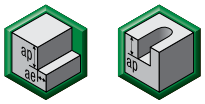
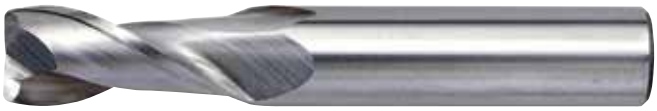


UNCOATED

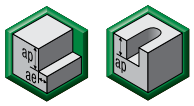
● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6853448	3AP9M12016SZT	12,0	12	11,28	36,00	100	48,00	3

ALUFLASH • Side Milling and Slotting • Application Data • Inch

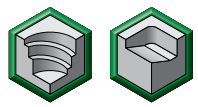
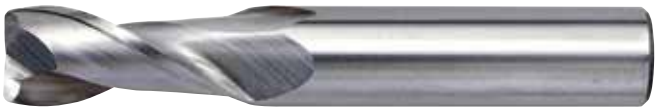



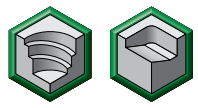
Material Group		Side Milling (A) and Slotting (B)			UNCOATED			Recommended feed per tooth (Fz = IPT) for side milling (A). For slotting (B), reduce Fz by 20%.												
		A		B	Cutting Speed — Vc SFM				D1 — Diameter											
		ap	ae	ap	min	Start	max	Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
N	1	Ap1 max	0,5 x D1	1 x D1	1500	1800	6000	IPT	.0009	.0017	.0022	.0026	.0035	.0043	.0052	.0060	.0069	.0078	.0087	.0108
	2	Ap1 max	0,5 x D1	1 x D1	1500	1800	4500	IPT	.0008	.0016	.0019	.0023	.0031	.0039	.0047	.0054	.0062	.0070	.0078	.0097
	3	Ap1 max	0,5 x D1	1 x D1	1500	1800	4500	IPT	.0006	.0012	.0015	.0018	.0024	.0030	.0036	.0042	.0048	.0054	.0061	.0076
	4	Ap1 max	0,5 x D1	1 x D1	1200	1350	2250	IPT	.0006	.0012	.0015	.0018	.0024	.0030	.0036	.0042	.0048	.0054	.0061	.0076
	5	Ap1 max	0,5 x D1	1 x D1	750	1200	3000	IPT	.0008	.0016	.0020	.0023	.0031	.0039	.0047	.0054	.0062	.0070	.0078	.0097

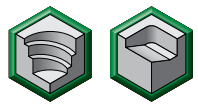
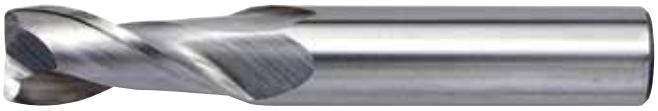



Material Group		Side Milling (A) and Slotting (B)			UNCOATED			Recommended feed per tooth (Fz = IPT) for side milling (A). For slotting (B), reduce Fz by 20%.												
		A		B	Cutting Speed — Vc SFM				D1 — Diameter											
		ap	ae	ap	min	Start	max	Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
N	1	Ap1 max	0,5 x D1	1 x D	1500	1800	6000	IPT	.0009	.0017	.0022	.0026	.0035	.0043	.0052	.0060	.0069	.0078	.0087	.0108
	2	Ap1 max	0,5 x D1	1 x D	1500	1800	4500	IPT	.0008	.0016	.0019	.0023	.0031	.0039	.0047	.0054	.0062	.0070	.0078	.0097
	3	Ap1 max	0,5 x D1	1 x D	1500	1800	4500	IPT	.0006	.0012	.0015	.0018	.0024	.0030	.0036	.0042	.0048	.0054	.0061	.0076
	4	Ap1 max	0,5 x D1	1 x D	1200	1350	2250	IPT	.0006	.0012	.0015	.0018	.0024	.0030	.0036	.0042	.0048	.0054	.0061	.0076
	5	Ap1 max	0,5 x D1	1 x D	750	1200	3000	IPT	.0008	.0016	.0020	.0023	.0031	.0039	.0047	.0054	.0062	.0070	.0078	.0097

ALUFLASH • Ramping 2 Flute • Application Data • Inch

Material Group		Helical Interpolation / Ramping 0° - 15°																
			UNCOATED				Recommended feed per tooth (fz = IPT) for helical interpolation and ramping											
			Cutting Speed — Vc SFM				Diameter – D1 [Ømin–Ømax]											
		Max Depth	min	Start	max	Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
						Decimals	.180-.180	.180-.297	.216-.356	.288-.475	.359-.594	.431-.713	.575-.950	.633-1.047	.719-1.188	.814-1.346	.863-1.425	1.150-1.900
N	1	1.25 x D1	1500	1800	6000	IPT	.0009	.0017	.0022	.0026	.0035	.0043	.0052	.0060	.0069	.0078	.0087	.0108
N	2	1.25 x D1	1500	1800	4500	IPT	.0008	.0016	.0019	.0023	.0031	.0039	.0047	.0054	.0062	.0070	.0078	.0097
N	3	1.25 x D1	1500	1800	4500	IPT	.0006	.0012	.0015	.0018	.0024	.0030	.0036	.0042	.0048	.0054	.0061	.0076
N	4	1.25 x D1	1200	1350	2250	IPT	.0006	.0012	.0015	.0018	.0024	.0030	.0036	.0042	.0048	.0054	.0061	.0076
N	5	1.25 x D1	750	1200	3000	IPT	.0008	.0016	.0020	.0023	.0031	.0039	.0047	.0054	.0062	.0070	.0078	.0097

Material Group		Helical Inter-polation / Ramping 15° - 30°																
			UNCOATED				Recommended feed per tooth (fz = IPT) for helical interpolation and ramping											
			Cutting Speed — Vc SFM				Diameter – D1 [Ømin–Ømax]											
		Max Depth	min	Start	max	Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
						Decimals	.180-.180	.180-.297	.216-.356	.288-.475	.359-.594	.431-.713	.575-.950	.633-1.047	.719-1.188	.814-1.346	.863-1.425	1.150-1.900
N	1	1.25 x D1	1500	1800	4800	IPT	.0006	.0013	.0016	.0019	.0026	.0032	.0039	.0045	.0052	.0058	.0065	.0081
N	2	1.25 x D1	1500	1800	3600	IPT	.0006	.0012	.0014	.0018	.0023	.0029	.0035	.0041	.0047	.0053	.0058	.0073
N	3	1.25 x D1	1500	1800	3600	IPT	.0005	.0009	.0011	.0014	.0018	.0023	.0027	.0032	.0036	.0041	.0045	.0057
N	4	1.25 x D1	1200	1350	1800	IPT	.0005	.0009	.0011	.0014	.0018	.0023	.0027	.0032	.0036	.0041	.0045	.0057
N	5	1.25 x D1	750	1200	2400	IPT	.0006	.0012	.0015	.0018	.0023	.0029	.0035	.0041	.0047	.0053	.0058	.0073

Material Group		Helical Interpolation / Ramping 30° - 45°																
			UNCOATED				Recommended feed per tooth (fz = IPT) for helical interpolation and ramping											
			Cutting Speed — Vc SFM				Diameter – D1 [Ømin–Ømax]											
		Max Depth	min	Start	max	Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
						Decimals	.180-.180	.180-.297	.216-.356	.288-.475	.359-.594	.431-.713	.575-.950	.633-1.047	.719-1.188	.814-1.346	.863-1.425	1.150-1.900
N	1	1.25 x D1	1260	1500	2400	IPT	.0005	.0010	.0013	.0016	.0021	.0026	.0031	.0036	.0042	.0047	.0052	.0065
N	2	1.25 x D1	1260	1500	2400	IPT	.0005	.0009	.0011	.0014	.0019	.0023	.0028	.0033	.0037	.0042	.0047	.0058
N	3	1.25 x D1	1260	1500	2400	IPT	.0004	.0007	.0009	.0011	.0015	.0018	.0022	.0025	.0029	.0033	.0036	.0045
N	4	1.25 x D1	1020	1140	1350	IPT	.0004	.0007	.0009	.0011	.0015	.0018	.0022	.0025	.0029	.0033	.0036	.0045
N	5	1.25 x D1	630	1020	1800	IPT	.0005	.0009	.0012	.0014	.0019	.0023	.0028	.0033	.0037	.0042	.0047	.0058

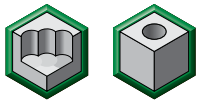
ALUFLASH • Ramping 3 Flute • Application Data • Inch

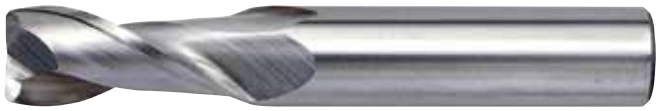
Material Group		Max Depth	Helical Interpolation / Ramping 0° - 15°															
			UNCOATED			Recommended feed per tooth (fz = IPT) for helical interpolation and ramping – fz x 1												
			Cutting Speed — Vc m/min			Diameter – D1 [Ømin–Ømax]												
						Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
						Decimals	.180-.180	.180-.297	.216-.356	.288-.475	.359-.594	.431-.713	.575-.950	.633-1.047	.719-1.188	.814-1.346	.863-1.425	1.150-1.900
N	1	1.25 x D1	1500	1800	6000	IPT	.0009	.0017	.0022	.0026	.0035	.0043	.0052	.0060	.0069	.0078	.0087	.0108
	2	1.25 x D1	1500	1800	4500	IPT	.0008	.0016	.0019	.0023	.0031	.0039	.0047	.0054	.0062	.0070	.0078	.0097
	3	1.25 x D1	1500	1800	4500	IPT	.0006	.0012	.0015	.0018	.0024	.0030	.0036	.0042	.0048	.0054	.0061	.0076
	4	1.25 x D1	1200	1350	2250	IPT	.0006	.0012	.0015	.0018	.0024	.0030	.0036	.0042	.0048	.0054	.0061	.0076
	5	1.25 x D1	750	1200	3000	IPT	.0008	.0016	.0020	.0023	.0031	.0039	.0047	.0054	.0062	.0070	.0078	.0097

Material Group		Max Depth	Helical Interpolation / Ramping 15° - 30°															
			UNCOATED			Recommended feed per tooth (fz = IPT) for helical interpolation and ramping – fz x 1												
			Cutting Speed — Vc m/min			Diameter – D1 [Ømin–Ømax]												
						Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
						Decimals	.180-.180	.180-.297	.216-.356	.288-.475	.359-.594	.431-.713	.575-.950	.633-1.047	.719-1.188	.814-1.346	.863-1.425	1.150-1.900
N	1	1.25 x D1	1500	1800	4800	IPT	.0006	.0013	.0016	.0019	.0026	.0032	.0039	.0045	.0052	.0058	.0065	.0081
	2	1.25 x D1	1500	1800	3600	IPT	.0006	.0012	.0014	.0018	.0023	.0029	.0035	.0041	.0047	.0053	.0058	.0073
	3	1.25 x D1	1500	1800	3600	IPT	.0005	.0009	.0011	.0014	.0018	.0023	.0027	.0032	.0036	.0041	.0045	.0057
	4	1.25 x D1	1200	1350	1800	IPT	.0005	.0009	.0011	.0014	.0018	.0023	.0027	.0032	.0036	.0041	.0045	.0057
	5	1.25 x D1	750	1200	2400	IPT	.0006	.0012	.0015	.0018	.0023	.0029	.0035	.0041	.0047	.0053	.0058	.0073

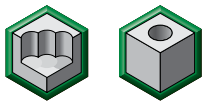
Material Group		Max Depth	Helical Interpolation / Ramping 30° - 45°															
			UNCOATED			Recommended feed per tooth (fz = IPT) for helical interpolation and ramping – fz x 1												
			Cutting Speed — Vc m/min			Diameter – D1 [Ømin–Ømax]												
						Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
						Decimals	.180-.180	.180-.297	.216-.356	.288-.475	.359-.594	.431-.713	.575-.950	.633-1.047	.719-1.188	.814-1.346	.863-1.425	1.150-1.900
N	1	1.25 x D1	1260	1500	2400	IPT	.0005	.0010	.0013	.0016	.0021	.0026	.0031	.0036	.0042	.0047	.0052	.0065
	2	1.25 x D1	1260	1500	2400	IPT	.0005	.0009	.0011	.0014	.0019	.0023	.0028	.0033	.0037	.0042	.0047	.0058
	3	1.25 x D1	1260	1500	2400	IPT	.0004	.0007	.0009	.0011	.0015	.0018	.0022	.0025	.0029	.0033	.0036	.0045
	4	1.25 x D1	1020	1140	1350	IPT	.0004	.0007	.0009	.0011	.0015	.0018	.0022	.0025	.0029	.0033	.0036	.0045
	5	1.25 x D1	630	1020	1800	IPT	.0005	.0009	.0012	.0014	.0019	.0023	.0028	.0033	.0037	.0042	.0047	.0058

ALUFLASH • Plunging • Application Data • Inch





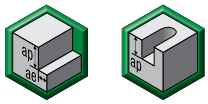
Material Group		Plunging/Drilling			UNCOATED			Recommended feed per revolution (fn =IPR) for plunging 2-flute end mills													
					Cutting Speed — Vc SFM				D1 — Diameter												
		Max Depth	Applicable	Coolant	min	Start	max	Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
N	1	1.5 x D	●	Required	360	780	1200	IPR	.0031	.0047	.0053	.0059	.0063	.0079	.0087	.0093	.0098	.0104	.0110	.0118
	2	1.5 x D	●	Required	360	750	840	IPR	.0031	.0047	.0053	.0059	.0063	.0079	.0087	.0093	.0098	.0104	.0110	.0118
	3	1.5 x D	●	Required	300	600	780	IPR	.0031	.0047	.0053	.0059	.0063	.0079	.0087	.0093	.0098	.0104	.0110	.0118
	4	1 x D	●	Required	180	450	780	IPR	.0024	.0031	.0039	.0047	.0055	.0063	.0079	.0083	.0087	.0093	.0098	.0110
	5	1.5 x D	●	Required	180	600	1200	IPR	.0031	.0047	.0053	.0059	.0063	.0079	.0087	.0093	.0098	.0104	.0110	.0118

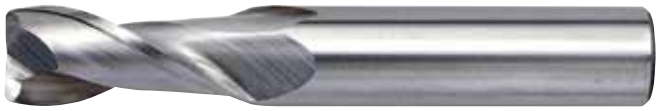




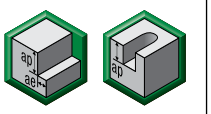
Material Group		Plunging/Drilling			UNCOATED			Recommended feed per revolution (fn =IPR) for plunging 3-flute end mills													
					Cutting Speed — Vc SFM				D1 — Diameter												
		Max Depth	Applicable	Coolant	min	Start	max	Fraction	1/8	5/32	3/16	1/4	5/16	3/8	1/2	9/16	5/8	23/32	3/4	1
N	1	1,5 x D	●	Required	360	780	1200	IPR	.0022	.0033	.0037	.0041	.0044	.0055	.0061	.0065	.0069	.0073	.0077	.0083
	2	1,5 x D	●	Required	360	750	840	IPR	.0022	.0033	.0037	.0041	.0044	.0055	.0061	.0065	.0069	.0073	.0077	.0083
	3	1,5 x D	●	Required	300	600	780	IPR	.0022	.0033	.0037	.0041	.0044	.0055	.0061	.0065	.0069	.0073	.0077	.0083
	4	1 x D	●	Required	180	450	780	IPR	.0017	.0022	.0028	.0033	.0039	.0044	.0055	.0058	.0061	.0065	.0069	.0077
	5	1,5 x D	●	Required	180	600	1200	IPR	.0022	.0033	.0037	.0041	.0044	.0055	.0061	.0065	.0069	.0073	.0077	.0083

ALUFLASH • Side Milling and Slotting • Application Data • Metric





Material Group		Side Milling (A) and Slotting (B)			UNCOATED			Recommended feed per tooth (fz = mm/z) for side milling (A). For slotting (B), reduce fz by 20%.													
		A		B	Cutting Speed — Vc m/min				D1 — Diameter												
		ap	ae	ap	min	Start	max	mm	2,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
N	1	Ap1 max	0,5 x D1	1 x D	500	600	2000	fz	0,022	0,044	0,055	0,066	0,088	0,110	0,132	0,153	0,176	0,198	0,220	0,275
	2	Ap1 max	0,5 x D1	1 x D	500	600	1500	fz	0,020	0,040	0,048	0,059	0,079	0,099	0,119	0,138	0,158	0,178	0,198	0,247
	3	Ap1 max	0,5 x D1	1 x D	500	600	1500	fz	0,015	0,031	0,038	0,046	0,062	0,077	0,092	0,107	0,123	0,138	0,154	0,192
	4	Ap1 max	0,5 x D1	1 x D	400	450	750	fz	0,015	0,031	0,038	0,046	0,062	0,077	0,092	0,107	0,123	0,138	0,154	0,192
	5	Ap1 max	0,5 x D1	1 x D	250	400	1000	fz	0,020	0,040	0,050	0,059	0,079	0,099	0,119	0,138	0,158	0,178	0,198	0,247





Material Group		Side Milling (A) and Slotting (B)			UNCOATED			Recommended feed per tooth (fz = mm/z) for side milling (A). For slotting (B), reduce fz by 20%.													
		A		B	Cutting Speed — Vc m/min				D1 — Diameter												
		ap	ae	ap	min	Start	max	mm	2,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
N	1	Ap1 max	0,5 x D1	1 x D	500	600	2000	fz	0,022	0,044	0,055	0,066	0,088	0,110	0,132	0,153	0,176	0,198	0,220	0,275
	2	Ap1 max	0,5 x D1	1 x D	500	600	1500	fz	0,020	0,040	0,048	0,059	0,079	0,099	0,119	0,138	0,158	0,178	0,198	0,247
	3	Ap1 max	0,5 x D1	1 x D	500	600	1500	fz	0,015	0,031	0,038	0,046	0,062	0,077	0,092	0,107	0,123	0,138	0,154	0,192
	4	Ap1 max	0,5 x D1	1 x D	400	450	750	fz	0,015	0,031	0,038	0,046	0,062	0,077	0,092	0,107	0,123	0,138	0,154	0,192
	5	Ap1 max	0,5 x D1	1 x D	250	400	1000	fz	0,020	0,040	0,050	0,059	0,079	0,099	0,119	0,138	0,158	0,178	0,198	0,247

ALUFLASH • Ramping 2 Flute • Application Data • Metric

Material Group		Helical Interpolation / Ramping 0° - 15°															
		UNCOATED				Recommended feed per tooth (fz = mm/z) for helical interpolation and ramping											
		Cutting Speed – Vc m/min				Diameter – D1 [Ømin–Ømax]											
					mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
Material Group		Max Depth	min	Start	max	mm	2,5-4,8	4,6-7,6	5,8-9,5	6,9-11,4	9,2-15,2	11,5-19,0	13,8-22,8	16,1-26,6	18,4-30,4	20,7-34,2	23,0-38,0	28,8-47,5
N	1	1,25 x D1	500	600	2000	fz	0,022	0,044	0,055	0,066	0,088	0,110	0,132	0,153	0,176	0,198	0,220	0,275
	2	1,25 x D1	500	600	1500	fz	0,020	0,040	0,048	0,059	0,079	0,099	0,119	0,138	0,158	0,178	0,198	0,247
	3	1,25 x D1	500	600	1500	fz	0,015	0,031	0,038	0,046	0,062	0,077	0,092	0,107	0,123	0,138	0,154	0,192
	4	1,25 x D1	400	450	750	fz	0,015	0,031	0,038	0,046	0,062	0,077	0,092	0,107	0,123	0,138	0,154	0,192
	5	1,25 x D1	250	400	1000	fz	0,020	0,040	0,050	0,059	0,079	0,099	0,119	0,138	0,158	0,178	0,198	0,247

Material Group		Helical Inter-polation / Ramping 15° - 30°															
		UNCOATED				Recommended feed per tooth (fz = mm/z) for helical interpolation and ramping											
		Cutting Speed – Vc m/min				Diameter – D1 [Ømin–Ømax]											
					mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
Material Group		Max Depth	min	Start	max	mm	2,5-4,8	4,6-7,6	5,8-9,5	6,9-11,4	9,2-15,2	11,5-19,0	13,8-22,8	16,1-26,6	18,4-30,4	20,7-34,2	23,0-38,0	28,8-47,5
N	1	1,25 x D1	500	600	1600	fz	0,017	0,033	0,041	0,050	0,066	0,082	0,099	0,115	0,132	0,148	0,165	0,206
	2	1,25 x D1	500	600	1200	fz	0,015	0,030	0,036	0,045	0,059	0,074	0,089	0,104	0,119	0,134	0,148	0,185
	3	1,25 x D1	500	600	1200	fz	0,012	0,023	0,029	0,035	0,046	0,058	0,069	0,080	0,092	0,104	0,115	0,144
	4	1,25 x D1	400	450	600	fz	0,012	0,023	0,029	0,035	0,046	0,058	0,069	0,080	0,092	0,104	0,115	0,144
	5	1,25 x D1	250	400	800	fz	0,015	0,030	0,038	0,045	0,059	0,074	0,089	0,104	0,119	0,134	0,148	0,185

Material Group		Helical Interpolation / Ramping 30° - 45°															
		UNCOATED				Recommended feed per tooth (fz = mm/z) for helical interpolation and ramping											
		Cutting Speed – Vc m/min				Diameter – D1 [Ømin–Ømax]											
					mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
Material Group		Max Depth	min	Start	max	mm	2,5-4,8	4,6-7,6	5,8-9,5	6,9-11,4	9,2-15,2	11,5-19,0	13,8-22,8	16,1-26,6	18,4-30,4	20,7-34,2	23,0-38,0	28,8-47,5
N	1	1,25 x D1	420	500	800	fz	0,013	0,026	0,033	0,040	0,053	0,066	0,079	0,092	0,106	0,119	0,132	0,165
	2	1,25 x D1	420	500	800	fz	0,012	0,024	0,029	0,036	0,048	0,059	0,071	0,083	0,095	0,107	0,119	0,148
	3	1,25 x D1	420	500	800	fz	0,009	0,018	0,023	0,028	0,037	0,046	0,055	0,064	0,074	0,083	0,092	0,115
	4	1,25 x D1	340	380	450	fz	0,009	0,018	0,023	0,028	0,037	0,046	0,055	0,064	0,074	0,083	0,092	0,115
	5	1,25 x D1	210	340	600	fz	0,012	0,024	0,030	0,036	0,048	0,059	0,071	0,083	0,095	0,107	0,119	0,148

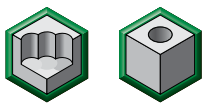
ALUFLASH • Ramping 3 Flute • Application Data • Metric

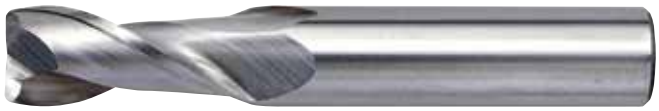
Material Group		Max Depth	Helical Interpolation / Ramping 0° - 15°														
			UNCOATED			Recommended feed per tooth (fz = mm/z) for helical interpolation and ramping – fz x 1											
			Cutting Speed – Vc m/min			Diameter – D1 [Ømin–Ømax]											
						mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
			min	Start	max	mm	2,5-4,8	4,6-7,6	5,8-9,5	6,9-11,4	9,2-15,2	11,5-19,0	13,8-22,8	16,1-26,6	18,4-30,4	20,7-34,2	23,0-38,0	28,8-47,5
N	1	1,25 x D1	500	600	2000	fz	0,022	0,044	0,055	0,066	0,088	0,110	0,132	0,153	0,176	0,198	0,220	0,275
	2	1,25 x D1	500	600	1500	fz	0,020	0,040	0,048	0,059	0,079	0,099	0,119	0,138	0,158	0,178	0,198	0,247
	3	1,25 x D1	500	600	1500	fz	0,015	0,031	0,038	0,046	0,062	0,077	0,092	0,107	0,123	0,138	0,154	0,192
	4	1,25 x D1	400	450	750	fz	0,015	0,031	0,038	0,046	0,062	0,077	0,092	0,107	0,123	0,138	0,154	0,192
	5	1,25 x D1	250	400	1000	fz	0,020	0,040	0,050	0,059	0,079	0,099	0,119	0,138	0,158	0,178	0,198	0,247

Material Group		Max Depth	Helical Interpolation / Ramping 15° - 30°														
			UNCOATED			Recommended feed per tooth (fz = mm/z) for helical interpolation and ramping – fz x 1											
			Cutting Speed – Vc m/min			Diameter – D1 [Ømin–Ømax]											
						mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
			min	Start	max	mm	2,5-4,8	4,6-7,6	5,8-9,5	6,9-11,4	9,2-15,2	11,5-19,0	13,8-22,8	16,1-26,6	18,4-30,4	20,7-34,2	23,0-38,0	28,8-47,5
N	1	1,25 x D1	500	600	1600	fz	0,017	0,033	0,041	0,050	0,066	0,082	0,099	0,115	0,132	0,148	0,165	0,206
	2	1,25 x D1	500	600	1200	fz	0,015	0,030	0,036	0,045	0,059	0,074	0,089	0,104	0,119	0,134	0,148	0,185
	3	1,25 x D1	500	600	1200	fz	0,012	0,023	0,029	0,035	0,046	0,058	0,069	0,080	0,092	0,104	0,115	0,144
	4	1,25 x D1	400	450	600	fz	0,012	0,023	0,029	0,035	0,046	0,058	0,069	0,080	0,092	0,104	0,115	0,144
	5	1,25 x D1	250	400	800	fz	0,015	0,030	0,038	0,045	0,059	0,074	0,089	0,104	0,119	0,134	0,148	0,185

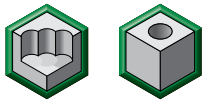
Material Group		Max Depth	Helical Interpolation / Ramping 30° - 45°														
			UNCOATED			Recommended feed per tooth (fz = mm/z) for helical interpolation and ramping – fz x 1											
			Cutting Speed – Vc m/min			Diameter – D1 [Ømin–Ømax]											
						mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
			min	Start	max	mm	2,5-4,8	4,6-7,6	5,8-9,5	6,9-11,4	9,2-15,2	11,5-19,0	13,8-22,8	16,1-26,6	18,4-30,4	20,7-34,2	23,0-38,0	28,8-47,5
N	1	1,25 x D1	420	500	800	fz	0,013	0,026	0,033	0,040	0,053	0,066	0,079	0,092	0,106	0,119	0,132	0,165
	2	1,25 x D1	420	500	800	fz	0,012	0,024	0,029	0,036	0,048	0,059	0,071	0,083	0,095	0,107	0,119	0,148
	3	1,25 x D1	420	500	800	fz	0,009	0,018	0,023	0,028	0,037	0,046	0,055	0,064	0,074	0,083	0,092	0,115
	4	1,25 x D1	340	380	450	fz	0,009	0,018	0,023	0,028	0,037	0,046	0,055	0,064	0,074	0,083	0,092	0,115
	5	1,25 x D1	210	340	600	fz	0,012	0,024	0,030	0,036	0,048	0,059	0,071	0,083	0,095	0,107	0,119	0,148

ALUFLASH • Plunging • Application Data • Metric





Material Group		Plunging/Drilling			UNCOATED			Recommended feed per revolution (fn =mm/rev) for plunging 2-flute end mills											
					Cutting Speed — Vc m/min				D1 — Diameter										
		Max Depth	Applicable	Coolant	min	Start	max	mm	2,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
N	1	1,5 x D	●	Required	120	260	400	fn	0,080	0,120	0,135	0,150	0,160	0,200	0,220	0,235	0,250	0,265	0,280	0,300
	2	1,5 x D	●	Required	120	250	280	fn	0,080	0,120	0,135	0,150	0,160	0,200	0,220	0,235	0,250	0,265	0,280	0,300
	3	1,5 x D	●	Required	100	200	260	fn	0,080	0,120	0,135	0,150	0,160	0,200	0,220	0,235	0,250	0,265	0,280	0,300
	4	1 x D	●	Required	60	150	260	fn	0,060	0,080	0,100	0,120	0,140	0,160	0,200	0,210	0,220	0,235	0,250	0,280
	5	1,5 x D	●	Required	60	200	400	fn	0,080	0,120	0,135	0,150	0,160	0,200	0,220	0,235	0,250	0,265	0,280	0,300





Material Group		Plunging/Drilling			UNCOATED			Recommended feed per revolution (fn =mm/rev) for plunging 3-flute end mills											
					Cutting Speed — Vc m/min				D1 — Diameter										
		Max Depth	Applicable	Coolant	min	Start	max	mm	2,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
N	1	1,5 x D	●	Required	120	260	400	fn	0,056	0,084	0,095	0,105	0,112	0,140	0,154	0,165	0,175	0,186	0,196	0,210
	2	1,5 x D	●	Required	120	250	280	fn	0,056	0,084	0,095	0,105	0,112	0,140	0,154	0,165	0,175	0,186	0,196	0,210
	3	1,5 x D	●	Required	100	200	260	fn	0,056	0,084	0,095	0,105	0,112	0,140	0,154	0,165	0,175	0,186	0,196	0,210
	4	1 x D	●	Required	60	150	260	fn	0,042	0,056	0,070	0,084	0,098	0,112	0,140	0,147	0,154	0,165	0,175	0,196
	5	1,5 x D	●	Required	60	200	400	fn	0,056	0,084	0,095	0,105	0,112	0,140	0,154	0,165	0,175	0,186	0,196	0,210



widia.com

HANITA™

X-Feed™

High-Performance Solid End Milling

The X-Feed solid end mill is for machining companies looking for a reliable high feed solution that can operate on all kind of steels with a hardness above 60 HRC or on heat-resistant alloys like titanium, INCONEL®, and stainless steels.

Features and Benefits

Low lead angle for high-speed applications.

6 flutes across the entire diameter range.

Long neck to reach the bottom of the deepest cavities.

Different edge preparations to machine ISO P and H material or ISO S and M categories.



The X-Feed milling line will deliver high feed-rates in multiple applications, from hardened steels up to 60 HRC, to the most demanding superalloys such as titanium or PH steels.

FAST

Constant 6-flute design to provide the high feed-rate on the entire diameter range.

LONG

With its 3 x D long neck, the X-Feed makes it possible to machine deep cavities with ease.

VERSATILE

The X-Feed range includes different geometries to machine steels, hardened steels, plus stainless steels and superalloys.

HIGH SPEED

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
AlTiN	6

DIAMETER RANGE

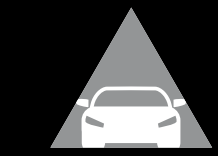
INCH	METRIC
1/4–1"	6–25mm

INDUSTRY





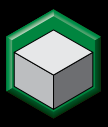




APPLICATIONS

MATERIALS

P M S H


FACING


RAMPING


HELICAL INTERPOLATION

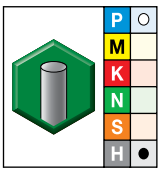

SLOTTING

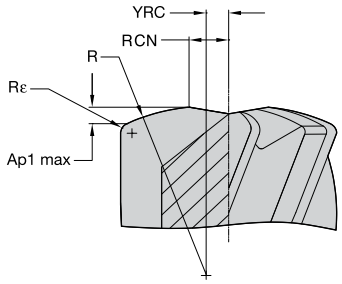

3D PROFILING

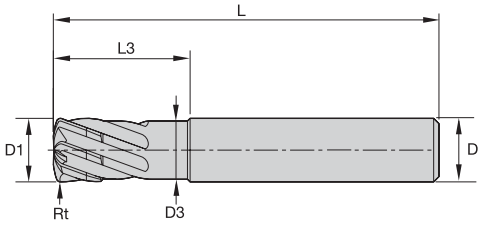

PLUNGING

X-Feed • Series 7FN6 • 37–52 HRC • High Feed • 6 Flute • Cylindrical Shank • Inch









● first choice
○ alternate choice

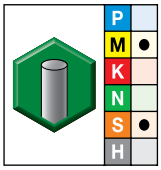
AlTiN-MT1

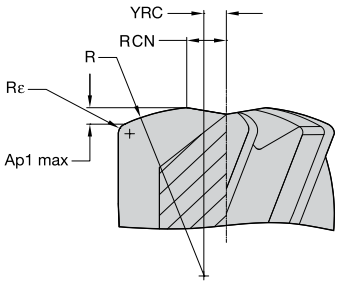
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3484760	TM7FN607002	1/4	1/4	.21	.013	3/4	2 1/2	.027	6
3484762	TM7FN610004	3/8	3/8	.34	.313	1 1/4	3 1/2	.040	6
3484763	TM7FN613005	1/2	1/2	.46	.375	1 1/2	4	.054	6
3484764	TM7FN616006	5/8	5/8	.59	.375	2	4 1/2	.067	6
3484765	TM7FN619007	3/4	3/4	.71	.438	2 1/2	5	.080	6

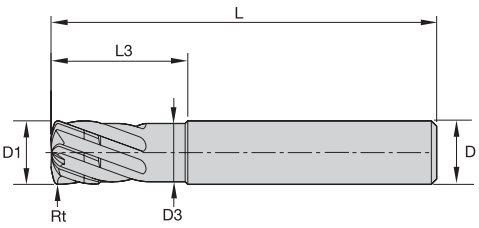
NOTE: YRC = distance from center line to the crown of the R radius.
RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.
R = the head radius size.
Rε = the shoulder radius or radius at the corner of the cutter.

X-Feed • Series 7FNS • Stainless Steel/Hi Temp • High Feed • 6 Flute • Cylindrical Shank • Inch









● first choice
○ alternate choice

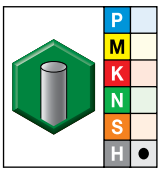
AlTiN-MT

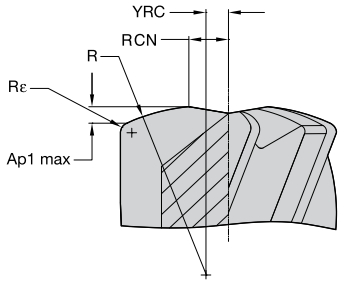
order #	catalog #	D1	D	D3	L3	length L	Rε	Rt	Z U
6441876	**7FNS07002**	1/4	1/4	.21	.73	2 1/2	.016	.027	6
6441877	**7FNS10004**	3/8	3/8	.34	1.23	3 1/2	.023	.040	6
6441878	**7FNS13005**	1/2	1/2	.46	1.48	4	.031	.054	6
6441879	**7FNS16006**	5/8	5/8	.59	1.98	4 1/2	.039	.067	6
6441880	**7FNS19007**	3/4	3/4	.71	2.48	5	.047	.080	6
6441881	**7FNS25008**	1	1	.96	2.98	5 1/2	.063	.106	6

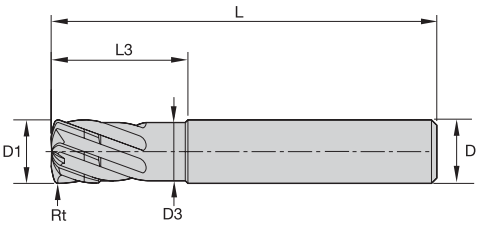
NOTE: YRC = distance from center line to the crown of the R radius.
RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.
R = the head radius size.
Rε = the shoulder radius or radius at the corner of the cutter.

X-Feed • Series 7FN7 • >52 HRC • High Feed • 6 Flute • Cylindrical Shank • Inch









● first choice
○ alternate choice

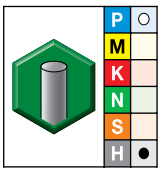
AlTiN-MT1

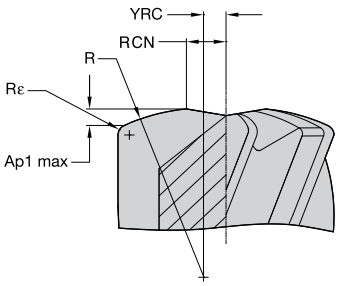
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rt	Z U
3484769	TM7FN710004	3/8	3/8	.34	.012	1 1/4	3 1/2	.036	6
3484770	TM7FN713005	1/2	1/2	.46	.016	1 1/2	4	.048	6
3484772	TM7FN719007	3/4	3/4	.71	.025	2 1/2	5	.072	6

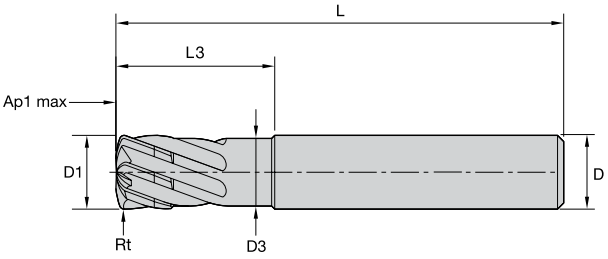
NOTE: YRC = distance from center line to the crown of the R radius.
RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.
R = the head radius size.
Rε = the shoulder radius or radius at the corner of the cutter.

X-Feed • Series 70N6 71N6 • 37–52 HRC • High Feed • 6 Flute • Cylindrical Shank • Metric









● first choice
○ alternate choice

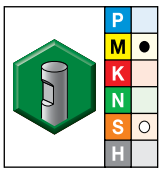
AlTiN-MT1

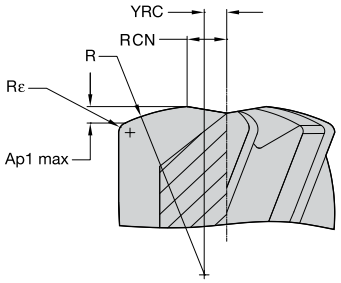
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	Rt	Z U
3745400	71N606002MT	6,0	6	5,50	0,32	9,00	57	0,38	0,62	6
3341346	70N606002MT	6,0	6	5,50	0,32	18,00	63	0,38	0,62	6
3745401	71N608003MT	8,0	8	7,50	0,42	12,00	63	0,50	0,83	6
3341348	70N608003MT	8,0	8	7,50	0,42	24,00	76	0,50	0,83	6
3745402	71N610004MT	10,0	10	9,00	0,53	15,00	72	0,63	1,04	6
3101466	70N610004MT	10,0	10	9,00	0,53	30,00	89	0,63	1,04	6
3745413	71N612005MT	12,0	12	11,00	0,63	18,00	83	0,75	1,24	6
3101467	70N612005MT	12,0	12	11,00	0,63	36,00	100	0,75	1,24	6
3484748	70N616006MT	16,0	16	15,00	0,84	48,00	110	1,00	1,66	6
3484749	70N620007MT	20,0	20	19,00	1,05	60,00	125	1,25	2,07	6

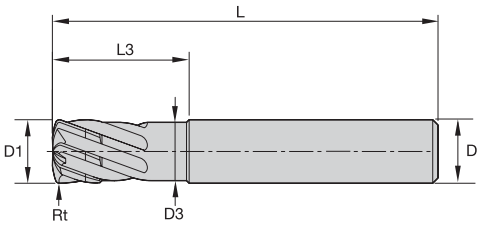
NOTE: YRC = distance from center line to the crown of the R radius.
RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.
R = the head radius size.
Rε = the shoulder radius or radius at the corner of the cutter.

X-Feed • Series 70NS • Stainless Steel/High-Temp • High Feed • 6 Flute • Cylindrical Shank • Metric









● first choice
○ alternate choice

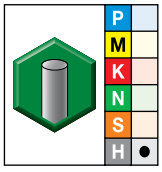
AlTiN-MT

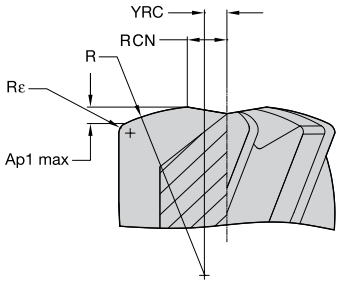
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	Z U
6441882	70NS06002	6,0	6	5,50	0,32	17,75	63	0,38	6
6441883	70NS08003	8,0	8	7,50	0,42	23,75	76	0,50	6
6441884	70NS10004	10,0	10	9,00	0,53	29,50	89	0,63	6
6441885	70NS12005	12,0	12	11,00	0,63	35,50	100	0,75	6
6441886	70NS16006	16,0	16	15,00	0,84	47,50	110	1,00	6
6441887	70NS20007	20,0	20	19,00	1,05	59,50	125	1,25	6
6441888	70NS25008	25,0	25	23,50	1,31	74,25	150	1,56	6

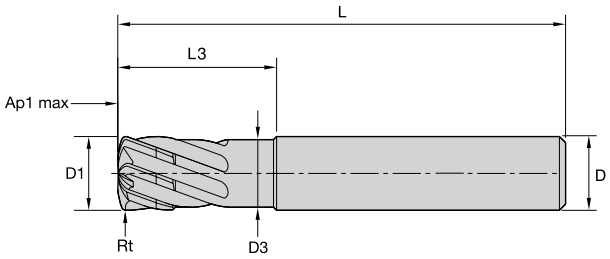
NOTE: YRC = distance from center line to the crown of the R radius.
RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.
R = the head radius size.
Rε = the shoulder radius or radius at the corner of the cutter.

X-Feed • Series 70N7 • >52 HRC • High Feed • 6 Flute • Cylindrical Shank • Metric









● first choice
○ alternate choice

AlTiN-MT1

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	Rt	Z U
3484756	70N706002MT	6,0	6	5,50	0,20	18,00	63	0,38	0,58	6
3484757	70N708003MT	8,0	8	7,50	0,27	24,00	76	0,50	0,77	6
3484758	70N710004MT	10,0	10	9,00	0,33	30,00	89	0,63	0,96	6
3403492	70N712005MT	12,0	12	11,00	0,40	36,00	100	0,75	1,15	6
3477329	70N716006MT	16,0	16	15,00	0,54	48,00	110	1,00	1,54	6
3484759	70N720007MT	20,0	20	19,00	0,67	60,00	125	1,25	1,92	6

NOTE: YRC = distance from center line to the crown of the R radius.
RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.
R = the head radius size.
Rε = the shoulder radius or radius at the corner of the cutter.

X-Feed • Series 7FN6 • Application Data • AlTiN-MT1 • Inch





Material Group		Profile Milling A ap	ae	AlTiN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) frac.	D1 — Diameter 1/4	5/16	3/8	1/2	5/8	3/4
							dec.	.2500	.3130	.3750	.5000	.6250	.7500
P	4	0.05 x D	0.55 x D	528	–	594	IPT	.0130	.0160	.0190	.0250	.0260	.0280
H	1	0.05 x D	0.55 x D	462	–	528	IPT	.0130	.0160	.0190	.0250	.0260	.0280
	2	0.05 x D	0.55 x D	330	–	396	IPT	.0080	.0090	.0110	.0150	.0190	.0230

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".

X-Feed • Series 7FNS • Application Data • AlTiN-MT • Inch





Material Group		Profile Milling A ap	ae	AlTiN-MT Cutting Speed — Vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) frac.	D1 — Diameter 1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.000
M	1	0.5 x D	0.55 x D	290	–	375	IPT	.0118	.0156	.0188	.0213	.0281	.0338	.0450
	2	0.5 x D	0.55 x D	190	–	260	IPT	.0094	.0125	.0150	.0189	.0250	.0300	.0400
	3	0.5 x D	0.55 x D	190	–	230	IPT	.0094	.0125	.0150	.0189	.0250	.0300	.0400
S	1	0.5 x D	0.55 x D	160	–	300	IPT	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	0.5 x D	0.55 x D	80	–	130	IPT	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	3	0.5 x D	0.55 x D	80	–	130	IPT	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	4	0.5 x D	0.55 x D	160	–	200	IPT	.0011	.0014	.0017	.0021	.0025	.0028	.0033

7FNS Inch																
Geometrical Parameters									Ramping Guide for Circular and Linear Interpolation							
									Circular Interpolation		Linear Interpolation					
diameter	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number	Allowed Range of Hole Diameter		Calculated Length (mm) per Ramp Angle					
											Ramp Angle (degree)					
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	flutes	Smallest	Largest	1	2	3	4	5	
1/4	0.0133	1/4	0.0269	0.0160	0.0133	0.0313	0.0525	6	0.355	0.5	0.76	0.38	0.25	0.19	0.15	
3/8	0.0200	3/8	0.0399	0.0235	0.0200	0.0469	0.0788	6	0.5325	0.75	1.14	0.57	0.38	0.29	0.23	
1/2	0.0266	1/2	0.0538	0.0320	0.0266	0.0625	0.1050	6	0.71	1	1.52	0.76	0.51	0.38	0.30	
5/8	0.0333	5/8	0.0672	0.0400	0.0333	0.0781	0.1313	6	0.8875	1.25	1.91	0.95	0.63	0.48	0.38	
3/4	0.0399	3/4	0.0798	0.0470	0.0399	0.0938	0.1575	6	1.065	1.5	2.29	1.14	0.76	0.57	0.46	
1	0.0532	1	0.1059	0.0620	0.0532	0.1250	0.2100	6	1.42	2	3.05	1.52	1.02	0.76	0.61	
Recommended Feed											30%	30%	30%	30%	10%	

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".

X-Feed • Series 7FN7 • Application Data • AlTiN-MT1 • Inch





Material Group		Profile Milling A		AlTiN Cutting Speed – vc SFM			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)						
								D1 – Diameter					
		ap	ae	min		max	frac. dec.	1/4 0.250	5/16 0.313	3/8 0.375	1/2 0.500	5/8 0.625	3/4 0.750
H	2	0.03 x D	0.55 x D	330	–	396	IPT	.0080	.0090	.0110	.0150	.0190	.0230
H	3	0.03 x D	0.55 x D	265	–	330	IPT	.0080	.0090	.0110	.0150	.0190	.0230
H	4	0.03 x D	0.55 x D	165	–	230	IPT	.0060	.0080	.0090	.0130	.0160	.0190

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".

X-Feed • Lists 70N6 71N6 • Application Data • AlTiN-MT1 • Metric





Material Group		Profile Milling A		AlTiN Cutting Speed – vc m/min			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A)						
								D1 – Diameter					
		ap	ae	min		max	mm	6,0	8,0	10,0	12,0	16,0	20,0
P	4	0,05 x D	0,55 x D	160	–	180	fz	0,300	0,500	0,500	0,500	0,600	0,700
H	1	0,05 x D	0,55 x D	140	–	160	fz	0,300	0,500	0,500	0,500	0,600	0,700
H	2	0,05 x D	0,55 x D	100	–	120	fz	0,200	0,300	0,300	0,400	0,500	0,600

Tool List 70N6																	
Geometrical Parameters										Ramping Guide for Circular and Linear Interpolation							
										Circular Interpolation		Linear Interpolation					
										Allowed Range of Hole Diameter		Calculated Length (mm) per Ramp Angle					
Tool	diameter	ap max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number			Ramp Angle (degree)					
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	flutes	Smallest	Largest	1	2	3	4	5
70N606003MT	6	0,32	6	0,62	0,375	0,32	0,75	1,32	6	8,64	12	18,12	9,06	6,03	4,52	3,61
70N608003MT	8	0,42	8	0,83	0,500	0,42	1,00	1,76	6	11,52	16	24,16	12,08	8,05	6,03	4,82
70N610004MT	10	0,53	10	1,04	0,625	0,53	1,25	2,20	6	14,4	20	30,20	15,09	10,06	7,54	6,02
70N612005MT	12	0,63	12	1,24	0,750	0,63	1,50	2,64	6	17,28	24	36,24	18,11	12,07	9,05	7,23
70N616006MT	16	0,84	16	1,66	1,000	0,84	2,00	3,52	6	23,04	32	48,31	24,15	16,09	12,06	9,64
70N620007MT	20	1,05	20	2,07	1,250	1,05	2,50	4,40	6	28,8	40	60,39	30,19	20,11	15,08	12,05
Recommended Feed												100%	70%	50%	30%	10%

NOTE: Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >12mm.

X-Feed • Series 70NS • Application Data • AlTiN-MT • Metric





Material Group		Profile Milling		AlTiN-MT			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A)						
		A		Cutting Speed – Vc m/min				D1 – Diameter					
		ap	ae	min		max	mm	6,0	8,0	10,0	12,0	16,0	20,0	25,0
M	1	0,05 x D	0,55 x D	90	–	115	fz	0,300	0,400	0,500	0,540	0,720	0,900	1,125
	2	0,05 x D	0,55 x D	60	–	80	fz	0,240	0,320	0,400	0,480	0,640	0,800	1,000
	3	0,05 x D	0,55 x D	60	–	70	fz	0,240	0,320	0,400	0,480	0,640	0,800	1,000
S	1	0,05 x D	0,55 x D	50	–	90	fz	0,270	0,360	0,450	0,500	0,650	0,800	1,000
	2	0,05 x D	0,55 x D	25	–	40	fz	0,240	0,320	0,400	0,480	0,600	0,700	0,900
	3	0,05 x D	0,55 x D	25	–	40	fz	0,180	0,240	0,300	0,350	0,430	0,500	0,600
	4	0,05 x D	0,55 x D	50	–	60	fz	0,210	0,280	0,350	0,420	0,560	0,700	0,875

70NS Metric															
Geometrical Parameters									Ramping Guide for Circular and Linear Interpolation						
									Circular Interpolation		Linear Interpolation				
									Allowed Range of Hole Diameter		Calculated Length (mm) per Ramp Angle				
diameter	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number			Ramp Angle (degree)				
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	flutes	Smallest	Largest	1	2	3	4	5
6	0,32	6	0,67	0,375	0,338	0,75	1,26	6	8,52	12	18,12	9,06	6,03	4,52	3,61
8	0,42	8	0,89	0,500	0,450	1,00	1,68	6	11,36	16	24,16	12,08	8,05	6,03	4,82
10	0,53	10	1,12	0,625	0,562	1,25	2,10	6	14,2	20	30,20	15,09	10,06	7,54	6,02
12	0,63	12	1,34	0,750	0,674	1,50	2,52	6	17,04	24	36,24	18,11	12,07	9,05	7,23
16	0,84	16	1,79	1,000	0,915	2,00	3,36	6	22,72	32	48,31	24,15	16,09	12,06	9,64
20	1,05	20	2,23	1,250	1,124	2,50	4,20	6	28,4	40	60,39	30,19	20,11	15,08	12,05
25	1,25	25	2,90	1,5625	1,405	3,1250	5,25	6	35,5	50	70,61	35,80	23,85	17,88	14,29
Recommended Feed											30%	30%	30%	30%	10%

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 12mm.

X-Feed • Series 70N7 • Application Data • AlTiN-MT1 • Metric





Material Group		Profile Milling A		AlTiN Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A)						
								D1 — Diameter					
		ap	ae	min		max	mm	6,0	8,0	10,0	12,0	16,0	20,0
H	2	0,03 x D	0,55 x D	100	–	120	fz	0,200	0,300	0,300	0,400	0,500	0,600
	3	0,03 x D	0,55 x D	80	–	100	fz	0,200	0,300	0,300	0,400	0,500	0,600
	4	0,03 x D	0,55 x D	50	–	70	fz	0,150	0,200	0,250	0,300	0,400	0,500

Tool List 70N7

Geometrical Parameters									Ramping Guide for Circular and Linear Interpolation						
									Circular Interpolation		Linear Interpolation				
									Allowed Range of Hole Diameter		Calculated Length (mm) per Ramp Angle				
diameter	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number			Ramp Angle (degree)				
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	flutes	Smallest	Largest	1	2	3	4	5
6	0,20	9	0,58	0,375	0,20	0,75	1,26	6	8,52	12	11,51	5,75	3,83	2,87	2,30
8	0,27	12	0,77	0,500	0,27	1,00	1,68	6	11,36	16	15,34	7,67	5,11	3,83	3,06
10	0,33	15	0,96	0,625	0,33	1,25	2,10	6	14,2	20	19,18	9,58	6,39	4,79	3,83
12	0,40	18	1,15	0,750	0,40	1,50	2,52	6	17,04	24	23,01	11,50	7,66	5,74	4,59
16	0,54	24	1,54	1,000	0,54	2,00	3,36	6	22,72	32	30,68	15,34	10,22	7,66	6,12
20	0,67	30	1,92	1,250	0,67	2,50	4,20	6	28,4	40	38,35	19,17	12,77	9,57	7,65
Recommended Feed											100%	70%	50%	30%	10%

NOTE: Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

Vision Plus™

High-Performance Solid End Milling

Vision Plus end mills are focused on delivering productivity in primarily the die and mold industry, in roughing or finishing operations for hardened steel up to 67 HRC.

Features and Benefits

Negative rakes to make the cutting edge robust.

High helix angles to reduce chip thickness and guarantee wall straightness in finishing operations.

Specific substrate engineered to perform on high hardness steels.



The Vision Plus series offers a variety of tools to machine the most complex components including various end face geometries.

ROBUST

Dedicated design to attack all types of hardened steels up to 67 HRC.

SPECIFIC

Specifically engineered design to compete in the die and mold industry, in all applications of hardened steels and high alloyed steels.

PRODUCTIVE

Vision Plus end mills include geometries and edge preparations designed to increase feed-rates and achieve higher metal removal rates.

HARD MACHINING MADE EASY

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
WU10PE AlTiN	2–6

DIAMETER RANGE

METRIC	INCH
0,3–25mm	1/8–1"

INDUSTRY

GENERAL ENGINEERING

APPLICATIONS

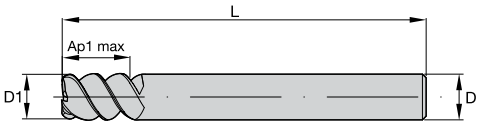
MATERIALS

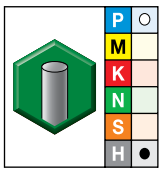
P H

- SIDE MILLING
- 3D PROFILING
- HELICAL INTERPOLATION
- RAMPING

Vision Plus • Series 7S05 • Sharp Edge • Cylindrical Shank • Inch







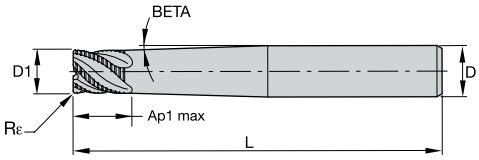
AlTiN-MT1

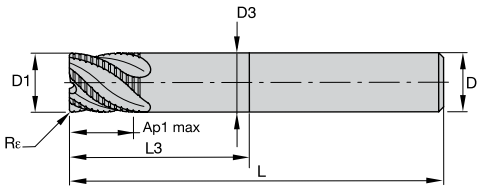
● first choice
○ alternate choice

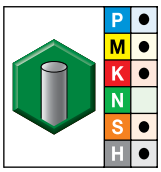
order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
3083618	TM7S0507002	1/4	1/4	3/8	3	4
3321600	TM7S1507002	1/4	1/4	5/8	3	4
3043480	TM7S0508000	5/16	5/16	1/2	4	4
3054914	TM7S1508000	5/16	5/16	3/4	4	4
3082394	TM7S2508000	5/16	5/16	1 1/8	4	4
3100520	TM7S0510004	3/8	3/8	9/16	4	4
3048589	TM7S1510004	3/8	3/8	15/16	4	5
3054915	TM7S2510004	3/8	3/8	1 5/16	4	5
3047518	TM7S0513005	1/2	1/2	3/4	5	4
3084183	TM7S1513005	1/2	1/2	1 1/4	5	6
3081614	TM7S2513005	1/2	1/2	1 3/4	5	6
3063997	TM7S1516006	5/8	5/8	1 9/16	5	6
3050197	TM7S2516006	5/8	5/8	2 3/16	5	6
3091702	TM7S1519007	3/4	3/4	1 7/8	6	6
3321602	TM7S2519007	3/4	3/4	2 5/8	6	6
3104294	TM7S2525008	1	1	3 1/2	6	6

Vision Plus • Series 7S7R • Radius • Cylindrical Shank • Inch









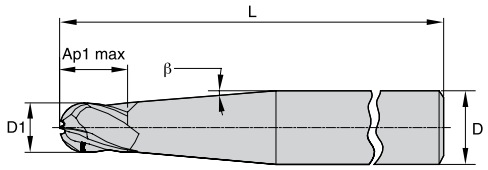
● first choice
○ alternate choice

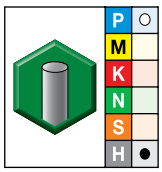
AlTiN-MT1

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	BETA	ZU
3096974	TM7S7R10005A	3/8	1/2	—	3/8	3/8	5	.030	2.500	4
3116105	TM7S7R13006A	1/2	5/8	.470	1/2	—	5	.040	—	4
3044789	TM7S7R19007A	3/4	3/4	.713	3/4	2 1/4	6	.050	—	6

Vision Plus • Series 7S5F • Ball Nose • Cylindrical Shank • Inch







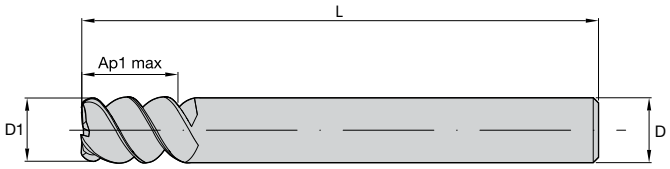
● first choice
○ alternate choice

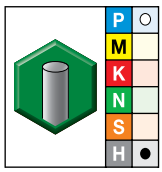
AlTiN-MT1

order #	catalog #	D1	D	length of cut Ap1 max	length L	BETA	ZU
3047519	TM7S5F03002	1/8	1/4	1/8	3	2.5	4
3062915	TM7S5F05002	3/16	1/4	3/16	3	2.5	4
3058580	TM7S5F07004	1/4	3/8	1/4	4	2.5	4
3061865	TM7S5F08004	5/16	3/8	5/16	4	2.5	4
3058738	TM7S5F10005	3/8	1/2	3/8	5	2.5	4
3062363	TM7S5F13006	1/2	5/8	1/2	5	2.5	4

Vision Plus • Series 7505 7515 7525 7545 • Sharp Edge • Cylindrical Shank • Metric







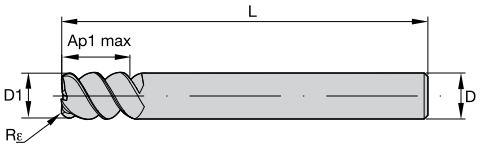
● first choice
○ alternate choice

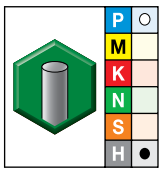
TiAlN-LT1

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
2499570	754503002LT	3,0	6	4,50	50	4
2499567	750503002LT	3,0	6	4,50	57	4
2499571	754504002LT	4,0	6	6,00	50	4
2499568	750504002LT	4,0	6	6,00	57	4
2499572	754505002LT	5,0	6	7,50	50	4
2499569	750505002LT	5,0	6	7,50	76	4
1848805	754506002LT	6,0	6	9,00	50	4
1724462	750506002LT	6,0	6	9,00	76	4
1724468	751506002LT	6,0	6	15,00	76	4
1724487	752506002LT	6,0	6	21,00	76	4
1860603	754508003LT	8,0	8	12,00	63	4
1724463	750508003LT	8,0	8	12,00	100	4
1724469	751508003LT	8,0	8	20,00	100	4
1724489	752508003LT	8,0	8	28,00	100	4
1860604	754510004LT	10,0	10	15,00	76	4
1724464	750510004LT	10,0	10	15,00	100	4
1724481	751510004LT	10,0	10	25,00	100	5
1724490	752510004LT	10,0	10	35,00	100	5
1860605	754512005LT	12,0	12	18,00	76	4
1724465	750512005LT	12,0	12	18,00	125	4
1724482	751512005LT	12,0	12	30,00	125	6
1724531	752512005LT	12,0	12	42,00	125	6
1860606	754516006LT	16,0	16	24,00	89	4
1724483	751516006LT	16,0	16	40,00	125	6
1724533	752516006LT	16,0	16	56,00	125	6
1724484	751520007LT	20,0	20	50,00	150	6
1724536	752520007LT	20,0	20	70,00	150	6
1747878	751525008LT	25,0	25	63,00	150	6
1747931	752525008LT	25,0	25	88,00	150	6

Vision Plus • Series 7585 7595 • Radius • Cylindrical Shank • Metric







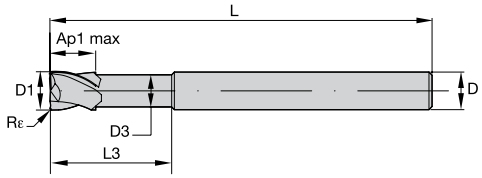
● first choice
○ alternate choice

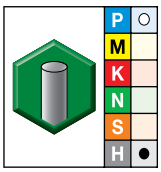
TiAlN-LT1

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
2540317	759503002LT	3,0	6	4,50	50	0,25	4
2540318	759503012LT	3,0	6	4,50	50	0,50	4
2540319	759504002LT	4,0	6	6,00	50	0,25	4
2540320	759504012LT	4,0	6	6,00	50	0,50	4
2540321	759505002LT	5,0	6	7,50	50	0,25	4
2540322	759505012LT	5,0	6	7,50	50	0,50	4
1862105	759506002LT	6,0	6	9,00	50	0,25	4
1862106	759506012LT	6,0	6	9,00	50	0,50	4
2541273	759506022LT	6,0	6	9,00	50	0,75	4
2541274	759506032LT	6,0	6	9,00	50	1,00	4
1860609	758506002LT	6,0	6	9,00	76	0,25	4
1860610	758506012LT	6,0	6	9,00	76	0,50	4
1862107	759508003LT	8,0	8	12,00	63	0,50	4
2541275	759508023LT	8,0	8	12,00	63	0,75	4
1862108	759508013LT	8,0	8	12,00	63	1,00	4
2541276	759508033LT	8,0	8	12,00	63	1,50	4
1860611	758508003LT	8,0	8	12,00	100	0,50	4
1860612	758508013LT	8,0	8	12,00	100	1,00	4
1862109	759510004LT	10,0	10	15,00	76	0,50	4
1862110	759510014LT	10,0	10	15,00	76	1,00	4
2541277	759510024LT	10,0	10	15,00	76	1,50	4
2541278	759510034LT	10,0	10	15,00	76	2,00	4
1860623	758510004LT	10,0	10	15,00	100	0,50	4
1860624	758510014LT	10,0	10	15,00	100	1,00	4
1862111	759512005LT	12,0	12	18,00	76	0,50	4
2541279	759512025LT	12,0	12	18,00	76	1,00	4
2541280	759512035LT	12,0	12	18,00	76	2,00	4
1860625	758512005LT	12,0	12	18,00	125	0,50	4
1862113	759516006LT	16,0	16	24,00	89	0,50	4
1860628	758516016LT	16,0	16	24,00	125	1,50	4
2541293	759520027LT	20,0	20	30,00	104	1,00	4

Vision Plus • Series 75N2 • Radius • Cylindrical Shank • Metric







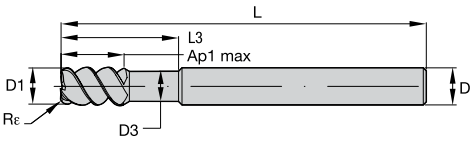
● first choice
○ alternate choice

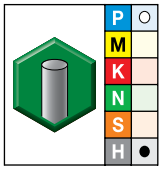
WU10PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
2544530	75N203022RT	3,0	6	2,80	3,00	9,00	75	0,30	2
2544737	75N204022RT	4,0	6	3,70	4,00	12,00	75	0,30	2
2545166	75N206062RT	6,0	6	5,50	6,00	18,00	75	1,00	2

Vision Plus • Series 75N5 • Neck • Cylindrical Shank • Metric







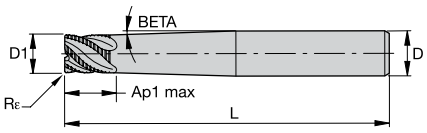
● first choice
○ alternate choice

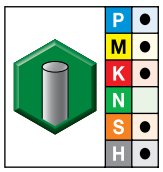
TiAlN-LT1

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU
2544367	75N503022LT	3,0	6	2,7	4,50	9,00	57	0,25	4
2544368	75N503042LT	3,0	6	2,7	4,50	9,00	57	0,50	4
2544369	75N504022LT	4,0	6	3,7	6,00	12,00	57	0,25	4
2544370	75N504042LT	4,0	6	3,7	6,00	12,00	57	0,50	4
2544371	75N505022LT	5,0	6	4,6	7,50	15,00	76	0,25	4
2544372	75N505042LT	5,0	6	4,6	7,50	15,00	76	0,50	4
1862119	75N506002LT	6,0	6	5,4	9,00	18,00	76	–	4
2544443	75N506022LT	6,0	6	5,4	9,00	18,00	76	0,25	4
2544444	75N506042LT	6,0	6	5,4	9,00	18,00	76	0,50	4
2544446	75N506082LT	6,0	6	5,4	9,00	18,00	76	1,00	4
1862120	75N508003LT	8,0	8	7,4	12,00	24,00	100	–	4
2544447	75N508023LT	8,0	8	7,4	12,00	24,00	100	0,50	4
2544448	75N508033LT	8,0	8	7,4	12,00	24,00	100	1,00	4
2544449	75N508043LT	8,0	8	7,4	12,00	24,00	100	1,50	4
2544450	75N508053LT	8,0	8	7,4	12,00	24,00	100	2,00	4
1862121	75N510004LT	10,0	10	9,4	15,00	30,00	100	–	4
2544452	75N510024LT	10,0	10	9,2	15,00	30,00	100	0,50	4
2544483	75N510034LT	10,0	10	9,2	15,00	30,00	100	1,00	4
2544484	75N510044LT	10,0	10	9,2	15,00	30,00	100	1,50	4
2544485	75N510054LT	10,0	10	9,2	15,00	30,00	100	2,00	4
1862122	75N512005LT	12,0	12	11,4	18,00	36,00	125	–	4
2544486	75N512025LT	12,0	12	11,0	18,00	36,00	125	0,50	4
2544487	75N512035LT	12,0	12	11,0	18,00	36,00	125	1,00	4
2544489	75N512055LT	12,0	12	11,0	18,00	36,00	125	2,00	4
1862123	75N516006LT	16,0	16	15,4	24,00	48,00	125	–	4
2544490	75N516026LT	16,0	16	15,0	24,00	48,00	125	0,50	4
1862124	75N520007LT	20,0	20	19,4	30,00	60,00	150	–	4
2544523	75N520047LT	20,0	20	19,0	30,00	60,00	150	2,00	4

Vision Plus • Series 7670 • Radius • Cylindrical Shank • Metric







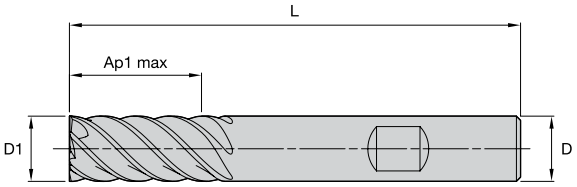
● first choice
○ alternate choice

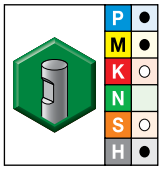
TiAlN-LT1

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	Rε	ZU
1724621	767016006LT	16,0	16	15,00	16,00	125	1,00	6

Vision Plus • Series D518 • Sharp Edge • Weldon® • Metric







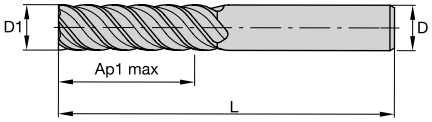
● first choice
○ alternate choice

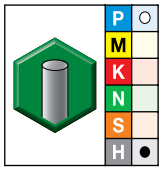
WP15PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
5559116	D51804002W	4,0	6	11,00	57	4
5559117	D51805002W	5,0	6	13,00	57	4
5559118	D51806002W	6,0	6	13,00	57	6
5559120	D51808003W	8,0	8	19,00	63	6
5559122	D51810004W	10,0	10	22,00	72	6
5559123	D51812005W	12,0	12	26,00	83	6
5559124	D51814014W	14,0	14	26,00	83	6
5559125	D51816006W	16,0	16	32,00	92	8
5559127	D51820007W	20,0	20	38,00	104	8
5559128	D51825008W	25,0	25	45,00	121	8

Vision Plus • Series D618 • Sharp Edge • Cylindrical Shank • Metric







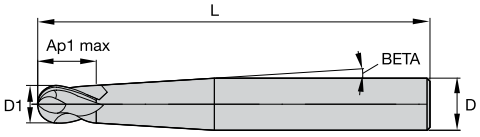
WU10PE

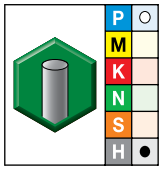
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
2256338	D61803002RJ	3,0	4	8,00	50	4
2257304	D61804002RJ	4,0	6	12,00	57	4
2256340	D61805002RJ	5,0	6	13,00	57	4
2256341	D61806002RJ	6,0	6	15,00	60	6
2256353	D61808003RJ	8,0	8	20,00	75	6
2256354	D61810004RJ	10,0	10	25,00	80	6
2256355	D61812005RJ	12,0	12	30,00	100	6
2256356	D61816006RJ	16,0	16	40,00	110	6
2256357	D61820007RJ	20,0	20	45,00	120	6

Vision Plus • Series 7050 7060 • Ball Nose • Cylindrical Shank • Metric







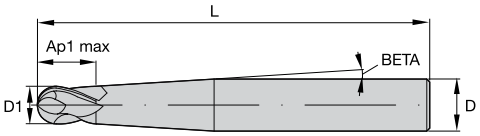
WU10PE

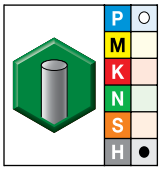
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BETA	ZU
1724321	705002001RT	2,0	4	2,00	63	2.5	4
1724323	705003002RT	3,0	6	3,00	75	2.5	4
1724324	705004002RT	4,0	6	4,00	75	2.5	4
2495916	706004002RT	4,0	6	4,00	75	1.5	4
1724325	705005002RT	5,0	6	5,00	75	2.5	4
1724326	705006004RT	6,0	10	6,00	100	2.5	4
2495918	706006004RT	6,0	10	6,00	100	1.5	4
1724327	705008004RT	8,0	10	8,00	100	2.5	4
1724328	705010005RT	10,0	12	10,00	125	2.5	4
1724330	705016006RT	16,0	16	16,00	125	–	4

Vision Plus • Series 7061 • Ball Nose • Cylindrical Shank • Metric







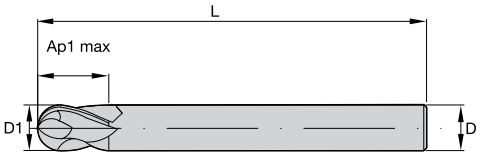
● first choice
○ alternate choice

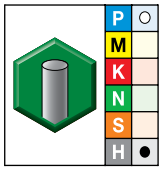
WU10PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	BETA	ZU
2495994	706101001RT	1,0	4	1,00	63	3.5	2
2495995	706102001RT	2,0	4	2,00	63	3.5	2
2495997	706103002RT	3,0	6	3,00	75	1.5	2
2495998	706104002RT	4,0	6	4,00	75	1.5	2
2496000	706106004RT	6,0	10	6,00	100	1.5	2
2496001	706108004RT	8,0	10	8,00	100	1.5	2

Vision Plus • Series 7150 • Ball Nose • Cylindrical Shank • Metric







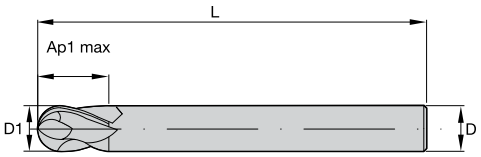
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○ alternate choice

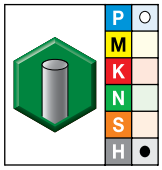
WU10PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
1859882	715003000RT	3,0	3	3,00	38	4
1859904	715004001RT	4,0	4	4,00	50	4
1859906	715005001RT	5,0	5	5,00	50	4
1859907	715006002RT	6,0	6	6,00	50	4
1859908	715008003RT	8,0	8	8,00	63	4
1859909	715010004RT	10,0	10	10,00	76	4
1859910	715012005RT	12,0	12	12,00	76	4

Vision Plus • Series 7151 • Ball Nose • Cylindrical Shank • Metric







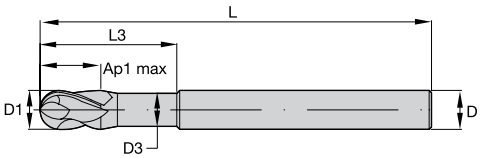
● first choice
○ alternate choice

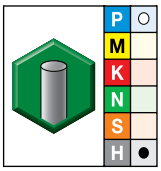
WU10PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
1860036	715101000RT	1,0	3	3,00	38	2
1860090	715102000RT	2,0	3	3,00	38	2
1860106	715103000RT	3,0	3	3,00	38	2
1860109	715104001RT	4,0	4	4,00	50	2
1860111	715105001RT	5,0	5	5,00	50	2
1860112	715106002RT	6,0	6	6,00	50	2
1860133	715108003RT	8,0	8	8,00	63	2
1860134	715110004RT	10,0	10	10,00	76	2
1860135	715112005RT	12,0	12	12,00	76	2

Vision Plus • Series 70N1 • Ball Nose • Neck • Cylindrical Shank • Metric







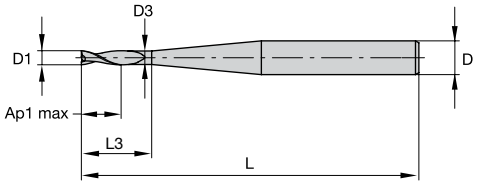
● first choice
○ alternate choice

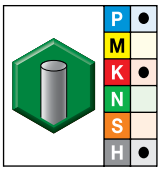
WU10PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	ZU
2545190	70N101001RT	1,0	4	0,80	1,00	63	2
2545191	70N101501RT	1,5	4	1,30	1,50	63	2
2545192	70N102002RT	2,0	6	1,80	2,00	76	2
2545213	70N103002RT	3,0	6	2,80	3,00	76	2
2545214	70N104002RT	4,0	6	3,70	4,00	76	2
2545215	70N105002RT	5,0	6	4,60	5,00	76	2
2545216	70N106002RT	6,0	6	5,50	6,00	76	2
2545217	70N108003RT	8,0	8	7,50	8,00	100	2
2545218	70N110004RT	10,0	10	9,50	10,00	100	2
2545219	70N112005RT	12,0	12	11,50	12,00	125	2

Vision Plus Micro • Series 7N02 7N12 7N22 • Sharp Edge • Cylindrical Shank • Metric







● first choice
○ alternate choice

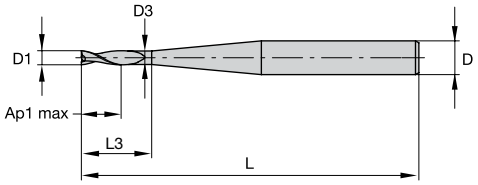
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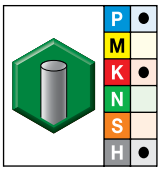
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	ZU
2256390	7N0200302RJ	0,3	6	0,24	0,40	0,40	50	2
2256438	7N2200400RJ	0,4	3	0,34	0,60	2,00	38	2
2256439	7N2200410RJ	0,4	3	0,34	0,60	4,00	38	2
2256391	7N0200402RJ	0,4	6	0,34	0,60	0,60	50	2
2256440	7N2200500RJ	0,5	3	0,44	0,70	2,00	38	2
2256441	7N2200510RJ	0,5	3	0,44	0,70	4,00	38	2
2256442	7N2200520RJ	0,5	3	0,44	0,70	6,00	38	2
2256392	7N0200502RJ	0,5	6	0,44	0,70	1,50	50	2
2256443	7N2200600RJ	0,6	3	0,54	0,90	2,00	38	2
2256444	7N2200610RJ	0,6	3	0,54	0,90	4,00	38	2
2256445	7N2200620RJ	0,6	3	0,54	0,90	6,00	38	2
2256393	7N0200602RJ	0,6	6	0,54	0,90	1,80	50	2
2256447	7N2200711RJ	0,7	4	0,64	1,00	4,00	50	2
2256448	7N2200721RJ	0,7	4	0,64	1,00	6,00	50	2
2256449	7N2200801RJ	0,8	4	0,74	1,20	4,00	50	2
2256450	7N2200811RJ	0,8	4	0,74	1,20	6,00	50	2
2256451	7N2200821RJ	0,8	4	0,74	1,20	8,00	50	2
2256394	7N0200802RJ	0,8	6	0,74	1,20	2,40	50	2
2256455	7N2201001RJ	1,0	4	0,94	1,50	6,00	50	2
2256456	7N2201011RJ	1,0	4	0,94	1,50	8,00	50	2
2256457	7N2201021RJ	1,0	4	0,94	1,50	10,00	50	2
2256458	7N2201031RJ	1,0	4	0,94	1,50	12,00	50	2
2256395	7N0201002RJ	1,0	6	0,94	1,50	2,50	50	2
2256406	7N1201002RJ	1,0	6	0,94	1,50	5,00	60	2
2256459	7N2201201RJ	1,2	4	1,14	1,50	6,00	50	2
2256460	7N2201211RJ	1,2	4	1,14	1,80	8,00	50	2
2256462	7N2201231RJ	1,2	4	1,14	1,80	12,00	50	2
2256396	7N0201202RJ	1,2	6	1,14	1,80	3,00	50	2
2256407	7N1201202RJ	1,2	6	1,14	1,80	6,00	60	2
2256463	7N2201401RJ	1,4	4	1,34	2,10	6,00	50	2
2256464	7N2201411RJ	1,4	4	1,34	2,10	8,00	50	2
2256465	7N2201421RJ	1,4	4	1,35	2,10	10,00	50	2
2256467	7N2201441RJ	1,4	4	1,34	2,10	16,00	50	2
2256397	7N0201402RJ	1,4	6	1,34	2,10	3,50	50	2
2256468	7N2201501RJ	1,5	4	1,44	2,30	6,00	50	2
2256469	7N2201511RJ	1,5	4	1,44	2,30	10,00	50	2
2256470	7N2201521RJ	1,5	4	1,44	2,30	12,00	50	2
2256471	7N2201531RJ	1,5	4	1,44	2,30	16,00	50	2
2256472	7N2201541RJ	1,5	4	1,44	2,30	18,00	63	2
2256473	7N2201551RJ	1,5	4	1,44	2,30	20,00	63	2
2256398	7N0201502RJ	1,5	6	1,44	2,30	3,80	50	2
2256409	7N1201502RJ	1,5	6	1,44	2,30	7,50	60	2
3454428	7N2201571RJ	1,6	4	1,54	2,80	11,70	50	2
2256479	7N2201701RJ	1,7	4	1,64	2,60	6,00	50	2
2256481	7N2201721RJ	1,7	4	1,64	2,60	12,00	50	2
2256484	7N2201801RJ	1,8	4	1,74	2,70	6,00	50	2
2256485	7N2201811RJ	1,8	4	1,74	2,70	10,00	50	2
2256486	7N2201821RJ	1,8	4	1,74	2,70	12,00	50	2
2256487	7N2201831RJ	1,8	4	1,74	2,70	16,00	50	2
2256400	7N0201802RJ	1,8	6	1,74	2,70	4,50	50	2
2256489	7N2201901RJ	1,9	4	1,84	2,80	6,00	50	2
2256494	7N2202001RJ	2,0	4	1,96	3,00	6,00	50	2

Vision Plus Micro • Series 7N02 7N12 7N22 • Sharp Edge • Cylindrical Shank • Metric

(continued)







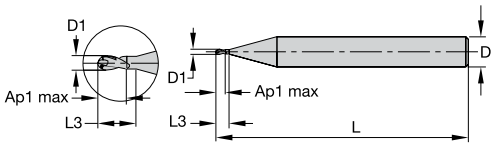
● first choice
○ alternate choice

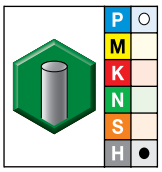
WU10PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	ZU
2256495	7N2202011RJ	2,0	4	1,96	3,00	10,00	50	2
2256496	7N2202021RJ	2,0	4	1,96	3,00	16,00	50	2
2256497	7N2202031RJ	2,0	4	1,96	3,00	20,00	63	2
2256498	7N2202041RJ	2,0	4	1,96	3,00	20,00	75	2
2256401	7N0202002RJ	2,0	6	1,94	3,00	5,00	50	2
2256412	7N1202002RJ	2,0	6	1,96	3,00	10,00	60	2
3454429	7N2202051RJ	2,1	4	2,00	3,00	8,00	50	2
2256499	7N2202501RJ	2,5	4	2,40	3,70	8,00	50	2
2256500	7N2202511RJ	2,5	4	2,40	3,70	10,00	50	2
2256501	7N2202521RJ	2,5	4	2,44	3,70	16,00	63	2
2256502	7N2202531RJ	2,5	4	2,44	3,70	20,00	63	2
2256503	7N2202541RJ	2,5	4	2,44	3,70	30,00	80	2
2256402	7N0202502RJ	2,5	6	2,44	3,70	5,00	50	2
2256504	7N2203002RJ	3,0	6	2,94	4,50	8,00	50	2
2256505	7N2203012RJ	3,0	6	2,94	4,50	10,00	50	2
2256506	7N2203022RJ	3,0	6	2,94	4,50	16,00	63	2
2256507	7N2203032RJ	3,0	6	2,94	4,50	20,00	63	2
2256508	7N2203042RJ	3,0	6	2,94	4,50	20,00	80	2
3454434	7N2203062RJ	3,1	6	3,00	4,50	25,00	76	2

Vision Plus Micro • Series 7N01 • Ball Nose • Cylindrical Shank • Metric







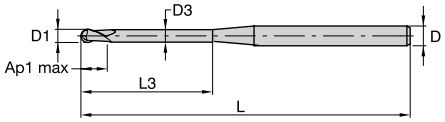
● first choice
○ alternate choice

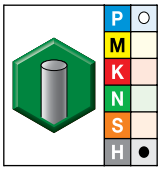
WU10PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
2256358	7N0100302RJ	0,3	6	0,30	50	2
2256359	7N0100402RJ	0,4	6	0,40	50	2
2256360	7N0100502RJ	0,5	6	0,50	50	2
2256361	7N0100602RJ	0,6	6	0,60	50	2
2256362	7N0100802RJ	0,8	6	0,80	50	2
2256363	7N0101002RJ	1,0	6	2,50	50	2
2256364	7N0101202RJ	1,2	6	1,20	50	2
2256366	7N0101502RJ	1,5	6	1,50	50	2
2256369	7N0102002RJ	2,0	6	2,00	50	2
2256370	7N0102502RJ	2,5	6	2,50	50	2
2256371	7N0103002RJ	3,0	6	3,00	50	2
2256372	7N0104002RJ	4,0	6	4,00	50	2
2256373	7N0106002RJ	6,0	6	6,00	50	2

Vision Plus Micro • Series 7N21 • Ball Nose • Cylindrical Shank • Metric







● first choice
○ alternate choice

WU10PE

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	ZU
3665122	7N2100501RT	0,5	4	0,44	1,00	5,00	63	2
3665141	7N2100801RT	0,8	4	0,74	1,30	8,00	63	2
3665142	7N2101001RT	1,0	4	0,94	1,60	10,00	63	2
3665164	7N2101501RT	1,5	4	1,44	2,40	16,00	63	2
3665166	7N2102001RT	2,0	4	1,94	3,20	20,00	63	2
3665168	7N2103001RT	3,0	4	2,90	4,50	30,00	63	2

Vision Plus • Series 7S05 • Application Data • AlTiN-MT1 • Inch







Material Group		Side Milling (A) and Slotting (B)			AlTiN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
		A		B	Cutting Speed — vc SFM				D1 — Diameter						
		ap	ae	ap	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4	1
								dec.	.2500	.3100	.3800	.5000	.6300	.7500	1.000
P	3	1 x D	0.4 x D	1 x D	390	–	520	IPT	.0017	.0021	.0025	.0032	.0037	.0042	.0050
	4	1 x D	0.4 x D	0.75 x D	300	–	490	IPT	.0015	.0019	.0022	.0029	.0033	.0036	.0043
H	1	1 x D	0.4 x D	0.75 x D	260	–	460	IPT	.0015	.0019	.0022	.0029	.0033	.0036	.0043
	2	1 x D	0.3 x D	0.5 x D	230	–	390	IPT	.0011	.0014	.0017	.0021	.0024	.0027	.0031
	3	1 x D	0.15 x D	0.3 x D	200	–	300	IPT	.0009	.0011	.0013	.0017	.0020	.0022	.0027
	4	1 x D	0.1 x D	0.15 x D	160	–	230	IPT	.0006	.0008	.0009	.0011	.0013	.0015	.0018

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
When using tools with 6 flutes, reduce slotting ap by 60%.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".

Vision Plus • Series 7S7R • Application Data • AlTiN-MT1 • Inch







Material Group		Side Milling (A) and Slotting (B)			AlTiN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.									
		A		B	Cutting Speed — vc SFM				D1 — Diameter								
		ap	ae	ap	min		max	frac. dec.	5/32 .1563	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.000
P	3	0.8 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	0.8 x D	0.4 x D	0.5 x D	300	–	490	IPT	.0008	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
	5	0.8 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	6	0.8 x D	0.4 x D	0.5 x D	160	–	250	IPT	.0006	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
M	1	0.8 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	0.8 x D	0.4XD	0.75 x D	200	–	260	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	3	0.8 x D	0.4 x D	0.75 x D	200	–	230	IPT	.0006	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
K	1	0.8 x D	0.5 x D	0.75 x D	390	–	490	IPT	.0011	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	0.8 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	0.8 x D	0.4 x D	0.75 x D	360	–	430	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
S	1	0.8 x D	0.4 x D	0.75 x D	160	–	300	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	0.8 x D	0.4 x D	0.75 x D	80	–	130	IPT	.0005	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	3	0.8 x D	0.25 x D	0.3 x D	80	–	130	IPT	.0005	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	4	0.8 x D	0.3 x D	0.5 x D	160	–	200	IPT	.0006	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033
H	1	0.8 x D	0.5 x D	0.5 x D	260	–	460	IPT	.0008	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
	2	0.8 x D	0.2 x D	0.3 x D	230	–	390	IPT	.0006	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
	3	0.8 x D	0.15 x D	0.2 x D	200	–	300	IPT	.0005	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
When using tools with 6 flutes, reduce slotting ap by 40%.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2.

Vision Plus • Series 7S5F • Application Data • AlTiN-MT1 • Inch




Material Group		Profile Milling A		AlTiN Cutting Speed — vc SFM			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)									
								D1 — Diameter								
		ap	ae	min		max	frac. dec.	1/8 .1250	5/32 .1563	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	7/16 .4375	1/2 .5000	5/8 .6250	3/4 .7500
P	3	0.5 x D	0.5 x D	910	–	1210	IPT	.0031	.0039	.0048	.0065	.0084	.0098	.0112	.0124	.0147	.0166
	4	0.5 x D	0.5 x D	680	–	1130	IPT	.0029	.0036	.0044	.0059	.0075	.0088	.0099	.0110	.0129	.0145
H	1	0.5 x D	0.5 x D	600	–	1060	IPT	.0029	.0036	.0044	.0059	.0075	.0088	.0099	.0110	.0129	.0145
	2	0.5 x D	0.5 x D	530	–	910	IPT	.0022	.0027	.0033	.0044	.0056	.0066	.0074	.0082	.0096	.0107
	3	0.5 x D	0.5 x D	450	–	680	IPT	.0017	.0021	.0026	.0035	.0044	.0052	.0059	.0066	.0078	.0089
	4	0.5 x D	0.5 x D	380	–	530	IPT	.0011	.0014	.0017	.0023	.0030	.0035	.0039	.0044	.0052	.0058




Material Group		Profile Milling A		AlTiN Cutting Speed — vc SFM			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)									
								D1 — Diameter								
		ap	ae	min		max	frac. dec.	1/8 .1250	5/32 .1563	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	7/16 .4375	1/2 .5000	5/8 .6250	3/4 .7500
P	3	0.1 x D	0.1 x D	790	–	1050	IPT	.0022	.0027	.0033	.0046	.0059	.0069	.0078	.0087	.0102	.0116
	4	0.1 x D	0.1 x D	590	–	980	IPT	.0020	.0025	.0030	.0041	.0052	.0061	.0069	.0077	.0090	.0101
H	1	0.1 x D	0.1 x D	520	–	920	IPT	.0020	.0025	.0030	.0041	.0052	.0061	.0069	.0077	.0090	.0101
	2	0.1 x D	0.1 x D	460	–	790	IPT	.0015	.0019	.0023	.0031	.0039	.0046	.0052	.0057	.0067	.0075
	3	0.1 x D	0.1 x D	390	–	590	IPT	.0012	.0015	.0018	.0024	.0031	.0036	.0041	.0046	.0054	.0062
	4	0.1 x D	0.1 x D	330	–	460	IPT	.0008	.0010	.0012	.0016	.0021	.0024	.0027	.0031	.0036	.0041




Material Group		Profile Milling A		AlTiN Cutting Speed — vc SFM			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)									
								D1 — Diameter								
		ap	ae	min		max	frac. dec.	1/8 .1250	5/32 .1563	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	7/16 .4375	1/2 .5000	5/8 .6250	3/4 .7500
P	3	0.2 x D	0.2 x D	510	–	680	IPT	.0009	.0012	.0014	.0020	.0025	.0030	.0034	.0038	.0044	.0050
	4	0.2 x D	0.2 x D	380	–	640	IPT	.0009	.0011	.0013	.0018	.0023	.0027	.0030	.0033	.0039	.0044
H	1	0.2 x D	0.2 x D	340	–	600	IPT	.0009	.0011	.0013	.0018	.0023	.0027	.0030	.0033	.0039	.0044
	2	0.2 x D	0.2 x D	300	–	510	IPT	.0007	.0008	.0010	.0013	.0017	.0020	.0022	.0025	.0029	.0032
	3	0.2 x D	0.2 x D	260	–	380	IPT	.0005	.0006	.0008	.0011	.0013	.0016	.0018	.0020	.0024	.0027
	4	0.2 x D	0.2 x D	210	–	300	IPT	.0003	.0004	.0005	.0007	.0009	.0010	.0012	.0013	.0016	.0018

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".

Vision Plus • Series 7505 7545 7515 7525 • Application Data • TiAlN-LT1 • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter 4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	3	1 x D	0,4 x D	1 x D	120	–	160	fz	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	4	1 x D	0,4 x D	0,75 x D	90	–	150	fz	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
H	1	1 x D	0,4 x D	0,75 x D	80	–	140	fz	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
	2	1 x D	0,3 x D	0,5 x D	70	–	120	fz	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078
	3	1 x D	0,15 x D	0,3 x D	60	–	90	fz	0,014	0,018	0,021	0,029	0,035	0,041	0,046	0,051	0,055	0,059	0,067
	4	1 x D	0,1 x D	0,15 x D	50	–	70	fz	0,009	0,012	0,014	0,019	0,023	0,027	0,031	0,034	0,037	0,039	0,044

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.

Vision Plus • Series 7515 • Application Data • TiAlN-LT1 • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter 3,0	4,0	5,0	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	3	2 x D	0,3 x D	0,75 x D	160	–	180	fz	0,019	0,026	0,033	0,040	0,055	0,067	0,077	0,096	0,111	0,125
	4	2 x D	0,25 x D	0,5 x D	140	–	160	fz	0,017	0,024	0,030	0,036	0,049	0,059	0,069	0,084	0,097	0,107
H	1	2 x D	0,25 x D	0,5 x D	120	–	140	fz	0,017	0,024	0,030	0,036	0,049	0,059	0,069	0,084	0,097	0,107
	2	2 x D	0,2 x D	0,4 x D	80	–	130	fz	0,013	0,018	0,022	0,027	0,037	0,044	0,051	0,063	0,071	0,078
	3	2 x D	0,1 x D	0,2 x D	70	–	100	fz	0,010	0,014	0,018	0,021	0,029	0,035	0,041	0,051	0,059	0,067
	4	2 x D	0,05 x D	0,05 x D	50	–	70	fz	0,007	0,009	0,012	0,014	0,019	0,023	0,027	0,034	0,039	0,044

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.

Vision Plus • Series 7525 • Application Data • TiAlN-LT1 • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter 3,0	4,0	5,0	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	3	3 x D	0,2 x D	0,5 x D	160	–	180	fz	0,019	0,026	0,033	0,040	0,055	0,067	0,077	0,096	0,111	0,125
	4	3 x D	0,2 x D	0,3 x D	140	–	160	fz	0,017	0,024	0,030	0,036	0,049	0,059	0,069	0,084	0,097	0,107
H	1	3 x D	0,2 x D	0,3 x D	120	–	140	fz	0,017	0,024	0,030	0,036	0,049	0,059	0,069	0,084	0,097	0,107
	2	3 x D	0,15 x D	0,2 x D	80	–	130	fz	0,013	0,018	0,022	0,027	0,037	0,044	0,051	0,063	0,071	0,078
	3	3 x D	0,05 x D	–	70	–	100	fz	0,010	0,014	0,018	0,021	0,029	0,035	0,041	0,051	0,059	0,067
	4	3 x D	0,03 x D	–	50	–	70	fz	0,007	0,009	0,012	0,014	0,019	0,023	0,027	0,034	0,039	0,044

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.

Vision Plus • Series 7585 7595 • Application Data • TiAlN-LT1 • Metric





Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	3	1 x D	0,4 x D	1 x D	120	–	160	fz	0,019	0,033	0,040	0,055	0,067	0,077	0,077	0,096	0,096	0,111	0,125
	4	1 x D	0,4 x D	0,75 x D	90	–	150	fz	0,017	0,030	0,036	0,049	0,059	0,069	0,069	0,084	0,084	0,097	0,107
H	1	1 x D	0,4 x D	0,75 x D	80	–	140	fz	0,017	0,030	0,036	0,049	0,059	0,069	0,069	0,084	0,084	0,097	0,107
	2	1 x D	0,3 x D	0,5 x D	70	–	120	fz	0,013	0,022	0,027	0,037	0,044	0,051	0,051	0,063	0,063	0,071	0,078
	3	1 x D	0,15 x D	0,3 x D	60	–	90	fz	0,010	0,018	0,021	0,029	0,035	0,041	0,041	0,051	0,051	0,059	0,067
	4	1 x D	0,1 x D	0,15 x D	50	–	70	fz	0,007	0,012	0,014	0,019	0,023	0,027	0,027	0,034	0,034	0,039	0,044

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.

Vision Plus™ • Series 75N2 • Application Data • WU10PE • Metric





Material Group		Side Milling (A) and Slotting (B)			WU10PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.						
		A		B	Cutting Speed — vc m/min				D1 — Diameter					
		ap	ae	ap	min		max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0
P	3	0,75 x D	0,1 x D	0,4 x D	160	–	180	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070
	4	0,75 x D	0,1 x D	0,4 x D	140	–	160	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062
H	1	0,75 x D	0,1 x D	0,4 x D	120	–	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062
	2	0,75 x D	0,05 x D	0,3 x D	100	–	130	fz	0,016	0,020	0,025	0,029	0,034	0,037	0,040
	3	0,75 x D	0,03 x D	0,2 x D	70	–	100	fz	0,013	0,016	0,019	0,023	0,026	0,029	0,032
	4	0,75 x D	0,01 x D	0,1 x D	50	–	70	fz	0,008	0,011	0,013	0,015	0,018	0,019	0,021

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Vision Plus • Series 75N5 Finishing • Application Data • WU10PE • Metric



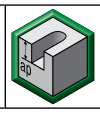


Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	3	1 x D	0,4 x D	1 x D	120	–	160	fz	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0.,104	0,111	0,125
	4	1 x D	0,4 x D	0,75 x D	90	–	150	fz	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
H	1	1 x D	0,4 x D	0,75 x D	80	–	140	fz	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
	2	1 x D	0,3 x D	0,5 x D	70	–	120	fz	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078
	3	1 x D	0,15 x D	0,3 x D	60	–	90	fz	0,014	0,018	0,021	0,029	0,035	0,041	0,046	0,051	0,055	0,059	0,067
	4	1 x D	0,1 x D	0,15 x D	50	–	70	fz	0,009	0,012	0,014	0,019	0,023	0,027	0,031	0,034	0,037	0,039	0,044

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.

Vision Plus • Series 7670 • Application Data • TiAlN-LT1 • Metric





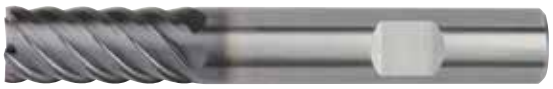


Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 10%.									
		A		B	Cutting Speed — vc m/min				D1 — Diameter								
		ap	ae	ap	min		max	mm	4,0	5,0	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	3	0,8 x D	0,5 x D	0,75 x D	160	–	180	fz	0,020	0,025	0,031	0,043	0,051	0,063	0,078	0,101	0,114
	4	0,8 x D	0,4 x D	0,5 x D	140	–	160	fz	0,018	0,023	0,028	0,038	0,046	0,056	0,069	0,088	0,098
	5	0,8 x D	0,5 x D	0,75 x D	60	–	100	fz	0,016	0,021	0,025	0,034	0,041	0,051	0,063	0,081	0,091
	6	0,8 x D	0,4 x D	0,5 x D	50	–	80	fz	0,014	0,017	0,021	0,029	0,034	0,042	0,051	0,065	0,071
M	1	0,8 x D	0,5 x D	0,75 x D	80	–	100	fz	0,020	0,025	0,031	0,043	0,051	0,063	0,078	0,101	0,114
	2	0,8 x D	0,4 x D	0,75 x D	60	–	80	fz	0,016	0,021	0,025	0,034	0,041	0,051	0,063	0,081	0,091
	3	0,8 x D	0,4 x D	0,75 x D	60	–	80	fz	0,014	0,017	0,021	0,029	0,034	0,042	0,051	0,065	0,071
K	1	0,8 x D	0,5 x D	0,75 x D	120	–	160	fz	0,024	0,031	0,037	0,051	0,061	0,075	0,091	0,114	0,124
	2	0,8 x D	0,5 x D	0,75 x D	110	–	140	fz	0,020	0,025	0,031	0,043	0,051	0,063	0,078	0,101	0,114
	3	0,8 x D	0,4 x D	0,75 x D	100	–	130	fz	0,016	0,021	0,025	0,034	0,041	0,051	0,063	0,081	0,091
S	1	0,8 x D	0,4 x D	0,75 x D	50	–	90	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	0,8 x D	0,25 x D	0,3 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	0,8 x D	0,4 x D	0,75 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	4	0,8 x D	0,3 x D	0,5 x D	50	–	60	fz	0,016	0,021	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	0,8 x D	0,5 x D	0,5 x D	120	–	140	fz	0,018	0,023	0,028	0,038	0,046	0,056	0,069	0,088	0,098
	2	0,8 x D	0,2 x D	0,3 x D	80	–	130	fz	0,014	0,017	0,021	0,029	0,034	0,042	0,051	0,065	0,071
	3	0,8 x D	0,15 x D	0,2 x D	70	–	100	fz	0,011	0,014	0,017	0,023	0,027	0,034	0,041	0,052	0,057

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For rougher tool with 6 flutes, use ap in slotting 60% of table value.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >12mm.

Vision Plus™ • Series D518 • Application Data • WP15PE • Metric





Material Group		Side Milling (A)		WP15PE			Recommended feed per tooth (fz = mm/th) for side milling (A).											
		A		Cutting Speed — vc m/min				D1 — Diameter										
		ap	ae	min		max	mm	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	Ap1 max	0,05 x D	150	–	200	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	1	Ap1 max	0,05 x D	150	–	200	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	Ap1 max	0,05 x D	140	–	190	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	3	Ap1 max	0,05 x D	120	–	160	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	4	Ap1 max	0,05 x D	90	–	150	fz	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	5	Ap1 max	0,05 x D	60	–	100	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	6	Ap1 max	0,04 x D	50	–	75	fz	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
M	1	Ap1 max	0,05 x D	90	–	115	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	Ap1 max	0,05 x D	60	–	80	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
	3	Ap1 max	0,05 x D	60	–	70	fz	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071
K	1	Ap1 max	0,05 x D	120	–	150	fz	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124
	2	Ap1 max	0,05 x D	110	–	140	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	3	Ap1 max	0,05 x D	110	–	130	fz	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091
S	1	Ap1 max	0,04 x D	50	–	90	fz	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114
	2	Ap1 max	0,04 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	3	Ap1 max	0,05 x D	25	–	40	fz	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061
	4	Ap1 max	0,05 x D	50	–	60	fz	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084
H	1	Ap1 max	0,04 x D	80	–	140	fz	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098
	2	Ap1 max	0,05 x D	70	–	120	fz	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.

Vision Plus • Series D618 • Application Data • WU10PE • Metric





Material Group		Side Milling (A)		WU10PE			Recommended feed per tooth (fz = mm/th) for side milling (A).								
		A		Cutting Speed — vc m/min				D1 — Diameter							
		ap	ae	min		max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	2 x D	0,15 x D	120	–	160	fz	0,019	0,026	0,033	0,040	0,055	0,067	0,077	0,096	0,111
	4	2 x D	0,15 x D	90	–	150	fz	0,017	0,024	0,030	0,036	0,049	0,059	0,069	0,084	0,097
H	1	2 x D	0,15 x D	80	–	140	fz	0,017	0,024	0,030	0,036	0,049	0,059	0,069	0,084	0,097
	2	2 x D	0,15 x D	70	–	120	fz	0,013	0,018	0,022	0,027	0,037	0,044	0,051	0,063	0,071
	3	2 x D	0,1 x D	60	–	90	fz	0,010	0,014	0,018	0,021	0,029	0,035	0,041	0,051	0,059
	4	2 x D	0,05 x D	50	–	70	fz	0,007	0,009	0,012	0,014	0,019	0,023	0,027	0,034	0,039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

Vision Plus • Series 7050 7060 Roughing • Application Data • WU10PE • Metric





Material Group		A		WU10PE			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - roughing								
				Cutting Speed — vc m/min				D1 - Diameter							
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,2 x D	0,1 x D	208	–	234	Fz	0,015	0,023	0,031	0,049	0,067	0,081	0,094	0,117	0,136
	4	0,2 x D	0,1 x D	182	–	208	Fz	0,014	0,021	0,029	0,044	0,060	0,073	0,084	0,103	0,118
H	1	0,15 x D	0,1 x D	140	–	196	Fz	0,021	0,032	0,043	0,066	0,090	0,109	0,125	0,154	0,177
	2	0,1 x D	0,075 x D	119	–	204	Fz	0,024	0,036	0,048	0,074	0,101	0,121	0,140	0,171	0,194
	3	0,05 x D	0,05 x D	138	–	207	Fz	0,027	0,041	0,055	0,084	0,114	0,138	0,161	0,200	0,233
	4	0,05 x D	0,05 x D	115	–	161	Fz	0,018	0,027	0,037	0,056	0,076	0,092	0,107	0,133	0,154

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7050 7060 Semi-Finishing • Application Data • WU10PE • Metric





Material Group		Profile Milling		WU10PE			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — semi-finishing									
		A		Cutting Speed — vc m/min				D1 — Diameter								
		ap	ae	min		max	mm	1,0	2,0	2,5	3,0	4,0	5,0	6,0	8,0	10,0	12,0
P	3	0,1 x D	0,1 x D	240	–	320	fz	0,017	0,034	0,043	0,052	0,070	0,089	0,109	0,150	0,182	0,211
	4	0,1 x D	0,1 x D	180	–	300	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
H	1	0,1 x D	0,1 x D	160	–	280	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
	2	0,1 x D	0,1 x D	140	–	240	fz	0,012	0,024	0,030	0,036	0,048	0,061	0,074	0,101	0,121	0,140
	3	0,1 x D	0,1 x D	120	–	180	fz	0,009	0,019	0,024	0,028	0,038	0,048	0,058	0,079	0,096	0,112
	4	0,1 x D	0,1 x D	100	–	140	fz	0,006	0,012	0,016	0,019	0,025	0,032	0,039	0,053	0,064	0,074

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7050 7060 Finishing • Application Data • WU10PE • Metric




Material Group		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - finishing								
								D1 - Diameter							
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,04 x D	0,04 x D	416	–	468	Fz	0,052	0,080	0,108	0,168	0,231	0,279	0,324	0,403	0,466
	4	0,04 x D	0,04 x D	364	–	416	Fz	0,048	0,073	0,099	0,152	0,207	0,249	0,288	0,355	0,406
H	1	0,03 x D	0,03 x D	290	–	406	Fz	0,052	0,078	0,106	0,162	0,221	0,266	0,308	0,379	0,434
	2	0,03 x D	0,03 x D	203	–	348	Fz	0,039	0,059	0,080	0,122	0,166	0,199	0,230	0,281	0,320
	3	0,02 x D	0,02 x D	216	–	324	Fz	0,033	0,050	0,067	0,102	0,139	0,168	0,196	0,244	0,284
	4	0,02 x D	0,02 x D	180	–	252	Fz	0,022	0,033	0,045	0,068	0,093	0,112	0,130	0,162	0,187

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7061 Roughing • Application Data • WU10PE • Metric




Material Group		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - roughing								
								D1 - Diameter							
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,2D	0,1D	208	–	234	Fz	0,015	0,023	0,031	0,049	0,067	0,081	0,094	0,117	0,136
	4	0,2D	0,1D	182	–	208	Fz	0,014	0,021	0,029	0,044	0,060	0,073	0,084	0,103	0,118
H	1	0,15D	0,1D	140	–	196	Fz	0,021	0,032	0,043	0,066	0,090	0,109	0,125	0,154	0,177
	2	0,1D	0,075D	119	–	204	Fz	0,024	0,036	0,048	0,074	0,101	0,121	0,140	0,171	0,194
	3	0,05D	0,05D	138	–	207	Fz	0,027	0,041	0,055	0,084	0,114	0,138	0,161	0,200	0,233
	4	0,05D	0,05D	115	–	161	Fz	0,018	0,027	0,037	0,056	0,076	0,092	0,107	0,133	0,154

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7061 Semi-Finishing • Application Data • WU10PE • Metric




Material Group		Profile Milling A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — semi-finishing									
								D1 — Diameter								
		ap	ae	min		max	mm	1,0	2,0	2,5	3,0	4,0	5,0	6,0	8,0	10,0	12,0
P	3	0,1 x D	0,05 x D	240	–	320	fz	0,017	0,034	0,043	0,052	0,070	0,089	0,109	0,150	0,182	0,211
	4	0,1 x D	0,1 x D	180	–	300	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
H	1	0,1 x D	0,1 x D	160	–	280	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
	2	0,1 x D	0,1 x D	140	–	240	fz	0,012	0,024	0,030	0,036	0,048	0,061	0,074	0,101	0,121	0,140
	3	0,1 x D	0,1 x D	120	–	180	fz	0,009	0,019	0,024	0,028	0,038	0,048	0,058	0,079	0,096	0,112
	4	0,1 x D	0,1 x D	100	–	140	fz	0,006	0,012	0,016	0,019	0,025	0,032	0,039	0,053	0,064	0,074

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7061 Finishing • Application Data • WU10PE • Metric





Material Group		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - finishing								
							D1 - Diameter								
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,04 x D	0,04 x D	416	–	468	Fz	0,052	0,080	0,108	0,168	0,231	0,279	0,324	0,403	0,466
	4	0,04 x D	0,04 x D	364	–	416	Fz	0,048	0,073	0,099	0,152	0,207	0,249	0,288	0,355	0,406
H	1	0,03 x D	0,03 x D	290	–	406	Fz	0,052	0,078	0,106	0,162	0,221	0,266	0,308	0,379	0,434
	2	0,03 x D	0,03 x D	203	–	348	Fz	0,039	0,059	0,080	0,122	0,166	0,199	0,230	0,281	0,320
	3	0,02 x D	0,02 x D	216	–	324	Fz	0,033	0,050	0,067	0,102	0,139	0,168	0,196	0,244	0,284
	4	0,02 x D	0,02 x D	180	–	252	Fz	0,022	0,033	0,045	0,068	0,093	0,112	0,130	0,162	0,187

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7150 Roughing • Application Data • WU10PE • Metric





Material Group		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - roughing								
							D1 - Diameter								
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,2 x D	0,1 x D	208	–	234	Fz	0,015	0,023	0,031	0,049	0,067	0,081	0,094	0,117	0,136
	4	0,2 x D	0,1 x D	182	–	208	Fz	0,014	0,021	0,029	0,044	0,060	0,073	0,084	0,103	0,118
H	1	0,15 x D	0,1 x D	140	–	196	Fz	0,021	0,032	0,043	0,066	0,090	0,109	0,125	0,154	0,177
	2	0,1 x D	0,075 x D	119	–	204	Fz	0,024	0,036	0,048	0,074	0,101	0,121	0,140	0,171	0,194
	3	0,05 x D	0,05 x D	138	–	207	Fz	0,027	0,041	0,055	0,084	0,114	0,138	0,161	0,200	0,233
	4	0,05 x D	0,05 x D	115	–	161	Fz	0,018	0,027	0,037	0,056	0,076	0,092	0,107	0,133	0,154

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7150 Semi-Finishing • Application Data • WU10PE • Metric





Material Group		Profile Milling A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — semi-finishing									
							D1 — Diameter									
		ap	ae	min		max	mm	1,0	2,0	2,5	3,0	4,0	5,0	6,0	8,0	10,0	12,0
P	3	0,1 x D	0,1 x D	240	–	320	fz	0,017	0,034	0,043	0,052	0,070	0,089	0,109	0,150	0,182	0,211
	4	0,1 x D	0,1 x D	180	–	300	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
H	1	0,1 x D	0,1 x D	160	–	280	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
	2	0,1 x D	0,1 x D	140	–	240	fz	0,012	0,024	0,030	0,036	0,048	0,061	0,074	0,101	0,121	0,140
	3	0,1 x D	0,1 x D	120	–	180	fz	0,009	0,019	0,024	0,028	0,038	0,048	0,058	0,079	0,096	0,112
	4	0,1 x D	0,1 x D	100	–	140	fz	0,006	0,012	0,016	0,019	0,025	0,032	0,039	0,053	0,064	0,074

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7150 Finishing • Application Data • WU10PE • Metric





Material Group		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - finishing								
							D1 - Diameter								
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,04 x D	0,04 x D	416	–	468	Fz	0,052	0,080	0,108	0,168	0,231	0,279	0,324	0,403	0,466
	4	0,04 x D	0,04 x D	364	–	416	Fz	0,048	0,073	0,099	0,152	0,207	0,249	0,288	0,355	0,406
H	1	0,03 x D	0,03 x D	290	–	406	Fz	0,052	0,078	0,106	0,162	0,221	0,266	0,308	0,379	0,434
	2	0,03 x D	0,03 x D	203	–	348	Fz	0,039	0,059	0,080	0,122	0,166	0,199	0,230	0,281	0,320
	3	0,02 x D	0,02 x D	216	–	324	Fz	0,033	0,050	0,067	0,102	0,139	0,168	0,196	0,244	0,284
	4	0,02 x D	0,02 x D	180	–	252	Fz	0,022	0,033	0,045	0,068	0,093	0,112	0,130	0,162	0,187

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7151 Roughing • Application Data • WU10PE • Metric





Material Group		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - roughing								
							D1 - Diameter								
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,2 x D	0,1 x D	208	–	234	Fz	0,015	0,023	0,031	0,049	0,067	0,081	0,094	0,117	0,136
	4	0,2 x D	0,1 x D	182	–	208	Fz	0,014	0,021	0,029	0,044	0,060	0,073	0,084	0,103	0,118
H	1	0,15 x D	0,1 x D	140	–	196	Fz	0,021	0,032	0,043	0,066	0,090	0,109	0,125	0,154	0,177
	2	0,1 x D	0,075 x D	119	–	204	Fz	0,024	0,036	0,048	0,074	0,101	0,121	0,140	0,171	0,194
	3	0,05 x D	0,05 x D	138	–	207	Fz	0,027	0,041	0,055	0,084	0,114	0,138	0,161	0,200	0,233
	4	0,05 x D	0,05 x D	115	–	161	Fz	0,018	0,027	0,037	0,056	0,076	0,092	0,107	0,133	0,154

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7151 Semi-Finishing • Application Data • WU10PE • Metric





Material Group		Profile Milling A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — semi-finishing									
							D1 — Diameter									
		ap	ae	min		max	mm	1,0	2,0	2,5	3,0	4,0	5,0	6,0	8,0	10,0	12,0
P	3	0,1 x D	0,05 x D	240	–	320	fz	0,017	0,034	0,043	0,052	0,070	0,089	0,109	0,150	0,182	0,211
	4	0,1 x D	0,1 x D	180	–	300	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
H	1	0,1 x D	0,1 x D	160	–	280	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
	2	0,1 x D	0,1 x D	140	–	240	fz	0,012	0,024	0,030	0,036	0,048	0,061	0,074	0,101	0,121	0,140
	3	0,1 x D	0,1 x D	120	–	180	fz	0,009	0,019	0,024	0,028	0,038	0,048	0,058	0,079	0,096	0,112
	4	0,1 x D	0,1 x D	100	–	140	fz	0,006	0,012	0,016	0,019	0,025	0,032	0,039	0,053	0,064	0,074

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7151 Finishing • Application Data • WU10PE • Metric




Material Group		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - finishing								
							D1 - Diameter								
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,04 x D	0,04 x D	416	–	468	Fz	0,052	0,080	0,108	0,168	0,231	0,279	0,324	0,403	0,466
	4	0,04 x D	0,04 x D	364	–	416	Fz	0,048	0,073	0,099	0,152	0,207	0,249	0,288	0,355	0,406
H	1	0,03 x D	0,03 x D	290	–	406	Fz	0,052	0,078	0,106	0,162	0,221	0,266	0,308	0,379	0,434
	2	0,03 x D	0,03 x D	203	–	348	Fz	0,039	0,059	0,080	0,122	0,166	0,199	0,230	0,281	0,320
	3	0,02 x D	0,02 x D	216	–	324	Fz	0,033	0,050	0,067	0,102	0,139	0,168	0,196	0,244	0,284
	4	0,02 x D	0,02 x D	180	–	252	Fz	0,022	0,033	0,045	0,068	0,093	0,112	0,130	0,162	0,187

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 70N1 Roughing • Application Data • WU10PE • Metric




Material Group		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - roughing								
							D1 - Diameter								
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,2 x D	0,1 x D	208	–	234	Fz	0,015	0,023	0,031	0,049	0,067	0,081	0,094	0,117	0,136
	4	0,2 x D	0,1 x D	182	–	208	Fz	0,014	0,021	0,029	0,044	0,060	0,073	0,084	0,103	0,118
H	1	0,15 x D	0,1 x D	140	–	196	Fz	0,021	0,032	0,043	0,066	0,090	0,109	0,125	0,154	0,177
	2	0,1 x D	0,075 x D	119	–	204	Fz	0,024	0,036	0,048	0,074	0,101	0,121	0,140	0,171	0,194
	3	0,05 x D	0,05 x D	138	–	207	Fz	0,027	0,041	0,055	0,084	0,114	0,138	0,161	0,200	0,233
	4	0,05 x D	0,05 x D	115	–	161	Fz	0,018	0,027	0,037	0,056	0,076	0,092	0,107	0,133	0,154

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 70N1 Semi-Finishing • Application Data • WU10PE • Metric




Material Group		Profile Milling A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — semi-finishing									
							D1 — Diameter									
		ap	ae	min		max	mm	1,0	2,0	2,5	3,0	4,0	5,0	6,0	8,0	10,0	12,0
P	3	0,1 x D	0,1 x D	240	–	320	fz	0,017	0,034	0,043	0,052	0,070	0,089	0,109	0,150	0,182	0,211
	4	0,1 x D	0,1 x D	180	–	300	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
H	1	0,1 x D	0,1 x D	160	–	280	fz	0,016	0,031	0,040	0,048	0,064	0,081	0,099	0,134	0,162	0,187
	2	0,1 x D	0,1 x D	140	–	240	fz	0,012	0,024	0,030	0,036	0,048	0,061	0,074	0,101	0,121	0,140
	3	0,1 x D	0,1 x D	120	–	180	fz	0,009	0,019	0,024	0,028	0,038	0,048	0,058	0,079	0,096	0,112
	4	0,1 x D	0,1 x D	100	–	140	fz	0,006	0,012	0,016	0,019	0,025	0,032	0,039	0,053	0,064	0,074

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

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Material Group																
		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - finishing								
								D1 - Diameter								
		ap	ae	Min		Max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	3	0,04 x D	0,04 x D	416	–	468	Fz	0,052	0,080	0,108	0,168	0,231	0,279	0,324	0,403	0,466
	4	0,04 x D	0,04 x D	364	–	416	Fz	0,048	0,073	0,099	0,152	0,207	0,249	0,288	0,355	0,406
H	1	0,03 x D	0,03 x D	290	–	406	Fz	0,052	0,078	0,106	0,162	0,221	0,266	0,308	0,379	0,434
	2	0,03 x D	0,03 x D	203	–	348	Fz	0,039	0,059	0,080	0,122	0,166	0,199	0,230	0,281	0,320
	3	0,02 x D	0,02 x D	216	–	324	Fz	0,033	0,050	0,067	0,102	0,139	0,168	0,196	0,244	0,284
	4	0,02 x D	0,02 x D	180	–	252	Fz	0,022	0,033	0,045	0,068	0,093	0,112	0,130	0,162	0,187

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7N02 7N12 7N22 • Application Data • WU10PE • Metric







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WU10PE Cutting Speed — vc m/min min		max	mm	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter 0,3	0,4	0,5	0,6	0,8	1,0	1,5	2,0	2,5	3,0
P	0	1,25 x D	0,25 x D	0,75 x D	150	–	200	fz	0,002	0,003	0,003	0,004	0,005	0,007	0,010	0,014	0,017	0,021
	1	1,25 x D	0,25 x D	0,75 x D	150	–	200	fz	0,002	0,003	0,003	0,004	0,005	0,007	0,010	0,014	0,017	0,021
	2	1,25 x D	0,25 x D	0,75 x D	140	–	190	fz	0,002	0,003	0,003	0,004	0,005	0,007	0,010	0,014	0,017	0,021
	3	1,25 x D	0,25 x D	0,75 x D	120	–	160	fz	0,002	0,002	0,003	0,003	0,004	0,006	0,008	0,011	0,014	0,017
	4	1,25 x D	0,25 x D	0,5 x D	90	–	150	fz	0,002	0,002	0,003	0,003	0,004	0,005	0,008	0,010	0,013	0,016
	5	1,25 x D	0,25 x D	0,5 x D	60	–	100	fz	0,001	0,002	0,002	0,003	0,004	0,005	0,007	0,009	0,012	0,014
K	1	1,25 x D	0,25 x D	0,75 x D	120	–	150	fz	0,002	0,003	0,003	0,004	0,005	0,007	0,010	0,014	0,017	0,021
	2	1,25 x D	0,25 x D	0,5 x D	110	–	140	fz	0,002	0,002	0,003	0,003	0,004	0,006	0,008	0,011	0,014	0,017
H	1	1,25 x D	0,25 x D	0,5 x D	80	–	140	fz	0,002	0,002	0,003	0,003	0,004	0,005	0,008	0,010	0,013	0,016
	2	1,25 x D	0,25 x D	0,3 x D	70	–	120	fz	0,001	0,002	0,002	0,002	0,003	0,004	0,006	0,008	0,010	0,012
	3	1,25 x D	0,25 x D	0,25 x D	60	–	90	fz	0,001	0,001	0,002	0,002	0,002	0,003	0,005	0,006	0,008	0,009







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WU10PE Cutting Speed — vc SFM min		max	mm	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter .0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
P	0	1.25 x D	0.25 x D	0.75 x D	492	–	656	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	1	1.25 x D	0.25 x D	0.75 x D	492	–	656	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	2	1.25 x D	0.25 x D	0.75 x D	459	–	623	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	3	1.25 x D	0.25 x D	0.75 x D	394	–	525	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0006	.0007
	4	1.25 x D	0.25 x D	0.5 x D	295	–	492	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0006
	5	1.25 x D	0.25 x D	0.5 x D	197	–	328	IPT	.0001	.0001	.0001	.0001	.0001	.0002	.0003	.0004	.0005	.0006
K	1	1.25 x D	0.25 x D	0.75 x D	394	–	492	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	2	1.25 x D	0.25 x D	0.5 x D	361	–	459	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0006	.0007
H	1	1.25 x D	0.25 x D	0.5 x D	262	–	459	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0006
	2	1.25 x D	0.25 x D	0.3 x D	230	–	394	IPT	.0000	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005
	3	1.25 x D	0.25 x D	0.25 x D	197	–	295	IPT	.0000	.0000	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For tools with reach > 3 x D, reduce fz by 20%.
For tools with reach > 5 x D, reduce fz by 30%.

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Material Group		Profile Milling A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — finishing							
								D1 — Diameter							
		ap	ae	min		max	mm	0,5	0,6	0,8	1,0	1,5	2,0	2,5	3,0
P	3	0,04 x D	0,04 x D	432	–	576	fz	0,012	0,015	0,020	0,025	0,038	0,051	0,064	0,078
	4	0,04 x D	0,04 x D	324	–	540	fz	0,012	0,014	0,019	0,023	0,035	0,047	0,059	0,072
H	1	0,03 x D	0,03 x D	288	–	504	fz	0,012	0,014	0,019	0,023	0,035	0,047	0,059	0,072
	2	0,03 x D	0,03 x D	252	–	432	fz	0,009	0,011	0,014	0,018	0,027	0,036	0,045	0,054
	3	0,02 x D	0,02 x D	216	–	324	fz	0,007	0,008	0,011	0,014	0,021	0,028	0,035	0,043
	4	0,02 x D	0,02 x D	180	–	252	fz	0,005	0,006	0,007	0,009	0,014	0,019	0,024	0,028





Material Group		Profile Milling A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — semi-finishing							
								D1 — Diameter							
		ap	ae	min		max	mm	0,5	0,6	0,8	1,0	1,5	2,0	2,5	3,0
P	3	0,1 x D	0,05 x D	300	-	400	fz	0,008	0,010	0,013	0,017	0,025	0,034	0,043	0,052
	4	0,1 x D	0,05 x D	225	-	375	fz	0,008	0,009	0,012	0,016	0,023	0,031	0,040	0,048
H	1	0,07 x D	0,1 x D	200	-	350	fz	0,008	0,009	0,012	0,016	0,023	0,031	0,040	0,048
	2	0,05 x D	0,04 x D	175	-	300	fz	0,006	0,007	0,009	0,012	0,018	0,024	0,030	0,036
	3	0,03 x D	0,03 x D	150	-	225	fz	0,005	0,006	0,007	0,009	0,014	0,019	0,024	0,028
	4	0,03 x D	0,03 x D	125	-	175	fz	0,003	0,004	0,005	0,006	0,009	0,012	0,016	0,019





Material Group		Profile Milling A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — roughing							
								D1 — Diameter							
		ap	ae	min		max	mm	0,5	0,6	0,8	1,0	1,5	2,0	2,5	3,0
P	3	0,2 x D	0,1 x D	216	-	288	fz	0,004	0,005	0,007	0,008	0,013	0,017	0,021	0,026
	4	0,2 x D	0,1 x D	162	-	270	fz	0,004	0,005	0,006	0,008	0,012	0,016	0,020	0,024
H	1	0,15 x D	0,1 x D	144	-	252	fz	0,004	0,005	0,006	0,008	0,012	0,016	0,020	0,024
	2	0,1 x D	0,075 x D	126	-	216	fz	0,003	0,004	0,005	0,006	0,009	0,012	0,015	0,018
	3	0,05 x D	0,05 x D	108	-	162	fz	0,002	0,003	0,004	0,005	0,007	0,009	0,012	0,014
	4	0,05 x D	0,05 x D	90	-	126	fz	0,002	0,002	0,002	0,003	0,005	0,006	0,008	0,009

NOTE: Please use reference table for correction of vc based on averages degree of the mold.

Vision Plus • Series 7N21 Roughing • Application Data • WU10PE • Metric

Material Group		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - roughing							
							D1 - Diameter							
		ap	ae	Min		Max	mm	0,5	0,6	0,8	1,0	1,5	2,0	2,5	3,0
P	3	0,2 x D	0,1 x D	208	–	234	Fz	0,0037	0,0044	0,0059	0,0075	0,0113	0,0152	0,0192	0,0232
	4	0,2 x D	0,1 x D	182	–	208	Fz	0,0035	0,0042	0,0056	0,0070	0,0105	0,0141	0,0177	0,0213
H	1	0,15 x D	0,1 x D	140	–	196	Fz	0,0052	0,0062	0,0083	0,0104	0,0157	0,0211	0,0265	0,0319
	2	0,1 x D	0,075 x D	119	–	204	Fz	0,0059	0,0070	0,0094	0,0118	0,0178	0,0238	0,0299	0,0360
	3	0,05 x D	0,05 x D	138	–	207	Fz	0,0066	0,0080	0,0106	0,0133	0,0201	0,0269	0,0338	0,0408
	4	0,05 x D	0,05 x D	115	–	161	Fz	0,0044	0,0053	0,0071	0,0089	0,0134	0,0179	0,0226	0,0272

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.

Vision Plus • Series 7N21 Semi-Finishing • Application Data • WU10PE • Metric





Material Group		Profile Milling		WU10PE			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — finishing							
		A		Cutting Speed — vc m/min				D1 — Diameter						
		ap	ae	min		max	mm	0,5	0,6	0,8	1,0	1,5	2,0	2,5	3,0
P	3	0,04 x D	0,04 x D	432	–	576	fz	0,012	0,015	0,020	0,025	0,038	0,051	0,064	0,078
	4	0,04 x D	0,04 x D	324	–	540	fz	0,012	0,014	0,019	0,023	0,035	0,047	0,059	0,072
H	1	0,03 x D	0,03 x D	288	–	504	fz	0,012	0,014	0,019	0,023	0,035	0,047	0,059	0,072
	2	0,03 x D	0,03 x D	252	–	432	fz	0,009	0,011	0,014	0,018	0,027	0,036	0,045	0,054
	3	0,02 x D	0,02 x D	216	–	324	fz	0,007	0,008	0,011	0,014	0,021	0,028	0,035	0,043
	4	0,02 x D	0,02 x D	180	–	252	fz	0,005	0,006	0,007	0,009	0,014	0,019	0,024	0,028





Material Group		Profile Milling		WU10PE			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — semi-finishing							
		A		Cutting Speed — vc m/min				D1 — Diameter						
		ap	ae	min		max	mm	0,5	0,6	0,8	1,0	1,5	2,0	2,5	3,0
P	3	0,1 x D	0,05 x D	300	-	400	fz	0,008	0,010	0,013	0,017	0,025	0,034	0,043	0,052
	4	0,1 x D	0,05 x D	225	-	375	fz	0,008	0,009	0,012	0,016	0,023	0,031	0,040	0,048
H	1	0,07 x D	0,1 x D	200	-	350	fz	0,008	0,009	0,012	0,016	0,023	0,031	0,040	0,048
	2	0,05 x D	0,04 x D	175	-	300	fz	0,006	0,007	0,009	0,012	0,018	0,024	0,030	0,036
	3	0,03 x D	0,03 x D	150	-	225	fz	0,005	0,006	0,007	0,009	0,014	0,019	0,024	0,028
	4	0,03 x D	0,03 x D	125	-	175	fz	0,003	0,004	0,005	0,006	0,009	0,012	0,016	0,019





Material Group		Profile Milling		WU10PE			Recommended feed per tooth (fz = mm/th) for 3D milling/profiling (A) — roughing							
		A		Cutting Speed — vc m/min				D1 — Diameter						
		ap	ae	min		max	mm	0,5	0,6	0,8	1,0	1,5	2,0	2,5	3,0
P	3	0,2 x D	0,1 x D	216	-	288	fz	0,004	0,005	0,007	0,008	0,013	0,017	0,021	0,026
	4	0,2 x D	0,1 x D	162	-	270	fz	0,004	0,005	0,006	0,008	0,012	0,016	0,020	0,024
H	1	0,15 x D	0,1 x D	144	-	252	fz	0,004	0,005	0,006	0,008	0,012	0,016	0,020	0,024
	2	0,1 x D	0,075 x D	126	-	216	fz	0,003	0,004	0,005	0,006	0,009	0,012	0,015	0,018
	3	0,05 x D	0,05 x D	108	-	162	fz	0,002	0,003	0,004	0,005	0,007	0,009	0,012	0,014
	4	0,05 x D	0,05 x D	90	-	126	fz	0,002	0,002	0,002	0,003	0,005	0,006	0,008	0,009

NOTE: Please use reference table for correction of vc based on averages degree of the mold.

Vision Plus • Series 7N21 Finishing • Application Data • WU10PE • Metric

Material Group														
		A		WU10PE Cutting Speed — vc m/min			Recommended feed per tooth (Fz=mm/th) for 3D milling/profiling (A) - finishing							
							D1 - Diameter							
		ap	ae	Min		Max	mm	0,5	0,6	0,8	1,0	1,5	2,0	2,5	3,0
P	3	0,04 x D	0,04 x D	416	–	468	Fz	0,0127	0,0153	0,0204	0,0256	0,0389	0,0522	0,0659	0,0796
	4	0,04 x D	0,04 x D	364	–	416	Fz	0,0119	0,0143	0,0191	0,0239	0,0361	0,0484	0,0609	0,0734
H	1	0,03 x D	0,03 x D	290	–	406	Fz	0,0127	0,0153	0,0204	0,0255	0,0386	0,0517	0,0650	0,0784
	2	0,03 x D	0,03 x D	203	–	348	Fz	0,0096	0,0116	0,0154	0,0193	0,0292	0,0391	0,0491	0,0592
	3	0,02 x D	0,02 x D	216	–	324	Fz	0,0081	0,0097	0,0130	0,0163	0,0245	0,0328	0,0413	0,0497
	4	0,02 x D	0,02 x D	180	–	252	Fz	0,0054	0,0065	0,0087	0,0108	0,0164	0,0219	0,0275	0,0331

Please use the reference table to optimize your cutting speed based on the average cutting angle of the application.



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HANITA™

HSS End Mills

High-Performance Solid End Milling

The next generation of premium cobalt HSS roughers are designed specifically for titanium and stainless steels. They are engineered with an eccentric relief (ER) grind to provide a stronger cutting edge that requires less torque to operate. The unique proprietary chipbreaker geometry will break and control the chip, enabling higher metal removal rates and greater productivity. The HSS rougher offers the best-in-class performance for difficult-to-machine workpiece materials.

Features and Benefits

High cobalt and vanadium content PM HSS providing superior wear resistance and red hardness.

Different edge preparations and geometries to machine a wide range of materials.

Center cutting offering excellent performance in roughing applications, especially in titanium.



WavCut™ tools for machining titanium are best suited for applications in aerospace and energy, providing high metal removal rates (MRR) and increased tool life. The special wave design of these 4- and 6-fluted end mills requires less horsepower during roughing and semi-finishing, and provides excellent chip formation. Since chips evacuate easily, WavCut tools do not recut chips, thus increasing tool life. Also, the edges change the radial cutting edge position without changing the diameter.

SOPHISTICATED

Sophisticated roughing profiles capable of dealing with chip formation issues.

HIGH PERFORMANCE

High-performance finishers with specific geometries for different workpiece materials.

EFFICIENT

Increase stock removal rates over regular roughing tools due to reduced horsepower consumption.

HIGH SPEED STEEL

PRODUCT

SOLID CARBIDE END MILL

GRADE	FLUTE
UNCOATED TiCN	4–8

DIAMETER RANGE

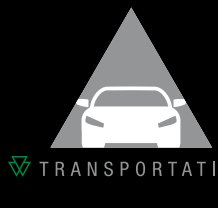
INCH	METRIC
1/2–2"	6–50mm

INDUSTRY









APPLICATIONS

MATERIALS

P M K S H



SIDE MILLING



RAMPING



HELICAL INTERPOLATION



SLOTTING



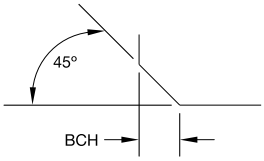
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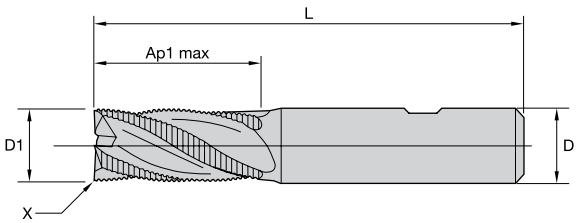


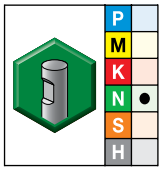
PLUNGING

HSS Roughers • Series 6A0R • Chamfer • Weldon® • Inch









● first choice
○ alternate choice

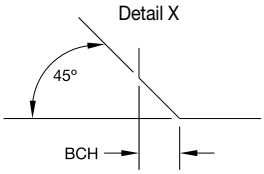
TiCN

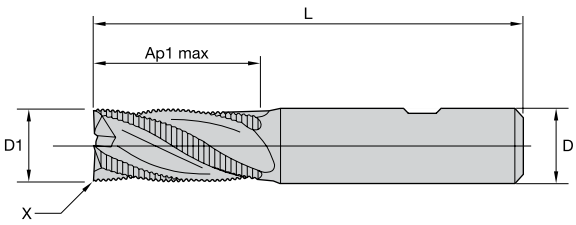
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
2840160	TC6A0R13005	1/2	1/2	1 1/4	3 1/4	.014	3
2840121	TC6A1R13005	1/2	1/2	2	4	.014	3
2840146	TC6A0R19007	3/4	3/4	1 5/8	3 7/8	.014	3
2840087	TC6A3R19007	3/4	3/4	2 1/4	4 1/2	.014	3
2840108	TC6A1R19007	3/4	3/4	3	5 1/4	.014	3
2840138	TC6A0R25008	1	1	2	4 1/2	.020	3
1839782	TC6A3R25008	1	1	3	5 1/2	.020	3
2840103	TC6A1R25008	1	1	4	6 1/2	.020	3
2840132	TC6A0R32009	1 1/4	1 1/4	2	4 1/2	.020	3
2840073	TC6A3R32009	1 1/4	1 1/4	3	5 1/2	.020	3
2840099	TC6A1R32009	1 1/4	1 1/4	4	6 1/2	.020	3

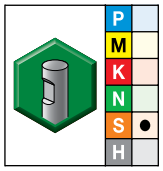
NOTE: For application data, please see page B364.

HSS Roughers • Series 6T0R • Chamfer • Weldon • Inch









● first choice
○ alternate choice

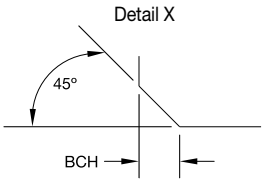
TiAlN

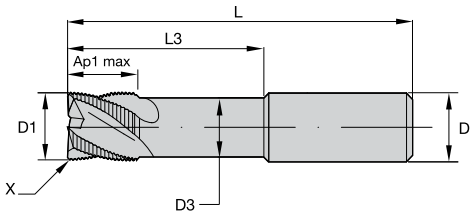
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
2836219	TF6T0R13005	1/2	1/2	1 1/4	3 1/4	.035	4
2836188	TF6T1R13005	1/2	1/2	2	4	.035	4
2836212	TF6T0R16006	5/8	5/8	1 5/8	3 3/4	.047	4
2836206	TF6T0R19007	3/4	3/4	1 5/8	3 7/8	.047	4
2836151	TF6T3R19007	3/4	3/4	2 1/4	4 1/2	.047	4
2836176	TF6T1R19007	3/4	3/4	3	5 1/4	.047	4
2836204	TF6T0R25008	1	1	2	4 1/2	.059	5
2836145	TF6T3R25008	1	1	3	5 1/2	.059	5
2836169	TF6T1R25008	1	1	4	6 1/2	.059	5
2836199	TF6T0R32009	1 1/4	1 1/4	2	4 1/2	.059	6
2836138	TF6T3R32009	1 1/4	1 1/4	3	5 1/2	.059	6
2836163	TF6T1R32009	1 1/4	1 1/4	4	6 1/2	.059	6
2836193	TF6T0R38009	1 1/2	1 1/4	2	4 1/2	.059	6
2836132	TF6T3R38009	1 1/2	1 1/4	3	5 1/2	.059	6

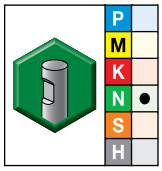
NOTE: For application data, please see page B364.

HSS Roughers • Series 6ANR • Chamfer • Neck • Weldon® • Inch









● first choice
○ alternate choice

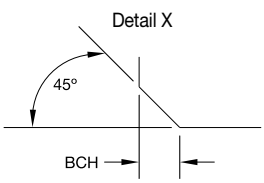
TiCN

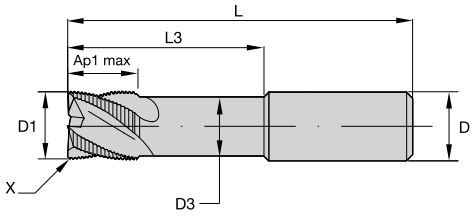
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	BCH	ZU
2840040	TC6ANR13005	1/2	1/2	.470	1 1/4	2	4	.014	3
2840034	TC6ANR13015	1/2	1/2	.470	1 1/4	3	5	.014	3
2840007	TC6ANR19007	3/4	3/4	.705	1 5/8	4	6 1/4	.014	3
2840000	TC6ANR19017	3/4	3/4	.705	1 5/8	6	8 1/4	.014	3
2839994	TC6ANR25008	1	1	.940	2	4	6 1/2	.020	3
1907409	TC6ANR25018	1	1	.940	2	6	8 1/2	.020	3

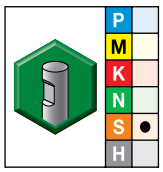
NOTE: For application data, please see page B364.

HSS Roughers • Series 6TNR • Chamfer • Neck • Weldon • Inch









● first choice
○ alternate choice

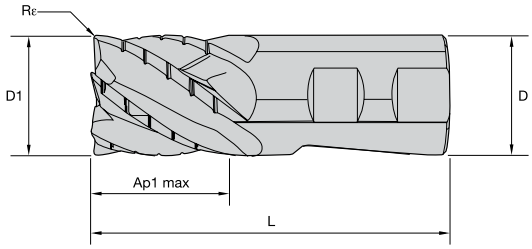
TiAlN

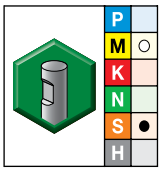
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	BCH	ZU
2836087	TF6TNR16016	5/8	5/8	.588	1 5/8	4	6 1/8	.047	4
2836081	TF6TNR19007	3/4	3/4	.705	1 5/8	4	6 1/4	.047	4
2836075	TF6TNR19017	3/4	3/4	.705	1 5/8	6	8 1/4	.047	4
2836068	TF6TNR25008	1	1	.940	2	4	6 1/2	.059	5
2836063	TF6TNR25018	1	1	.940	2	6	8 1/2	.059	5
2836059	TF6TNR32009	1 1/4	1 1/4	1.175	2	4	6 1/2	.059	6
2836054	TF6TNR32019	1 1/4	1 1/4	1.175	2	6	8 1/2	.059	6

NOTE: For application data, please see page B365.

HSS ER Roughers • Series 620E • Radius • Whistle Notch • Weldon® NAS 986 • Inch







● first choice
○ alternate choice

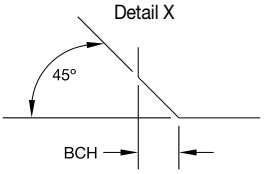
UNCOATED

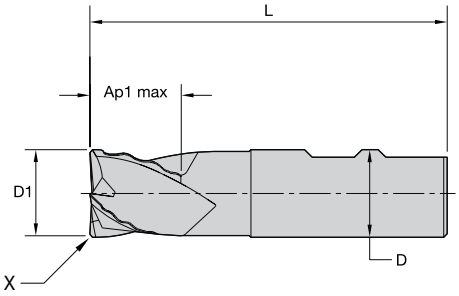
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
5329387	620E32009CW	1 1/4	1 1/4	2	4 1/2	.060	6
5599913	620E32009EW	1 1/4	1 1/4	2	4 1/2	.120	6
5329388	623E32009CW	1 1/4	1 1/4	3	5 1/2	.060	6
5599914	623E32009EW	1 1/4	1 1/4	3	5 1/2	.120	6
5599915	621E32009EW	1 1/4	1 1/4	4	6 1/2	.120	6
5329554	623E3800ACW	1 1/2	1 1/2	3	6 1/4	.060	6
5329555	621E3800ACW	1 1/2	1 1/2	4	7 1/4	.060	6
5329556	625E51022CW	2	2	2	5 3/4	.060	6
5599972	625E51022EW	2	2	2	5 3/4	.120	6
5329557	625E51032CW	2	2	3	6 3/4	.060	6
5599973	625E51032EW	2	2	3	6 3/4	.120	6
5329558	625E51042CW	2	2	4	7 3/4	.060	6
5599974	625E51042EW	2	2	4	7 3/4	.120	6
5329559	625E51062CW	2	2	6	9 3/4	.060	6
5599975	625E51062EW	2	2	6	9 3/4	.120	6

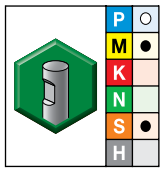
NOTE: For application data, please see page B366.

WavCut I • Series 620W • Chamfer • Weldon® • Inch









● first choice
○ alternate choice

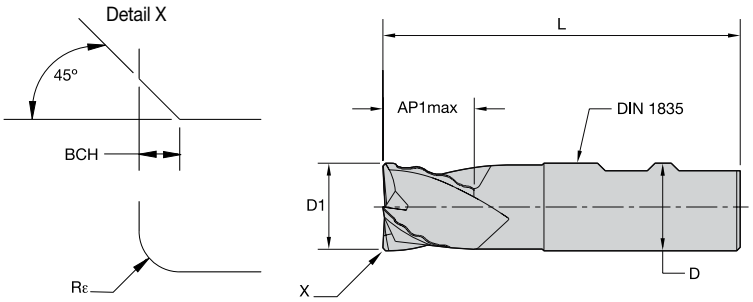
UNCOATED

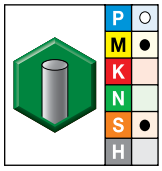
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
2709800	620W19077	3/4	3/4	1 5/8	3 7/8	.039	4
2709779	620W25078	1	1	2	4 1/2	.039	4
2709772	620W25088	1	1	2	4 1/2	.039	6
2709389	623W25078	1	1	3	5 1/2	.039	4
3032729	623W25088	1	1	3	5 1/2	.039	6
2709606	621W25088	1	1	4	6 1/2	.039	6
2709613	621W25078	1	1	4	6 1/2	.039	4
2709747	620W32089	1 1/4	1 1/4	2	4 1/2	.039	6
2709375	623W32089	1 1/4	1 1/4	3	5 1/2	.039	6
2709583	621W32089	1 1/4	1 1/4	4	6 1/2	.039	6
2709487	622W32089	1 1/4	1 1/4	6	8 1/2	.039	6
2709562	621W38089	1 1/2	1 1/4	4	6 1/2	.039	6
2709233	625W51722	2	2	2	5 3/4	.039	6
2709219	625W51732	2	2	3	6 3/4	.039	6
2709206	625W51742	2	2	4	7 3/4	.039	6
2709200	625W51762	2	2	6	9 3/4	.039	6
2709191	625W51782	2	2	8	11 3/4	.039	6

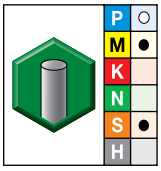
NOTE: For application data, please see page B367.

WavCut II • Series 620V • Weldon® • Inch









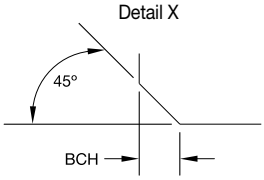
● first choice
○ alternate choice

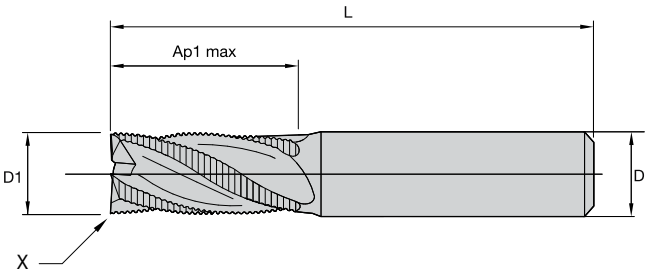
UNCOATED		TiAlN								
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH	Z U
–		2686847	TF620V19077	3/4	3/4	1 5/8	3 7/8	–	.039	4
2709865	620V25088	–		1	1	2	4 1/2	–	.039	6
3887310	620V25288	–		1	1	2	4 1/2	.060	–	6
2709872	620V25078	–		1	1	2	4 1/2	–	.039	4
3887449	621V25288	–		1	1	4	6 1/2	.060	–	6
2709837	620V32089	–		1 1/4	1 1/4	2	4 1/2	–	.039	6
2709844	620V32079	–		1 1/4	1 1/4	2	4 1/2	–	.039	4
3185195	623V32079	–		1 1/4	1 1/4	3	5 1/2	–	.039	4
2709428	623V32089	–		1 1/4	1 1/4	3	5 1/2	–	.039	6
2709662	621V32089	–		1 1/4	1 1/4	4	6 1/2	–	.039	6
2709669	621V32079	–		1 1/4	1 1/4	4	6 1/2	–	.039	4
3887452	622V32289	–		1 1/4	1 1/4	6	8 1/2	.060	–	6
3887451	621V38289	–		1 1/2	1 1/4	4	6 1/2	.060	–	6
2709641	621V38089	–		1 1/2	1 1/4	4	6 1/2	–	.039	6
3887453	622V38289	–		1 1/2	1 1/4	6	8 1/2	.060	–	6
3887457	625V51232	–		2	2	3	6 3/4	.060	–	6
3887458	625V51242	–		2	2	4	7 3/4	.060	–	6
3887460	625V51282	–		2	2	8	11 3/4	.060	–	6

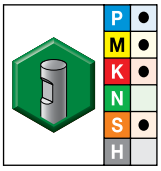
NOTE: For application data, please see page B368.

HSS Roughers • List 6N06 • Chamfer • Weldon® • Metric









● first choice
○ alternate choice

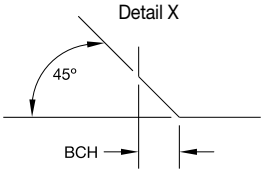
TiAlN-LW

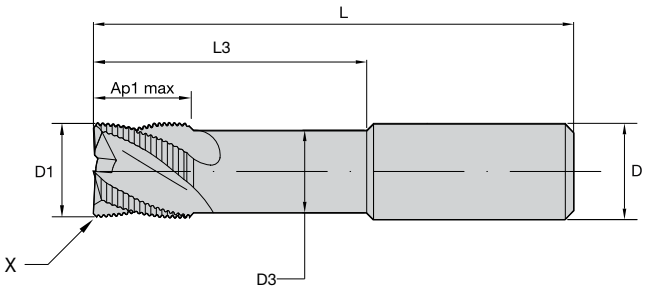
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
1660373	6N0606002LW	6,0	6	13,00	57	0,25	4
1660389	6N0608004LW	8,0	10	19,00	69	0,25	4
1660397	6N0609004LW	9,0	10	19,00	69	0,25	4
1660405	6N0610004LW	10,0	10	22,00	72	0,25	4
1660421	6N0612005LW	12,0	12	26,00	83	0,35	4
1660437	6N0614005LW	14,0	12	26,00	83	0,35	4
1660453	6N0616006LW	16,0	16	32,00	92	0,35	4
1660479	6N0620007LW	20,0	20	38,00	104	0,35	4
1660487	6N0622007LW	22,0	20	38,00	104	0,50	5
1660497	6N0625008LW	25,0	25	45,00	121	0,50	5
1660507	6N0630008LW	30,0	25	45,00	121	0,50	5

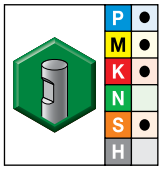
NOTE: For application data, please see page B369.

HSS Roughers • List 6NL6 • Chamfer • Neck • Weldon • Metric









● first choice
○ alternate choice

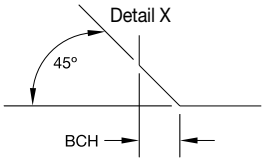
TiAlN-LW

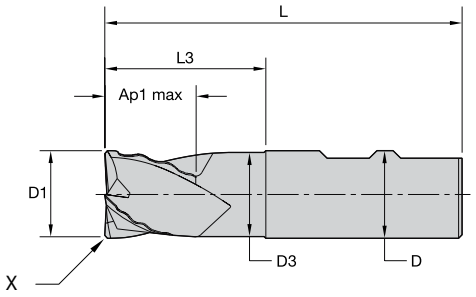
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	BCH	ZU
1660623	6NL612005LW	12,0	12	12	26,00	78,00	125	0,35	4
1660629	6NL616006LW	16,0	16	15	32,00	87,00	138	0,35	4
1660635	6NL620007LW	20,0	20	20	38,00	108,00	160	0,35	4
1660640	6NL625008LW	25,0	25	25	45,00	155,00	216	0,50	5

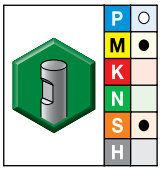
NOTE: For application data, please see page B369.

WavCut I • List 664W • Chamfer • Weldon® • Metric









● first choice
○ alternate choice

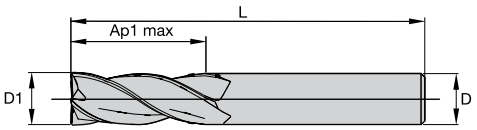
UNCOATED-WW

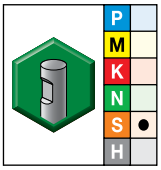
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	BCH	ZU
3871691	664W25008WW	25,0	25	23	26,00	46,00	102	1,00	5
3871692	660W25008WW	25,0	25	23	45,00	65,00	121	1,00	5
3871833	661W25008WW	25,0	25	23	90,00	110,00	166	1,00	6
3871835	660W32009WW	32,0	32	30	53,00	73,00	133	1,00	6
3871836	661W32009WW	32,0	32	30	100,00	110,00	170	1,00	6
3871837	664W40009WW	40,0	32	–	38,00	58,00	118	1,00	6
3871839	661W40009WW	40,0	32	–	100,00	110,00	170	1,00	6
3871840	664W50000WW	50,0	50	47	40,00	60,00	140	1,00	6
3871841	660W50000WW	50,0	50	47	75,00	95,00	175	1,00	6
3871842	661W50000WW	50,0	50	47	110,00	130,00	210	1,00	8

NOTE: For application data, please see page B370.

HSS Finishers • Series 3405 • Sharp Edge • Weldon® • Inch







● first choice
○ alternate choice

UNCOATED

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
2866063	341513005	1/2	1/2	2	4	4
2865982	343725008	1	1	3	5 1/2	6
2866036	341725008	1	1	4	6 1/2	6
2866051	341525008	1	1	4	6 1/2	4
2866006	342725008	1	1	6	8 1/2	6
2865978	343732009	1 1/4	1 1/4	3	5 1/2	6
2866033	341732009	1 1/4	1 1/4	4	6 1/2	6
2866003	342732009	1 1/4	1 1/4	6	8 1/2	6
2865999	342738009	1 1/2	1 1/4	6	8 1/2	6
2865960	345751020	2	2	2	5 3/4	6
2865955	345751040	2	2	4	7 3/4	6
2865951	345751060	2	2	6	9 3/4	6

NOTE: For application data, please see page B370.

HSS Roughers • Series 6A0R • Application Data • TiCN • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc SFM min		Uncoated max	TiCN Cutting Speed — vc SFM min		TiCN max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/2	3/4	1	1 1/4
											dec.	.5000	.7500	1.0000	1.2500
N	1	1.25 x D	0.5 x D	1 x D	1050	–	1750	1500	–	2500	IPT	.0055	.0075	.0085	.0100
	2	1.25 x D	0.5 x D	1 x D	840	–	1400	1200	–	2000	IPT	.0050	.0068	.0077	.0090

NOTE: Side milling applications — For longest length tools, reduce ae by 30%.
Slot milling applications — For longest length tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

HSS Roughers • Series 6T0R • Application Data • TiAlN • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiAlN Cutting Speed — vc SFM min		TiAlN max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/2	5/8	3/4	1	1 1/4	1 1/2
								dec.	.5000	.6250	.7500	1.0000	1.2500	1.5000
S	3	1.25 x D	0.5 x D	1 x D	50	–	90	IPT	.0028	.0033	.0036	.0040	.0050	.0060
	4	1.25 x D	0.3 x D	0.5 x D	50	–	90	IPT	.0026	.0030	.0033	.0036	.0045	.0055

NOTE: Side milling applications — For longest length tools, reduce ae by 30%.
Slot milling applications — For longest length tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

HSS Roughers • Series 6ANR • Application Data • TiCN • Inch







Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TiCN Cutting Speed — vc SFM min		TiCN max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/2	3/4	1	1 1/4
								dec.	.5000	.7500	1.0000	1.2500
N	1	1 x D	0.3 x D	0.75 x D	1500	–	2500	IPT	.0055	.0075	.0085	.0100
	2	1 x D	0.3 x D	0.5 x D	1200	–	2000	IPT	.0050	.0068	.0077	.0090

NOTE: Side milling applications — For longest length tools, reduce ae by 30%.
Slot milling applications — For longest length tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

HSS Roughers • Series 6TNR • Application Data • TiAlN • Inch

Material Group												
		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.				
		A		B	Cutting Speed — vc SFM				D1 — Diameter			
								frac.	5/8	3/4	1	1 1/4
		ap	ae	ap	min		max	dec.	.6250	.7500	1.0000	1.2500
S	3	0.75 x D	0.4 x D	0.5 x D	50	–	90	IPT	.0033	.0036	.0040	.0050
	4	0.75 x D	0.3 x D	0.3 x D	50	–	90	IPT	.0030	.0033	.0036	.0045

NOTE: Side milling applications — For longest length tools, reduce ae by 30%.
Slot milling applications — For longest length tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

HSS ER Roughers • Series 620E • Application Data • Uncoated • Inch







Material Group		Side Milling (A) and Slotting (B)			Uncoated			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.			
		A		B	Cutting Speed — vc SFM				D1 — Diameter		
		ap	ae	ap	min		max	frac. dec.	1 1/4 1.2500	1 1/2 1.5000	2 2.0000
M	1	1.5 x D	0.5 x D	1 x D	40	–	60	IPT	.0052	.0053	.0053
	2	1.5 x D	0.5 x D	1 x D	40	–	60	IPT	.0042	.0042	.0043
S	4	1.5 x D	0.5 x D	1 x D	16	–	50	IPT	.0038	.0039	.0039

NOTE: Side milling applications — for longest length tools, reduce ae by 30%.
Slot milling applications — for longest length tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

WavCut™ I • Series 620W • Application Data • Uncoated • Inch

Material Group		Side Milling (A) and Slotting (B)			Uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.					
		A		B	Cutting Speed — vc SFM				D1 — Diameter				
		ap	ae	ap	min		max	frac. dec.	3/4 .7500	1 1.0000	1 1/4 1.2500	1 1/2 1.5000	2 2.0000
P	5	1.5 x D	0.4 x D	1 x D	30	–	50	IPT	.0030	.0040	.0045	.0050	.0055
M	1	1.5 x D	0.4 x D	1 x D	30	–	50	IPT	.0040	.0045	.0050	.0055	.0060
	2	1.5 x D	0.4 x D	1 x D	30	–	40	IPT	.0035	.0040	.0045	.0050	.0055
S	4	1.5 x D	0.4 x D	0.75 x D	50	–	70	IPT	.0033	.0040	.0050	.0055	.0060

NOTE: Side milling applications — For longest length tools, reduce ae by 30%.
Slot milling applications — For longest length tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

WavCut II • Series 620V • Application Data • Uncoated - TiAlN • Inch







Material Group		A		B	Uncoated Cutting Speed — vc SFM			TiAlN Cutting Speed — vc SFM			Recommended feed per tooth (Fz=inch/th) for side milling (A). For slotting (B), reduce Fz by 20%.					
											–	D1 - Diameter				
		ap	ae	ap	Min		Max	Min		Max	frac.	3/4	1	1 1/4	1 1/2	2
											dec.	.7500	1.0000	1.2500	1.5000	2.0000
P	5	1.5 x D	0.4 x D	1 x D	30	–	50	80	–	110	Fz	.0030	.0040	.0045	.0050	.0055
M	1	1.5 x D	0.4 x D	1 x D	30	–	50	80	–	110	Fz	.0040	.0045	.0050	.0055	.0060
	2	1.5 x D	0.4 x D	1 x D	30	–	40	80	–	100	Fz	.0035	.0040	.0045	.0050	.0055
S	4	1.5 x D	0.4 x D	0.75 x D	50	–	70	50	–	90	90	.0033	.0040	.0050	.0055	.0060

NOTE: Side milling applications - For longest length tools, reduce ae by 30%.
Slot milling applications - For longest length tools, reduce ap by 30%.
Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".

HSS Roughers • Series 6N06 • Application Data • TiAlN-LW • Metric





Material Group		Side Milling (A) and Slotting (B)			TiCN			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.									
		A		B	Cutting Speed – vc m/min			Cutting Speed – vc m/min				D1 – Diameter								
		ap	ae	ap	min		max	min		max	mm	6,0	8,0	10,0	12,0	16,0	18,0	20,0	25,0	30,0
P	1	1,5 x D	0,5 x D	1 x D	56	–	64	70	–	80	fz	0,046	0,062	0,072	0,079	0,097	0,104	0,109	0,119	0,143
	2	1,5 x D	0,5 x D	1 x D	48	–	64	60	–	80	fz	0,046	0,062	0,072	0,079	0,097	0,104	0,109	0,119	0,143
	3	1,5 x D	0,5 x D	1 x D	40	–	56	50	–	70	fz	0,038	0,052	0,061	0,067	0,084	0,091	0,097	0,109	0,131
	5	1,5 x D	0,5 x D	1 x D	20	–	28	25	–	35	fz	0,031	0,042	0,048	0,054	0,067	0,073	0,078	0,087	0,105
M	1	1,5 x D	0,5 x D	1 x D	20	–	28	25	–	35	fz	0,038	0,052	0,061	0,067	0,084	0,091	0,097	0,109	0,131
	2	1,5 x D	0,5 x D	1 x D	20	–	24	25	–	30	fz	0,031	0,042	0,048	0,054	0,067	0,073	0,078	0,087	0,105
	3	1,5 x D	0,5 x D	1 x D	12	–	16	15	–	20	fz	0,026	0,035	0,040	0,045	0,055	0,059	0,062	0,068	0,082
K	1	1,5 x D	0,5 x D	1 x D	56	–	64	70	–	80	fz	0,046	0,062	0,072	0,079	0,097	0,104	0,109	0,119	0,143
	2	1,5 x D	0,5 x D	1 x D	40	–	56	50	–	70	fz	0,038	0,052	0,061	0,067	0,084	0,091	0,097	0,109	0,131
S	1	1,5 x D	0,5 x D	1 x D	12	–	24	15	–	30	fz	0,038	0,052	0,061	0,067	0,084	0,091	0,097	0,109	0,131
	2	1,5 x D	0,5 x D	1 x D	4	–	12	5	–	15	fz	0,021	0,027	0,032	0,036	0,045	0,048	0,052	0,059	0,071
	3	1,5 x D	0,5 x D	1 x D	12	–	22	15	–	28	fz	0,031	0,042	0,048	0,054	0,067	0,073	0,078	0,087	0,105
	4	1,5 x D	0,5 x D	1 x D	12	–	22	15	–	28	fz	0,027	0,038	0,045	0,050	0,062	0,067	0,071	0,080	0,096

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

HSS Roughers • Series 6NL6 • Application Data • TiAlN-LW • Metric





Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.					
		A		B	Cutting Speed – vc m/min				D1 – Diameter				
		ap	ae	ap	min		max	mm	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	70	–	80	fz	0,063	0,070	0,085	0,096	0,104
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,063	0,070	0,085	0,096	0,104
	3	1,5 x D	0,5 x D	1 x D	50	–	70	fz	0,053	0,059	0,073	0,085	0,096
	5	1,5 x D	0,5 x D	1 x D	25	–	35	fz	0,042	0,047	0,059	0,068	0,076
M	1	1,5 x D	0,5 x D	1 x D	25	–	35	fz	0,053	0,059	0,073	0,085	0,096
	2	1,5 x D	0,5 x D	1 x D	25	–	30	fz	0,042	0,047	0,059	0,068	0,076
	3	1,5 x D	0,5 x D	1 x D	15	–	20	fz	0,035	0,039	0,048	0,054	0,060
K	1	1,5 x D	0,5 x D	1 x D	70	–	80	fz	0,063	0,070	0,085	0,096	0,104
	2	1,5 x D	0,5 x D	1 x D	50	–	70	fz	0,053	0,059	0,073	0,085	0,096
S	1	1,5 x D	0,5 x D	1 x D	15	–	30	fz	0,053	0,059	0,073	0,085	0,096
	2	1,5 x D	0,5 x D	1 x D	5	–	15	fz	0,028	0,031	0,039	0,045	0,051
	3	1,5 x D	0,5 x D	1 x D	15	–	30	fz	0,042	0,047	0,059	0,068	0,076
	4	1,5 x D	0,5 x D	1 x D	10	–	20	fz	0,039	0,043	0,054	0,062	0,070

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

WavCut I • Series 664W 660W 661W • Application Data • Uncoated-WW • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.	D1 — Diameter 25,0	32,0	40,0	50,0
P	5	1,5 x D	0,4 x D	1 x D	10	–	14	fz	0,091	0,105	0,124	0,146
M	1	1,5 x D	0,4 x D	1 x D	10	–	14	fz	0,114	0,131	0,155	0,182
	2	1,5 x D	0,4 x D	1 x D	10	–	12	fz	0,091	0,105	0,124	0,146
S	3	1,5 x D	0,4 x D	0,75 x D	6	–	11	fz	0,091	0,105	0,124	0,146
	4	1,5 x D	0,4 x D	0,75 x D	6	–	11	fz	0,084	0,096	0,114	0,134

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >12mm.

WavCut I • Series 3405 • Application Data • Uncoated-WW • Metric





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc SFM min		max	TiAlN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
											dec.	.3750	.5000	.6250	.7500	1.0000	1.2500	1.5000	2.0000
S	3	1.5 x D	0.1 x D	0.5 x D	50	–	80	50	–	90	IPT	.0020	.0025	.0029	.0032	.0038	.0042	.0045	.0048
	4	1.5 x D	0.1 x D	0.4 x D	40	–	60	50	–	90	IPT	.0018	.0023	.0026	.0029	.0035	.0038	.0041	.0044

NOTE: Side milling applications — For longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — For longest reach (L3) tools, reduce ap by 30%.
For cutting aluminum with high silicon, coating is recommended.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".



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Holemaking

Selection Guide and Grade Descriptions C4–C6

Solid Carbide Drills C8–C46

VariDrill C8–C29

TOP DRILL S+ C30–C35

TOP DRILL Deep Hole Drills C36–C46

Modular Drills C48–87

TOP DRILL Modular X C48–C67

TOP DRILL M1 ..... C68–C87

Indexable Drills C88–C117

Top Cut 4 ..... C88–C117

Added Value for Your Performance

Optimized Purchase

- Broad selection of holemaking tools.
- Integrated into a full range of cutting tools and service offers.
- On-site service for an efficient development and implementation of machining solutions.

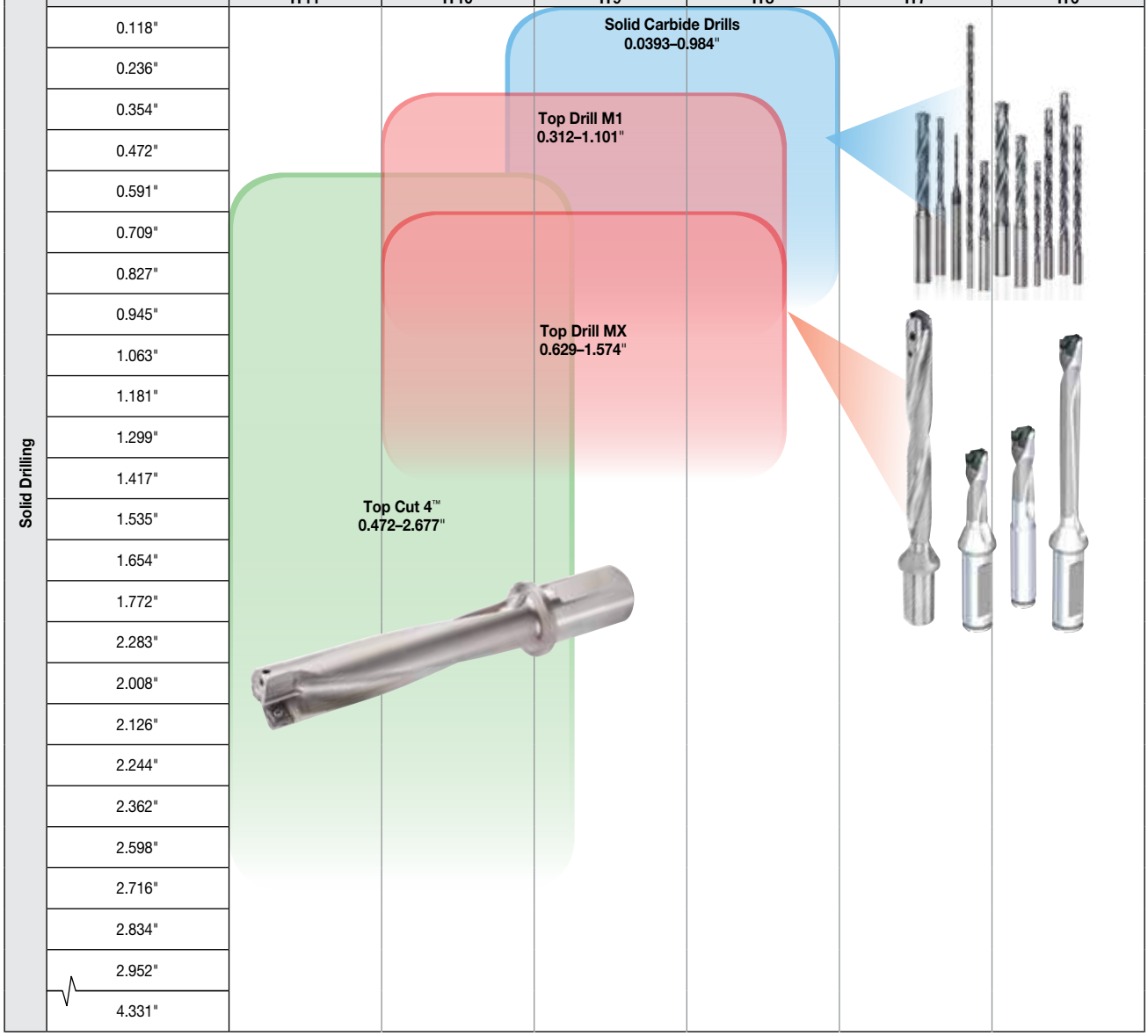
Control of Total Tooling Costs

- Process-safe regrinding service.
- Reduction of stocks through efficient modular concepts.
- Multiple platforms per application to achieve the most cost-efficient solution.

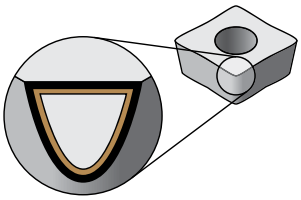
- Solid Carbide Drills
- Modular Drills
- Indexable Drills

Select the Correct Holemaking Product Platform for Your Application

	diameter	hourly rate					
		low (rough)		normal (M/C)		high (fine)	
	inch	hole quality					
		IT11	IT10	IT9	IT8	IT7	IT6
Solid Drilling	0.118"						
	0.236"						
	0.354"						
	0.472"						
	0.591"						
	0.709"						
	0.827"						
	0.945"						
	1.063"						
	1.181"						
	1.299"						
	1.417"						
	1.535"						
	1.654"						
	1.772"						
	2.283"						
	2.008"						
	2.126"						
	2.244"						
	2.362"						
	2.598"						
	2.716"						
	2.834"						
	2.952"						
	4.331"						



Grades and Grade Descriptions



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

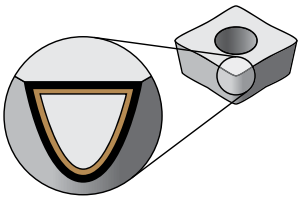
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Grade

wear resistance ← → toughness

Coating	Grade Description		05	10	15	20	25	30	35	40	45
WK15PD	**Composition:** With a newly developed unique multilayered PVD AlCrN coating and a high-quality submicron carbide substrate, this grade gives the highest level of wear resistance at high cutting speeds. **Application:** This grade offers extraordinary wear resistance in drilling of cast iron materials. With its high hot hardness, it allows for high-speed machining.	K									
WM15PD	**Composition:** With PVD AlTiN coating for wear resistance along with unalloyed, sub-micron tungsten carbide containing 10% cobalt. **Application:** For use in cast iron, stainless steel, non-ferrous, and super alloys. Grade capable to operate at higher temperatures to guarantee high performance at faster cutting speeds.	P M K N S									
WU20PD	**Composition:** With a multilayered PVD TiN-TiAlN coating, a high-quality, sub-micron, carbide substrate and a state-of-the-art surface condition, this grade gives the highest level of wear resistance at high cutting speeds. **Application:** First choice for alloyed and high-alloyed steels and cast irons. A state-of-the-art surface condition enables superior chip evacuation even when MQL is applied.	P K									
WU25PD	**Composition:** With a multilayered PVD TiN-TiAlN coating and a high-quality, sub-micron, carbide substrate, this grade gives a high level of wear resistance at medium to high cutting speeds. **Application:** First choice for high reliability in all materials. This grade should be used at medium to high speeds and feeds. It is a general-purpose grade that performs very well for alloyed and high-alloy steel and cast iron, but can also be used with excellent performance in all other material groups.	P M K N S H									
WP40PD	**Composition:** With a multilayered TiN-TiAlN coating and a high-quality, tough substrate containing 11% cobalt. **Application:** For use in steel, cast iron, stainless steel, and super alloys. This grade is suitable for critical operations and unstable conditions.	P M K N S H									
WN10HD	**Composition:** This uncoated fine-grain carbide with high hardness offers excellent abrasive wear resistance. **Application:** First choice for precision drilling of non-ferrous materials.	K N									

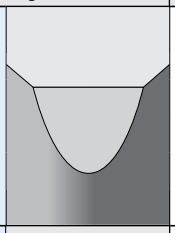
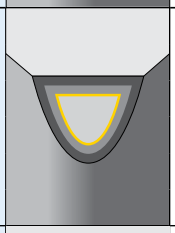
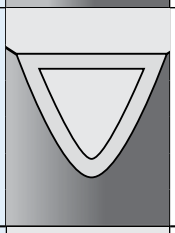
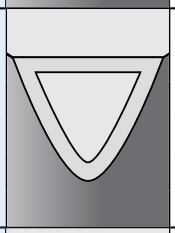
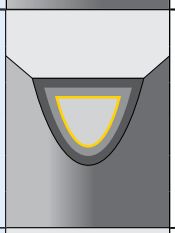
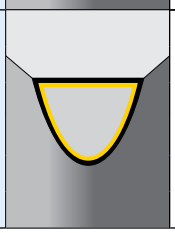
Grades and Grade Descriptions



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Grade

Coating	Grade Description	wear resistance ← → toughness: 05	10	15	20	25	30	35	40	45
WN15HD 	**Composition**: Submicron grain size tungsten carbide for excellent wear resistance and edge retention. **Application**: For use in aluminum and non-ferrous materials	K, N	K, N	K, N	N					
WPK10CH 	**Composition:** With an advanced CVD TiCN-Al_2O_3 coating combined with a cobalt-enriched carbide substrate, this grade offers a balanced combination of deformation resistance and edge toughness. **Application:** Offers outstanding abrasion and crater wear resistance for high-speed machining of steels and cast irons. Use for very high cutting speeds with low to medium feed rates.	P, K	P, K	P, K	P, K					
WN10PH 	**Composition**: Submicron grain size tungsten carbide with PVD TiB_2 coating for excellent wear resistance. **Application**: For use in aluminum and non-ferrous applications.	N	N	N	N					
WU20PH 	**Composition:** With a wear-resistant TiAlN coating and unalloyed, submicron tungsten carbide containing 10% cobalt. **Application:** This is a universal grade for use in steel, cast iron, stainless steel, and super alloys at medium machining speeds.	P, M, K, N, S, H	P, M, K, N, S, H	P, M, K, N, S	P, M, K, N, S	P, M, K, S	P			
WU25CH 	**Composition:** Advanced CVD TiCN-Al_2O_3 coating together with a newly engineered, tough carbide substrate. Ensures adequate deformation resistance and excellent edge strength and offers very good wear resistance over a wide range of machining conditions. **Application:** high-productivity grade with high speeds and feeds. First choice for high productivity with excellent reliability in steels, stainless steels, and cast irons.	P, M, K	P, M, K	P, M, K	P, M, K	P, M, K	P, K	P, K		
WU40PH 	**Composition:** With a multilayered PVD TiN-TiAlN coating and a tough substrate, this grade withstands interruptions and provides high wear resistance for long tool life. **Application:** First choice for high reliability in most materials. This grade should be used at medium speeds and high feeds due to sharper edges and as a grade for high-toughness applications. It covers steel, stainless steel, cast iron, and high-temp alloys under certain conditions.	P, M, K	P, M, K	P, M, K	P, K	P, M, K	P, M, K	P, M, K	P, M	P



widia.com

WIDIA™

VariDrill™

Solid Carbide Drills

The VariDrill solid carbide drill is a versatile drill designed for use in multi-material drilling operations.



The VariDrill solid carbide drill series is a multi-material drill offered in a wide range of sizes from .39–.787" (1–20mm) in 0.1mm steps in 3 x D, 5 x D, and 8 x D, with and without coolant channels.

WU25PD



P M K N S

Delivers a smooth surface finish across multiple materials:

Steel, stainless steel, aluminum, cast iron, and high-temp alloys.

MULTI-MATERIAL DRILLING

PRODUCT

GRADE

WU25PD

DIAMETER RANGE

.0394–.7874" (1–20mm)
.0591–.7874" (1.5–20mm)

INDUSTRY

ENERGY

GENERAL ENGINEERING

TRANSPORTATION

MATERIALS

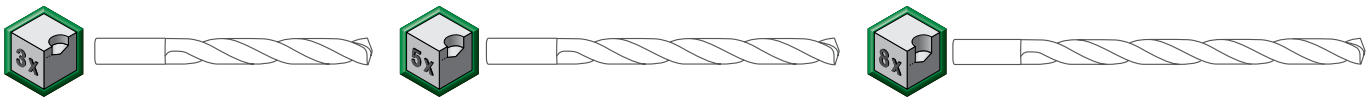
FIRST CHOICE

P M K N S

Applications



DRILLING | STACKED PLATES | PLAIN SHANK: ≤H6 | HELIX ANGLE: 30° | DIN 6537 | DIN 6535 | THROUGH COOLANT | FLOOD COOLANT | THROUGH COOLANT: MQL



SERIES	COOLANT	LENGTH RATIO	DIAMETER RANGE
VDS201	Non-Coolant	3 x D	.0394–.7874" (1–20mm)
VDS202	Non-Coolant	5 x D	.0394–.7874" (1–20mm)
VDS401	Through Coolant	3 x D	.0591–.7874" (1.5–20mm)
VDS402	Through Coolant	5 x D	.0591–.7874" (1.5–20mm)
VDS403	Through Coolant	8 x D	.0591–.7874" (1.5–20mm)

PRECISION SHANK

Low Runout
Increase the overall drill stability

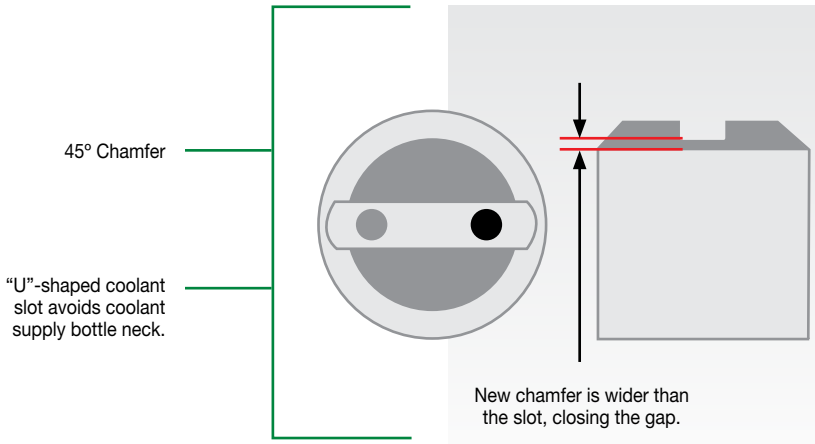


VariDrill™ • Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

VDS	4	0	1	A	06350	WU25PD
VariDrill Spiral	Flute Style - Coolant	Point	Length	Shank	Diameter in Inch	
	2 = 2 Flute Spiral Non-Coolant **4** = 2 Flute Spiral Coolant	**0** = Conventional Cone Point	**1** = ~ 3 x D **2** = ~ 5 x D **3** = ~ 8 x D	**A** = Cylindrical Shank, DIN 6535 - 2mm steps **F** = Whistle Notch 2, DIN 6535 - 2mm steps	**03000** = 3,000mm **06350** = 1/4"	**W**IDIA™; **U**niversal, Application **25** = roughing carbide, **P**VD coated, **D**rill

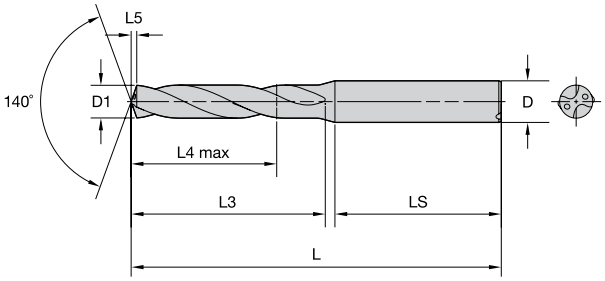
New type “A”



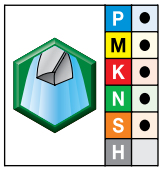
New standard back end fufills the requirements of DIN 6535 and 69090-03 for variable use of internal coolant or MQL.

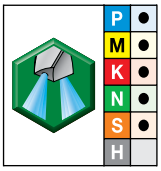
VariDrill™ • 3 x D • VDS201A / VDS401A • A-Shank





For information on L, L3, and L4 max, see page C46.





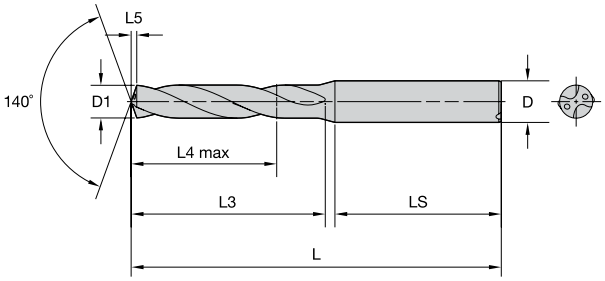
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4144195	VDS201A01000		–	1,000	.0394	–	–	5	7	0,2	58	28	4
4144196	VDS201A01016		–	1,016	.0400	–	–	5	7	0,1	58	28	4
4144197	VDS201A01041		–	1,041	.0410	–	–	5	7	0,2	58	28	4
4144198	VDS201A01067		–	1,067	.0420	–	–	5	7	0,2	58	28	4
4144199	VDS201A01092		–	1,092	.0430	–	–	5	7	0,2	58	28	4
4144200	VDS201A01100		–	1,100	.0433	–	–	5	7	0,2	58	28	4
4144201	VDS201A01181		–	1,181	.0465	–	–	5	7	0,2	58	28	4
4144202	VDS201A01191		–	1,191	.0469	3/64	–	5	7	0,2	58	28	4
4144523	VDS201A01200		–	1,200	.0472	–	–	5	7	0,2	58	28	4
4144524	VDS201A01300		–	1,300	.0512	–	–	5	7	0,2	58	28	4
4144526	VDS201A01397		–	1,397	.0550	–	–	5	7	0,2	58	28	4
4144527	VDS201A01400		–	1,400	.0551	–	–	5	7	0,2	58	28	4
4144528	VDS201A01500	4140270	VDS401A01500	1,500	.0591	–	–	6	9	0,2	58	28	4
4144529	VDS201A01600		–	1,600	.0630	–	–	6	9	0,3	58	28	4
–		4140271	VDS401A01600	1,600	.0630	–	–	6	9	0,2	58	28	4
4144530	VDS201A01700	4140272	VDS401A01700	1,700	.0669	–	–	6	9	0,3	58	28	4
4144531	VDS201A01800	4140423	VDS401A01800	1,800	.0709	–	–	6	9	0,3	58	28	4
4144532	VDS201A01900	4140424	VDS401A01900	1,900	.0748	–	–	6	9	0,3	58	28	4
4144533	VDS201A01984	4140425	VDS401A01984	1,984	.0781	5/64	–	10	13	0,3	58	28	4
4144534	VDS201A02000	4140426	VDS401A02000	2,000	.0787	–	–	10	13	0,3	58	28	4
4144535	VDS201A02100	4140427	VDS401A02100	2,100	.0827	–	–	10	13	0,3	58	28	4
4144536	VDS201A02200	4140428	VDS401A02200	2,200	.0866	–	–	10	13	0,3	58	28	4
4144537	VDS201A02300	4140429	VDS401A02300	2,300	.0906	–	–	10	13	0,4	58	28	4
4144538	VDS201A02383	4140430	VDS401A02383	2,383	.0938	3/32	–	12	17	0,4	58	28	4
4144539	VDS201A02400	4140431	VDS401A02400	2,400	.0945	–	–	12	17	0,4	58	28	4
4144540	VDS201A02439	4140432	VDS401A02439	2,439	.0960	–	41	12	17	0,4	58	28	4
4144541	VDS201A02489	4140433	VDS401A02489	2,489	.0980	–	40	12	17	0,4	58	28	4
4144542	VDS201A02500	4140434	VDS401A02500	2,500	.0984	–	–	12	17	0,4	58	28	4
4144543	VDS201A02578	4140435	VDS401A02578	2,578	.1015	–	38	12	17	0,4	58	28	4
4144544	VDS201A02600	4140436	VDS401A02600	2,600	.1024	–	–	12	17	0,4	58	28	4
4144545	VDS201A02642	4140437	VDS401A02642	2,642	.1040	–	37	12	17	0,4	58	28	4
4144546	VDS201A02700	4140438	VDS401A02700	2,700	.1063	–	–	12	17	0,4	58	28	4
4144547	VDS201A02705	4140439	VDS401A02705	2,705	.1065	–	36	12	17	0,4	58	28	4
4144548	VDS201A02779	4140440	VDS401A02779	2,779	.1094	7/64	–	12	17	0,4	58	28	4
4144549	VDS201A02800	4140441	VDS401A02800	2,800	.1102	–	–	12	17	0,5	58	28	4
4144550	VDS201A02820	4140442	VDS401A02820	2,820	.1110	–	34	12	17	0,5	58	28	4
4144551	VDS201A02870	4140443	VDS401A02870	2,870	.1130	–	33	12	17	0,5	58	28	4
4144552	VDS201A02900	4140444	VDS401A02900	2,900	.1142	–	–	12	17	0,5	58	28	4
4144553	VDS201A02947	4140445	VDS401A02947	2,947	.1160	–	32	12	17	0,5	58	28	4
4143907	VDS201A03000	4140299	VDS401A03000	3,000	.1181	–	–	14	20	0,5	62	36	6
4143908	VDS201A03048	4140300	VDS401A03048	3,048	.1200	–	31	14	20	0,5	62	36	6
4143909	VDS201A03100	4140301	VDS401A03100	3,100	.1220	–	–	14	20	0,5	62	36	6
4143910	VDS201A03175	4140302	VDS401A03175	3,175	.1250	1/8	–	14	20	0,5	62	36	6
4143911	VDS201A03200	4140303	VDS401A03200	3,200	.1260	–	–	14	20	0,5	62	36	6
4143912	VDS201A03264	4140304	VDS401A03264	3,264	.1285	–	30	14	20	0,5	62	36	6
4143913	VDS201A03300	4140305	VDS401A03300	3,300	.1299	–	–	14	20	0,5	62	36	6
4143914	VDS201A03400	4140306	VDS401A03400	3,400	.1339	–	–	14	20	0,6	62	36	6
4143915	VDS201A03455	4140307	VDS401A03455	3,455	.1360	–	29	14	20	0,6	62	36	6

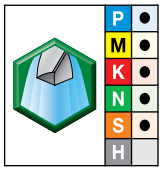
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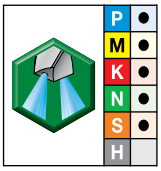
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For information on L, L3, and L4 max, see page C46.





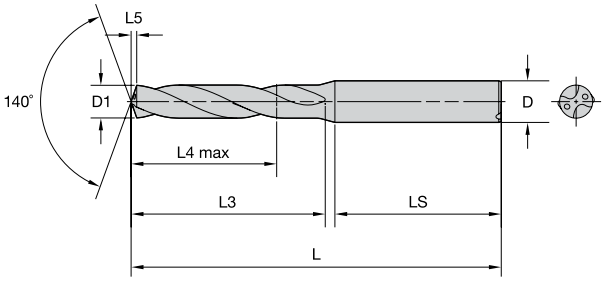
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4143916	VDS201A03500	4140308	VDS401A03500	3,500	.1378	–	–	14	20	0,6	62	36	6
4143917	VDS201A03571	4140309	VDS401A03571	3,571	.1406	9/64	–	14	20	0,6	62	36	6
4143918	VDS201A03600	4140310	VDS401A03600	3,600	.1417	–	–	14	20	0,6	62	36	6
4143919	VDS201A03658	4140311	VDS401A03658	3,658	.1440	–	27	14	20	0,6	62	36	6
4143920	VDS201A03700	4140312	VDS401A03700	3,700	.1457	–	–	14	20	0,6	62	36	6
4143921	VDS201A03734	4140313	VDS401A03734	3,734	.1470	–	26	14	20	0,6	62	36	6
4143922	VDS201A03800	4140314	VDS401A03800	3,800	.1496	–	–	17	24	0,6	66	36	6
4143923	VDS201A03900	4140315	VDS401A03900	3,900	.1535	–	–	17	24	0,6	66	36	6
4143924	VDS201A03970	4140316	VDS401A03970	3,970	.1563	5/32	–	17	24	0,7	66	36	6
4143925	VDS201A04000	4140317	VDS401A04000	4,000	.1575	–	–	17	24	0,7	66	36	6
4143926	VDS201A04039	4140318	VDS401A04039	4,039	.1590	–	21	17	24	0,7	66	36	6
4143927	VDS201A04090	4140319	VDS401A04090	4,090	.1610	–	20	17	24	0,7	66	36	6
4143928	VDS201A04100	4140320	VDS401A04100	4,100	.1614	–	–	17	24	0,7	66	36	6
4143929	VDS201A04200	4140321	VDS401A04200	4,200	.1654	–	–	17	24	0,7	66	36	6
4143930	VDS201A04217		–	4,217	.1660	–	19	17	24	0,7	66	36	6
4143931	VDS201A04300	4140323	VDS401A04300	4,300	.1693	–	–	17	24	0,7	66	36	6
4143932	VDS201A04366	4140324	VDS401A04366	4,366	.1719	11/64	–	17	24	0,7	66	36	6
4143933	VDS201A04400	4140325	VDS401A04400	4,400	.1732	–	–	17	24	0,7	66	36	6
4143934	VDS201A04500	4140326	VDS401A04500	4,500	.1772	–	–	17	24	0,7	66	36	6
4143935	VDS201A04600	4140328	VDS401A04600	4,600	.1811	–	–	17	24	0,8	66	36	6
4143936	VDS201A04623	4140329	VDS401A04623	4,623	.1820	–	14	17	24	0,8	66	36	6
4143937	VDS201A04700	4140330	VDS401A04700	4,700	.1850	–	13	17	24	0,8	66	36	6
4143938	VDS201A04763	4140331	VDS401A04763	4,763	.1875	3/16	–	20	28	0,8	66	36	6
4143939	VDS201A04800	4140332	VDS401A04800	4,800	.1890	–	12	20	28	0,8	66	36	6
4143940	VDS201A04852	4140333	VDS401A04852	4,852	.1910	–	11	20	28	0,8	66	36	6
4143941	VDS201A04900	4140334	VDS401A04900	4,900	.1929	–	–	20	28	0,8	66	36	6
4143942	VDS201A05000	4140335	VDS401A05000	5,000	.1969	–	–	20	28	0,8	66	36	6
4143943	VDS201A05100	4140336	VDS401A05100	5,100	.2008	–	–	20	28	0,9	66	36	6
4143944	VDS201A05106	4140337	VDS401A05106	5,106	.2010	–	7	20	28	0,9	66	36	6
4143945	VDS201A05159	4140338	VDS401A05159	5,159	.2031	13/64	–	20	28	0,9	66	36	6
4143946	VDS201A05200	4140339	VDS401A05200	5,200	.2047	–	–	20	28	0,9	66	36	6
4143947	VDS201A05300	4140340	VDS401A05300	5,300	.2087	–	–	20	28	0,9	66	36	6
4143948	VDS201A05400	4140341	VDS401A05400	5,400	.2126	–	–	20	28	0,9	66	36	6
4143949	VDS201A05410	4140342	VDS401A05410	5,410	.2130	–	3	20	28	0,9	66	36	6
4143950	VDS201A05500	4140343	VDS401A05500	5,500	.2165	–	–	20	28	0,9	66	36	6
4143951	VDS201A05558	4140344	VDS401A05558	5,558	.2188	7/32	–	20	28	0,9	66	36	6
4143952	VDS201A05600	4140345	VDS401A05600	5,600	.2205	–	–	20	28	0,9	66	36	6
4143953	VDS201A05616	4140346	VDS401A05616	5,616	.2211	–	2	20	28	0,9	66	36	6
4143954	VDS201A05700	4140347	VDS401A05700	5,700	.2244	–	–	20	28	1,0	66	36	6
4143955	VDS201A05800	4140348	VDS401A05800	5,800	.2283	–	–	20	28	1,0	66	36	6
4143956	VDS201A05900	4140349	VDS401A05900	5,900	.2323	–	–	20	28	1,0	66	36	6
4143957	VDS201A05954	4140350	VDS401A05954	5,954	.2344	15/64	–	20	28	1,0	66	36	6
4143958	VDS201A06000	4140351	VDS401A06000	6,000	.2362	–	–	20	28	1,0	66	36	6
4143959	VDS201A06100	4140352	VDS401A06100	6,100	.2402	–	–	24	34	1,0	79	36	8
4143960	VDS201A06200	4140353	VDS401A06200	6,200	.2441	–	–	24	34	1,0	79	36	8
4143961	VDS201A06300	4140354	VDS401A06300	6,300	.2480	–	–	24	34	1,1	79	36	8
4143962	VDS201A06350	4140355	VDS401A06350	6,350	.2500	1/4	E	24	34	1,1	79	36	8
4143963	VDS201A06400	4140356	VDS401A06400	6,400	.2520	–	–	24	34	1,1	79	36	8

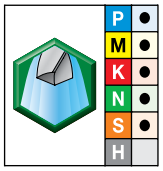
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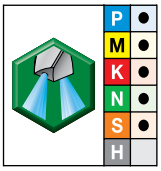
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For information on L, L3, and L4 max, see page C46.





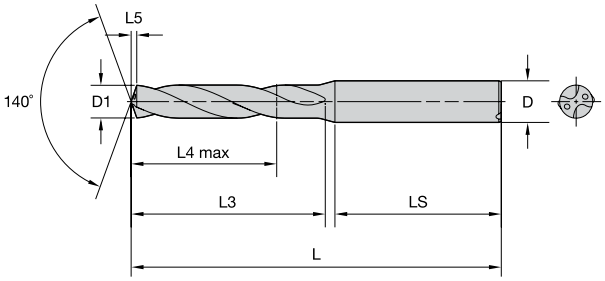
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4143964	VDS201A06500	4140357	VDS401A06500	6,500	.2559	–	–	24	34	1,1	79	36	8
4143965	VDS201A06528	4140358	VDS401A06528	6,528	.2570	–	F	24	34	1,1	79	36	8
4143966	VDS201A06600	4140359	VDS401A06600	6,600	.2598	–	–	24	34	1,1	79	36	8
4143967	VDS201A06630	4140360	VDS401A06630	6,630	.2610	–	G	24	34	1,1	79	36	8
4143968	VDS201A06700	4140361	VDS401A06700	6,700	.2638	–	–	24	34	1,1	79	36	8
4143969	VDS201A06746	4140362	VDS401A06746	6,746	.2656	17/64	–	24	34	1,1	79	36	8
4143970	VDS201A06800	4140363	VDS401A06800	6,800	.2677	–	–	24	34	1,1	79	36	8
4143971	VDS201A06900	4140364	VDS401A06900	6,900	.2717	–	–	24	34	1,2	79	36	8
4143972	VDS201A07000	4140365	VDS401A07000	7,000	.2756	–	–	24	34	1,2	79	36	8
4143973	VDS201A07100	4140366	VDS401A07100	7,100	.2795	–	–	29	41	1,2	79	36	8
4143974	VDS201A07145	4140367	VDS401A07145	7,145	.2813	9/32	–	29	41	1,2	79	36	8
4143975	VDS201A07200	4140368	VDS401A07200	7,200	.2835	–	–	29	41	1,2	79	36	8
4143976	VDS201A07300	4140369	VDS401A07300	7,300	.2874	–	–	29	41	1,2	79	36	8
4143977	VDS201A07400	4140370	VDS401A07400	7,400	.2913	–	–	29	41	1,3	79	36	8
4143978	VDS201A07500	4140371	VDS401A07500	7,500	.2953	–	–	29	41	1,3	79	36	8
4143979	VDS201A07541	4140372	VDS401A07541	7,541	.2969	19/64	–	29	41	1,3	79	36	8
4143980	VDS201A07600	4140373	VDS401A07600	7,600	.2992	–	–	29	41	1,3	79	36	8
4143981	VDS201A07700	4140374	VDS401A07700	7,700	.3031	–	–	29	41	1,3	79	36	8
4143982	VDS201A07800	4140375	VDS401A07800	7,800	.3071	–	–	29	41	1,3	79	36	8
4143983	VDS201A07900	4140376	VDS401A07900	7,900	.3110	–	–	29	41	1,3	79	36	8
4143984	VDS201A07938	4140377	VDS401A07938	7,938	.3125	5/16	–	29	41	1,3	79	36	8
4143985	VDS201A08000	4140378	VDS401A08000	8,000	.3150	–	–	29	41	1,4	79	36	8
4143986	VDS201A08100	4140379	VDS401A08100	8,100	.3189	–	–	35	47	1,4	89	40	10
4143987	VDS201A08200	4140380	VDS401A08200	8,200	.3228	–	–	35	47	1,4	89	40	10
4143988	VDS201A08300	4140381	VDS401A08300	8,300	.3268	–	–	35	47	1,4	89	40	10
4143989	VDS201A08334	4140382	VDS401A08334	8,334	.3281	21/64	–	35	47	1,4	89	40	10
4143990	VDS201A08400	4140383	VDS401A08400	8,400	.3307	–	–	35	47	1,4	89	40	10
4143991	VDS201A08433	4140384	VDS401A08433	8,433	.3320	–	Q	35	47	1,4	89	40	10
4143992	VDS201A08500	4140385	VDS401A08500	8,500	.3346	–	–	35	47	1,4	89	40	10
4143993	VDS201A08600	4140386	VDS401A08600	8,600	.3386	–	–	35	47	1,5	89	40	10
4143994	VDS201A08700	4140387	VDS401A08700	8,700	.3425	–	–	35	47	1,5	89	40	10
4143995	VDS201A08733	4140388	VDS401A08733	8,733	.3438	11/32	–	35	47	1,5	89	40	10
4143996	VDS201A08800	4140389	VDS401A08800	8,800	.3465	–	–	35	47	1,5	89	40	10
4143997	VDS201A08900	4140390	VDS401A08900	8,900	.3504	–	–	35	47	1,5	89	40	10
4143998	VDS201A09000	4140391	VDS401A09000	9,000	.3543	–	–	35	47	1,5	89	40	10
4143999	VDS201A09100		–	9,100	.3583	–	–	35	47	1,5	89	40	10
	–	4140392	VDS401A09100	9,100	.3583	–	–	35	47	1,6	89	40	10
4144000	VDS201A09129	4140393	VDS401A09129	9,129	.3594	23/64	–	35	47	1,6	89	40	10
4144001	VDS201A09200	4140394	VDS401A09200	9,200	.3622	–	–	35	47	1,6	89	40	10
4144002	VDS201A09300	4140395	VDS401A09300	9,300	.3661	–	–	35	47	1,6	89	40	10
4144003	VDS201A09347	4140396	VDS401A09347	9,347	.3680	–	U	35	47	1,6	89	40	10
4144004	VDS201A09400	4140397	VDS401A09400	9,400	.3701	–	–	35	47	1,6	89	40	10
4144005	VDS201A09500	4140398	VDS401A09500	9,500	.3740	–	–	35	47	1,6	89	40	10
4144006	VDS201A09525	4140399	VDS401A09525	9,525	.3750	3/8	–	35	47	1,6	89	40	10
4144007	VDS201A09600	4140400	VDS401A09600	9,600	.3780	–	–	35	47	1,6	89	40	10
4144008	VDS201A09700	4140401	VDS401A09700	9,700	.3819	–	–	35	47	1,7	89	40	10
4144009	VDS201A09800	4140402	VDS401A09800	9,800	.3858	–	–	35	47	1,7	89	40	10
4144010	VDS201A09900	4140403	VDS401A09900	9,900	.3898	–	–	35	47	1,7	89	40	10

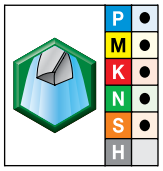
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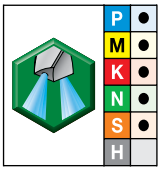
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For information on L, L3, and L4 max, see page C46.





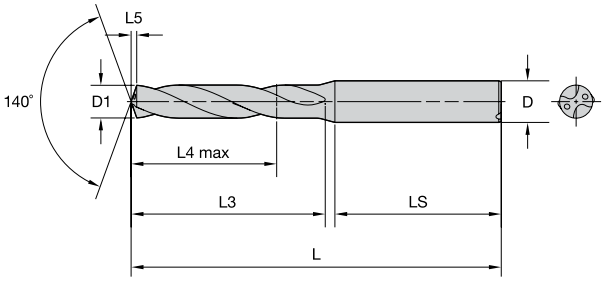
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4144011	VDS201A09921	4140404	VDS401A09921	9,921	.3906	25/64	–	35	47	1,7	89	40	10
4144172	VDS201A10000	4140001	VDS401A10000	10,000	.3937	–	–	35	47	1,7	89	40	10
4144423	VDS201A10100	4140002	VDS401A10100	10,100	.3976	–	–	40	55	1,7	102	45	12
4144424	VDS201A10200	4140163	VDS401A10200	10,200	.4016	–	–	40	55	1,7	102	45	12
4144425	VDS201A10300	4140164	VDS401A10300	10,300	.4055	–	–	40	55	1,8	102	45	12
4144426	VDS201A10320	4140165	VDS401A10320	10,320	.4063	13/32	–	40	55	1,8	102	45	12
4144427	VDS201A10400	4140166	VDS401A10400	10,400	.4094	–	–	40	55	1,8	102	45	12
4144428	VDS201A10500	4140167	VDS401A10500	10,500	.4134	–	–	40	55	1,8	102	45	12
4144429	VDS201A10600	4140168	VDS401A10600	10,600	.4173	–	–	40	55	1,8	102	45	12
4144430	VDS201A10700	4140169	VDS401A10700	10,700	.4213	–	–	40	55	1,8	102	45	12
4144431	VDS201A10716	4140170	VDS401A10716	10,716	.4219	27/64	–	40	55	1,8	102	45	12
4144432	VDS201A10800	4140171	VDS401A10800	10,800	.4252	–	–	40	55	1,9	102	45	12
4144433	VDS201A10900	4140172	VDS401A10900	10,900	.4291	–	–	40	55	1,9	102	45	12
4144434	VDS201A11000	4140173	VDS401A11000	11,000	.4331	–	–	40	55	1,9	102	45	12
4144435	VDS201A11100	4140174	VDS401A11100	11,100	.4370	–	–	40	55	1,9	102	45	12
4144436	VDS201A11113	4140175	VDS401A11113	11,113	.4375	7/16	–	40	55	1,9	102	45	12
4144437	VDS201A11200	4140176	VDS401A11200	11,200	.4409	–	–	40	55	1,9	102	45	12
4144438	VDS201A11300	4140177	VDS401A11300	11,300	.4449	–	–	40	55	1,9	102	45	12
4144439	VDS201A11400	4140178	VDS401A11400	11,400	.4488	–	–	40	55	2,0	102	45	12
4144440	VDS201A11500	4140179	VDS401A11500	11,500	.4528	–	–	40	55	2,0	102	45	12
4144441	VDS201A11509	4140180	VDS401A11509	11,509	.4531	29/64	–	40	55	2,0	102	45	12
4144442	VDS201A11600	4140181	VDS401A11600	11,600	.4567	–	–	40	55	2,0	102	45	12
4144443	VDS201A11700	4140182	VDS401A11700	11,700	.4606	–	–	40	55	2,0	102	45	12
4144444	VDS201A11800	4140183	VDS401A11800	11,800	.4646	–	–	40	55	2,0	102	45	12
4144445	VDS201A11900	4140184	VDS401A11900	11,900	.4685	–	–	40	55	2,0	102	45	12
4144446	VDS201A11908	4140185	VDS401A11908	11,908	.4688	15/32	–	40	55	2,0	102	45	12
4144447	VDS201A12000	4140186	VDS401A12000	12,000	.4724	–	–	40	55	2,1	102	45	12
4144448	VDS201A12100	4140187	VDS401A12100	12,100	.4764	–	–	43	60	2,1	107	45	14
4144449	VDS201A12200	4140188	VDS401A12200	12,200	.4803	–	–	43	60	2,1	107	45	14
4144450	VDS201A12300	4140189	VDS401A12300	12,300	.4843	–	–	43	60	2,1	107	45	14
4144451	VDS201A12304	4140190	VDS401A12304	12,304	.4844	31/64	–	43	60	2,1	107	45	14
4144452	VDS201A12400	4140191	VDS401A12400	12,400	.4882	–	–	43	60	2,1	107	45	14
4144453	VDS201A12500	4140192	VDS401A12500	12,500	.4921	–	–	43	60	2,2	107	45	14
4144454	VDS201A12600	4140194	VDS401A12600	12,600	.4961	–	–	43	60	2,2	107	45	14
4144455	VDS201A12700	4140195	VDS401A12700	12,700	.5000	1/2	–	43	60	2,2	107	45	14
4144456	VDS201A12800	4140196	VDS401A12800	12,800	.5039	–	–	43	60	2,2	107	45	14
4144457	VDS201A12900	4140197	VDS401A12900	12,900	.5079	–	–	43	60	2,2	107	45	14
4144458	VDS201A13000	4140198	VDS401A13000	13,000	.5118	–	–	43	60	2,2	107	45	14
4144459	VDS201A13096	4140199	VDS401A13096	13,096	.5156	33/64	–	43	60	2,3	107	45	14
4144460	VDS201A13100	4140200	VDS401A13100	13,100	.5157	–	–	43	60	2,3	107	45	14
4144461	VDS201A13200	4140201	VDS401A13200	13,200	.5197	–	–	43	60	2,3	107	45	14
4144462	VDS201A13300	4140202	VDS401A13300	13,300	.5236	–	–	43	60	2,3	107	45	14
4144463	VDS201A13400	4140203	VDS401A13400	13,400	.5276	–	–	43	60	2,3	107	45	14
4144464	VDS201A13500	4140204	VDS401A13500	13,500	.5315	–	–	43	60	2,3	107	45	14
4144465	VDS201A13600	4140205	VDS401A13600	13,600	.5354	–	–	43	60	2,3	107	45	14
4144466	VDS201A13700	4140206	VDS401A13700	13,700	.5394	–	–	43	60	2,4	107	45	14
4144467	VDS201A13800	4140207	VDS401A13800	13,800	.5433	–	–	43	60	2,4	107	45	14
4144468	VDS201A13891		–	13,891	.5469	35/64	–	43	60	2,4	107	45	14

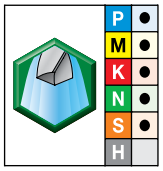
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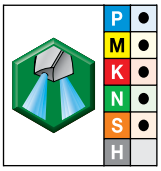
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For information on L, L3, and L4 max, see page C46.





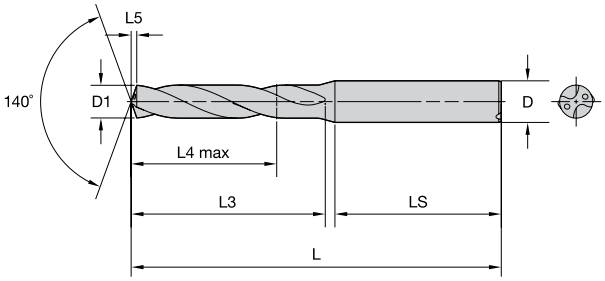
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4144469	VDS201A13900	4140209	VDS401A13900	13,900	.5472	–	–	43	60	2,4	107	45	14
4144470	VDS201A14000	4140210	VDS401A14000	14,000	.5512	–	–	43	60	2,4	107	45	14
4144471	VDS201A14100	4140211	VDS401A14100	14,100	.5551	–	–	45	65	2,4	115	48	16
4144472	VDS201A14200	4140212	VDS401A14200	14,200	.5591	–	–	45	65	2,5	115	48	16
4144473	VDS201A14288	4140213	VDS401A14288	14,288	.5625	9/16	–	45	65	2,5	115	48	16
4144474	VDS201A14300	4140214	VDS401A14300	14,300	.5630	–	–	45	65	2,5	115	48	16
4144475	VDS201A14400	4140215	VDS401A14400	14,400	.5669	–	–	45	65	2,5	115	48	16
4144476	VDS201A14500	4140216	VDS401A14500	14,500	.5709	–	–	45	65	2,5	115	48	16
4144477	VDS201A14600	4140217	VDS401A14600	14,600	.5748	–	–	45	65	2,5	115	48	16
4144478	VDS201A14684	4140218	VDS401A14684	14,684	.5781	37/64	–	45	65	2,5	115	48	16
4144479	VDS201A14700	4140219	VDS401A14700	14,700	.5787	–	–	45	65	2,5	115	48	16
4144480	VDS201A14800	4140220	VDS401A14800	14,800	.5827	–	–	45	65	2,6	115	48	16
4144481	VDS201A14900	4140221	VDS401A14900	14,900	.5866	–	–	45	65	2,6	115	48	16
4144482	VDS201A15000	4140222	VDS401A15000	15,000	.5906	–	–	45	65	2,6	115	48	16
4144483	VDS201A15083	4140223	VDS401A15083	15,083	.5938	19/32	–	45	65	2,6	115	48	16
4144484	VDS201A15100	4140224	VDS401A15100	15,100	.5945	–	–	45	65	2,6	115	48	16
4144485	VDS201A15200	4140225	VDS401A15200	15,200	.5984	–	–	45	65	2,6	115	48	16
4144486	VDS201A15300	4140226	VDS401A15300	15,300	.6024	–	–	45	65	2,6	115	48	16
4144487	VDS201A15400	4140227	VDS401A15400	15,400	.6063	–	–	45	65	2,7	115	48	16
4144488	VDS201A15479	4140228	VDS401A15479	15,479	.6094	39/64	–	45	65	2,7	115	48	16
4144489	VDS201A15500	4140229	VDS401A15500	15,500	.6102	–	–	45	65	2,7	115	48	16
4144490	VDS201A15600	4140230	VDS401A15600	15,600	.6142	–	–	45	65	2,7	115	48	16
4144491	VDS201A15700	4140231	VDS401A15700	15,700	.6181	–	–	45	65	2,7	115	48	16
4144492	VDS201A15800	4140232	VDS401A15800	15,800	.6220	–	–	45	65	2,7	115	48	16
4144493	VDS201A15875	4140233	VDS401A15875	15,875	.6250	5/8	–	45	65	2,8	115	48	16
4144494	VDS201A15900	4140234	VDS401A15900	15,900	.6260	–	–	45	65	2,8	115	48	16
4144495	VDS201A16000	4140235	VDS401A16000	16,000	.6299	–	–	45	65	2,8	115	48	16
4144496	VDS201A16100	4140236	VDS401A16100	16,100	.6339	–	–	51	73	2,8	123	48	18
4144497	VDS201A16200	4140237	VDS401A16200	16,200	.6378	–	–	51	73	2,8	123	48	18
4144498	VDS201A16271		–	16,271	.6406	41/64	–	51	73	2,8	123	48	18
4144499	VDS201A16300	4140239	VDS401A16300	16,300	.6417	–	–	51	73	2,8	123	48	18
4144500	VDS201A16400	4140241	VDS401A16400	16,400	.6457	–	–	51	73	2,8	123	48	18
4144501	VDS201A16500	4140242	VDS401A16500	16,500	.6496	–	–	51	73	2,9	123	48	18
4144503	VDS201A16600	4140243	VDS401A16600	16,600	.6535	–	–	51	73	2,9	123	48	18
4144504	VDS201A16670	4140244	VDS401A16670	16,670	.6563	21/32	–	51	73	2,9	123	48	18
4144505	VDS201A16700	4140245	VDS401A16700	16,700	.6575	–	–	51	73	2,9	123	48	18
4144506	VDS201A16800	4140246	VDS401A16800	16,800	.6614	–	–	51	73	2,9	123	48	18
4144507	VDS201A16900	4140247	VDS401A16900	16,900	.6654	–	–	51	73	2,9	123	48	18
4144508	VDS201A17000		–	17,000	.6693	–	–	51	73	3,0	123	48	18
	–	4140248	VDS401A17000	17,000	.6693	–	–	51	73	2,9	123	48	18
4144509	VDS201A17100	4140249	VDS401A17100	17,100	.6732	–	–	51	73	3,0	123	48	18
4144510	VDS201A17200	4140250	VDS401A17200	17,200	.6772	–	–	51	73	3,0	123	48	18
4144511	VDS201A17300	4140251	VDS401A17300	17,300	.6811	–	–	51	73	3,0	123	48	18
4144512	VDS201A17400	4140252	VDS401A17400	17,400	.6850	–	–	51	73	3,0	123	48	18
4144513	VDS201A17463	4140253	VDS401A17463	17,463	.6875	11/16	–	51	73	3,0	123	48	18
4144514	VDS201A17500	4140254	VDS401A17500	17,500	.6890	–	–	51	73	3,0	123	48	18
4144515	VDS201A17600	4140255	VDS401A17600	17,600	.6929	–	–	51	73	3,1	123	48	18
4144516	VDS201A17700	4140256	VDS401A17700	17,700	.6969	–	–	51	73	3,1	123	48	18

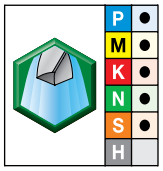
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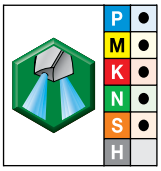
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For information on L, L3, and L4 max, see page C46.



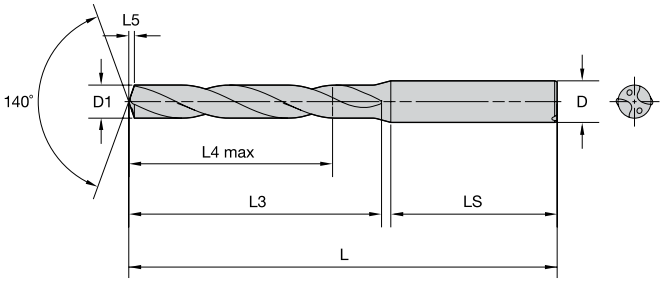


● first choice
○ alternate choice

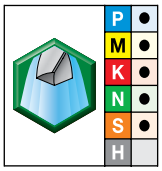
grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4144517	VDS201A17800	4140257	VDS401A17800	17,800	.7008	–	–	51	73	3,1	123	48	18
4144518	VDS201A17859		–	17,859	.7031	45/64	–	51	73	3,1	123	48	18
4144519	VDS201A17900		–	17,900	.7047	–	–	51	73	3,1	123	48	18
4144590	VDS201A18000	4140449	VDS401A18000	18,000	.7087	–	–	51	73	3,1	123	48	18
4144591	VDS201A18100	4140450	VDS401A18100	18,100	.7126	–	–	55	79	3,1	131	50	20
4144592	VDS201A18200	4140451	VDS401A18200	18,200	.7165	–	–	55	79	3,2	131	50	20
4144593	VDS201A18258	4140452	VDS401A18258	18,258	.7188	23/32	–	55	79	3,2	131	50	20
4144594	VDS201A18300	4140463	VDS401A18300	18,300	.7205	–	–	55	79	3,2	131	50	20
	–	4140464	VDS401A18400	18,400	.7244	–	–	55	79	3,2	131	50	20
4144596	VDS201A18500	4140465	VDS401A18500	18,500	.7283	–	–	55	79	3,2	131	50	20
4144597	VDS201A18600	4140466	VDS401A18600	18,600	.7323	–	–	55	79	3,2	131	50	20
4144598	VDS201A18654	4140467	VDS401A18654	18,654	.7344	47/64	–	55	79	3,2	131	50	20
4144599	VDS201A18700		–	18,700	.7362	–	–	55	79	3,3	131	50	20
	–	4140468	VDS401A18700	18,700	.7362	–	–	55	79	3,2	131	50	20
4144600	VDS201A18800	4140469	VDS401A18800	18,800	.7402	–	–	55	79	3,3	131	50	20
4144601	VDS201A18900	4140470	VDS401A18900	18,900	.7441	–	–	55	79	3,3	131	50	20
4144602	VDS201A19000	4140471	VDS401A19000	19,000	.7480	–	–	55	79	3,3	131	50	20
4144603	VDS201A19050	4140472	VDS401A19050	19,050	.7500	3/4	–	55	79	3,3	131	50	20
4144604	VDS201A19100	4140473	VDS401A19100	19,100	.7520	–	–	55	79	3,3	131	50	20
4144605	VDS201A19200	4140474	VDS401A19200	19,200	.7559	–	–	55	79	3,3	131	50	20
4144606	VDS201A19300	4140475	VDS401A19300	19,300	.7598	–	–	55	79	3,4	131	50	20
4144607	VDS201A19400	4140476	VDS401A19400	19,400	.7638	–	–	55	79	3,4	131	50	20
4144608	VDS201A19500	4140477	VDS401A19500	19,500	.7677	–	–	55	79	3,4	131	50	20
	–	4140478	VDS401A19600	19,600	.7717	–	–	55	79	3,4	131	50	20
4144610	VDS201A19700	4140479	VDS401A19700	19,700	.7756	–	–	55	79	3,4	131	50	20
4144611	VDS201A19800	4140480	VDS401A19800	19,800	.7795	–	–	55	79	3,4	131	50	20
4144612	VDS201A19900	4140481	VDS401A19900	19,900	.7835	–	–	55	79	3,5	131	50	20
4144613	VDS201A20000	4140482	VDS401A20000	20,000	.7874	–	–	55	79	3,5	131	50	20

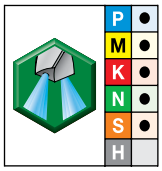
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For information on L, L3, and L4 max, see page C46.





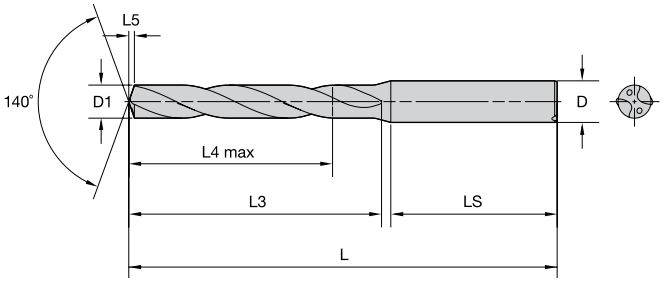
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4148000	VDS202A01000		–	1,000	.0394	–	–	6	9	0,1	58	28	4
4148001	VDS202A01016		–	1,016	.0400	–	–	6	9	0,1	58	28	4
4148002	VDS202A01041		–	1,041	.0410	–	–	6	9	0,2	58	28	4
4148003	VDS202A01067		–	1,067	.0420	–	–	6	9	0,2	58	28	4
4148005	VDS202A01100		–	1,100	.0433	–	–	6	9	0,2	58	28	4
4148006	VDS202A01181		–	1,181	.0465	–	–	6	9	0,2	58	28	4
4148007	VDS202A01191		–	1,191	.0469	3/64	–	6	9	0,2	58	28	4
4148008	VDS202A01200		–	1,200	.0472	–	–	6	9	0,2	58	28	4
4148009	VDS202A01300		–	1,300	.0512	–	–	6	9	0,2	58	28	4
4148010	VDS202A01321		–	1,321	.0520	–	–	6	9	0,2	58	28	4
4148011	VDS202A01397		–	1,397	.0550	–	–	6	9	0,2	58	28	4
4148012	VDS202A01400		–	1,400	.0551	–	–	6	9	0,2	58	28	4
4148013	VDS202A01500	4142871	VDS402A01500	1,500	.0591	–	–	9	12	0,2	58	28	4
4148014	VDS202A01600	4142884	VDS402A01600	1,600	.0630	–	–	9	12	0,2	58	28	4
4148015	VDS202A01700	4142887	VDS402A01700	1,700	.0669	–	–	9	12	0,3	58	28	4
4148016	VDS202A01800	4142890	VDS402A01800	1,800	.0709	–	–	9	12	0,3	58	28	4
4148017	VDS202A01900	4142893	VDS402A01900	1,900	.0748	–	–	9	12	0,3	58	28	4
4148018	VDS202A01984	4142896	VDS402A01984	1,984	.0781	5/64	–	14	18	0,3	58	28	4
4148019	VDS202A02000	4142899	VDS402A02000	2,000	.0787	–	–	14	18	0,3	58	28	4
4148020	VDS202A02100	4142902	VDS402A02100	2,100	.0827	–	–	14	18	0,3	58	28	4
4148021	VDS202A02200	4142905	VDS402A02200	2,200	.0866	–	–	14	18	0,3	58	28	4
4148022	VDS202A02300	4142908	VDS402A02300	2,300	.0906	–	–	14	18	0,4	58	28	4
4148023	VDS202A02383	4142911	VDS402A02383	2,383	.0938	3/32	–	17	22	0,4	58	28	4
4148024	VDS202A02400	4142924	VDS402A02400	2,400	.0945	–	–	17	22	0,4	58	28	4
4148025	VDS202A02439	4142927	VDS402A02439	2,439	.0960	–	41	17	22	0,4	58	28	4
4148026	VDS202A02489	4142930	VDS402A02489	2,489	.0980	–	40	17	22	0,4	58	28	4
4148027	VDS202A02500	4142933	VDS402A02500	2,500	.0984	–	–	17	22	0,4	58	28	4
4148028	VDS202A02578	4142936	VDS402A02578	2,578	.1015	–	38	17	22	0,4	58	28	4
4148029	VDS202A02600	4142939	VDS402A02600	2,600	.1024	–	–	17	22	0,4	58	28	4
4148030	VDS202A02642	4142942	VDS402A02642	2,642	.1040	–	37	17	22	0,4	58	28	4
4148031	VDS202A02700	4142945	VDS402A02700	2,700	.1063	–	–	17	22	0,4	58	28	4
4148032	VDS202A02705		–	2,705	.1065	–	36	17	22	0,4	58	28	4
4148033	VDS202A02779	4142951	VDS402A02779	2,779	.1094	7/64	–	17	22	0,4	58	28	4
4148034	VDS202A02800	4142964	VDS402A02800	2,800	.1102	–	–	17	22	0,5	58	28	4
4148035	VDS202A02820	4142967	VDS402A02820	2,820	.1110	–	34	17	22	0,5	58	28	4
4148036	VDS202A02870	4142970	VDS402A02870	2,870	.1130	–	33	17	22	0,5	58	28	4
4148037	VDS202A02900	4142973	VDS402A02900	2,900	.1142	–	–	17	22	0,5	58	28	4
4148038	VDS202A02947	4142976	VDS402A02947	2,947	.1160	–	32	17	22	0,5	58	28	4
4148142	VDS202A03000	4142844	VDS402A03000	3,000	.1181	–	–	23	28	0,5	66	36	6
4148143	VDS202A03048	4142846	VDS402A03048	3,048	.1200	–	31	23	28	0,5	66	36	6
4148144	VDS202A03100	4142847	VDS402A03100	3,100	.1220	–	–	23	28	0,5	66	36	6
4148145	VDS202A03175	4142849	VDS402A03175	3,175	.1250	1/8	–	23	28	0,5	66	36	6
4148146	VDS202A03200	4142851	VDS402A03200	3,200	.1260	–	–	23	28	0,5	66	36	6
4148147	VDS202A03264	4142864	VDS402A03264	3,264	.1285	–	30	23	28	0,5	66	36	6
4148148	VDS202A03300	4142865	VDS402A03300	3,300	.1299	–	–	23	28	0,5	66	36	6
4148149	VDS202A03400	4142867	VDS402A03400	3,400	.1339	–	–	23	28	0,6	66	36	6
4148150	VDS202A03455	4142869	VDS402A03455	3,455	.1360	–	29	23	28	0,6	66	36	6
4148151	VDS202A03500	4142872	VDS402A03500	3,500	.1378	–	–	23	28	0,6	66	36	6

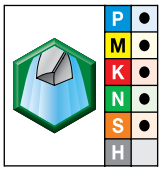
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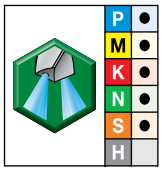
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For information on L, L3, and L4 max, see page C46.





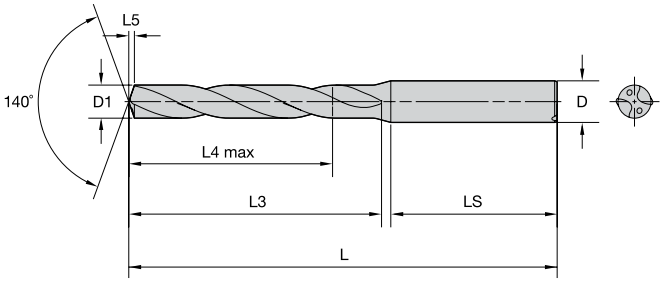
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4148152	VDS202A03571	4142885	VDS402A03571	3,571	.1406	9/64	–	23	28	0,6	66	36	6
4148153	VDS202A03600	4142888	VDS402A03600	3,600	.1417	–	–	23	28	0,6	66	36	6
4148154	VDS202A03658	4142891	VDS402A03658	3,658	.1440	–	27	23	28	0,6	66	36	6
4148155	VDS202A03700	4142894	VDS402A03700	3,700	.1457	–	–	23	28	0,6	66	36	6
4148156	VDS202A03734	4142897	VDS402A03734	3,734	.1470	–	26	23	28	0,6	66	36	6
4148157	VDS202A03800	4142900	VDS402A03800	3,800	.1496	–	–	29	36	0,6	74	36	6
4148158	VDS202A03900	4142903	VDS402A03900	3,900	.1535	–	–	29	36	0,6	74	36	6
4148159	VDS202A03970	4142906	VDS402A03970	3,970	.1563	5/32	–	29	36	0,7	74	36	6
4148160	VDS202A04000	4142909	VDS402A04000	4,000	.1575	–	–	29	36	0,7	74	36	6
4148161	VDS202A04039	4142912	VDS402A04039	4,039	.1590	–	21	29	36	0,7	74	36	6
4148162	VDS202A04090	4142925	VDS402A04090	4,090	.1610	–	20	29	36	0,7	74	36	6
4148163	VDS202A04100	4142928	VDS402A04100	4,100	.1614	–	–	29	36	0,7	74	36	6
4148164	VDS202A04200	4142931	VDS402A04200	4,200	.1654	–	–	29	36	0,7	74	36	6
4148165	VDS202A04217	4142934	VDS402A04217	4,217	.1660	–	19	29	36	0,7	74	36	6
4148166	VDS202A04300	4142937	VDS402A04300	4,300	.1693	–	–	29	36	0,7	74	36	6
4148167	VDS202A04366	4142940	VDS402A04366	4,366	.1719	11/64	–	29	36	0,7	74	36	6
4148168	VDS202A04400	4142943	VDS402A04400	4,400	.1732	–	–	29	36	0,7	74	36	6
4148169	VDS202A04500	4142946	VDS402A04500	4,500	.1772	–	–	29	36	0,7	74	36	6
4148170	VDS202A04600	4142949	VDS402A04600	4,600	.1811	–	–	29	36	0,8	74	36	6
4148171	VDS202A04623	4142952	VDS402A04623	4,623	.1820	–	14	29	36	0,8	74	36	6
4148172	VDS202A04700	4142965	VDS402A04700	4,700	.1850	–	13	29	36	0,8	74	36	6
4148173	VDS202A04763	4142968	VDS402A04763	4,763	.1875	3/16	–	35	44	0,8	82	36	6
4148174	VDS202A04800	4142971	VDS402A04800	4,800	.1890	–	12	35	44	0,8	82	36	6
4148175	VDS202A04852	4142974	VDS402A04852	4,852	.1910	–	11	35	44	0,8	82	36	6
4148176	VDS202A04900	4142977	VDS402A04900	4,900	.1929	–	–	35	44	0,8	82	36	6
4148177	VDS202A05000	4142979	VDS402A05000	5,000	.1969	–	–	35	44	0,8	82	36	6
4148178	VDS202A05100	4142981	VDS402A05100	5,100	.2008	–	–	35	44	0,9	82	36	6
4148179	VDS202A05106	4142994	VDS402A05106	5,106	.2010	–	7	35	44	0,9	82	36	6
4148180	VDS202A05159	4142996	VDS402A05159	5,159	.2031	13/64	–	35	44	0,9	82	36	6
4148181	VDS202A05200	4142997	VDS402A05200	5,200	.2047	–	–	35	44	0,9	82	36	6
4148182	VDS202A05300	4142999	VDS402A05300	5,300	.2087	–	–	35	44	0,9	82	36	6
4148183	VDS202A05400	4143000	VDS402A05400	5,400	.2126	–	–	35	44	0,9	82	36	6
4148184	VDS202A05410	4143001	VDS402A05410	5,410	.2130	–	3	35	44	0,9	82	36	6
4148185	VDS202A05500	4143002	VDS402A05500	5,500	.2165	–	–	35	44	0,9	82	36	6
4148186	VDS202A05558	4143003	VDS402A05558	5,558	.2188	7/32	–	35	44	0,9	82	36	6
4148187	VDS202A05600	4143004	VDS402A05600	5,600	.2205	–	–	35	44	0,9	82	36	6
4148188	VDS202A05616	4143005	VDS402A05616	5,616	.2211	–	2	35	44	0,9	82	36	6
4148189	VDS202A05700	4143006	VDS402A05700	5,700	.2244	–	–	35	44	1,0	82	36	6
4148190	VDS202A05800	4143007	VDS402A05800	5,800	.2283	–	–	35	44	1,0	82	36	6
4148191	VDS202A05900	4143008	VDS402A05900	5,900	.2323	–	–	35	44	1,0	82	36	6
4148192	VDS202A05954	4143009	VDS402A05954	5,954	.2344	15/64	–	35	44	1,0	82	36	6
4148193	VDS202A06000	4143010	VDS402A06000	6,000	.2362	–	–	35	44	1,0	82	36	6
4148194	VDS202A06100	4143011	VDS402A06100	6,100	.2402	–	–	43	53	1,0	91	36	8
4148195	VDS202A06200	4143012	VDS402A06200	6,200	.2441	–	–	43	53	1,0	91	36	8
4148196	VDS202A06300	4143023	VDS402A06300	6,300	.2480	–	–	43	53	1,1	91	36	8
4148197	VDS202A06350	4143024	VDS402A06350	6,350	.2500	1/4	E	43	53	1,1	91	36	8
4148198	VDS202A06400	4143025	VDS402A06400	6,400	.2520	–	–	43	53	1,1	91	36	8
4148199	VDS202A06500	4143026	VDS402A06500	6,500	.2559	–	–	43	53	1,1	91	36	8

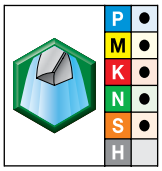
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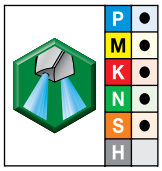
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For information on L, L3, and L4 max, see page C46.





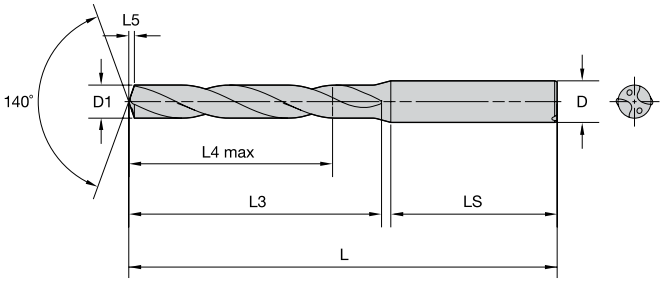
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4148200	VDS202A06528	4143027	VDS402A06528	6,528	.2570	–	F	43	53	1,1	91	36	8
4148201	VDS202A06600	4143028	VDS402A06600	6,600	.2598	–	–	43	53	1,1	91	36	8
4148202	VDS202A06630	4143029	VDS402A06630	6,630	.2610	–	G	43	53	1,1	91	36	8
4148203	VDS202A06700	4143030	VDS402A06700	6,700	.2638	–	–	43	53	1,1	91	36	8
4148204	VDS202A06746	4143031	VDS402A06746	6,746	.2656	17/64	–	43	53	1,1	91	36	8
4148205	VDS202A06800	4143032	VDS402A06800	6,800	.2677	–	–	43	53	1,1	91	36	8
4148206	VDS202A06900	4143043	VDS402A06900	6,900	.2717	–	–	43	53	1,2	91	36	8
4148207	VDS202A07000	4143044	VDS402A07000	7,000	.2756	–	–	43	53	1,2	91	36	8
4148208	VDS202A07100	4143045	VDS402A07100	7,100	.2795	–	–	43	53	1,2	91	36	8
4148209	VDS202A07145	4143046	VDS402A07145	7,145	.2813	9/32	–	43	53	1,2	91	36	8
4148210	VDS202A07200	4143047	VDS402A07200	7,200	.2835	–	–	43	53	1,2	91	36	8
4148211	VDS202A07300	4143048	VDS402A07300	7,300	.2874	–	–	43	53	1,2	91	36	8
4148212	VDS202A07400	4143049	VDS402A07400	7,400	.2913	–	–	43	53	1,3	91	36	8
4148213	VDS202A07500	4143050	VDS402A07500	7,500	.2953	–	–	43	53	1,3	91	36	8
4148214	VDS202A07541	4143051	VDS402A07541	7,541	.2969	19/64	–	43	53	1,3	91	36	8
4148215	VDS202A07600	4143052	VDS402A07600	7,600	.2992	–	–	43	53	1,3	91	36	8
4148216	VDS202A07700	4143063	VDS402A07700	7,700	.3031	–	–	43	53	1,3	91	36	8
4148217	VDS202A07800	4143064	VDS402A07800	7,800	.3071	–	–	43	53	1,3	91	36	8
4148218	VDS202A07900	4143065	VDS402A07900	7,900	.3110	–	–	43	53	1,3	91	36	8
4148219	VDS202A07938	4143066	VDS402A07938	7,938	.3125	5/16	–	43	53	1,3	91	36	8
4148220	VDS202A08000	4143067	VDS402A08000	8,000	.3150	–	–	43	53	1,4	91	36	8
4148221	VDS202A08100	4143068	VDS402A08100	8,100	.3189	–	–	49	61	1,4	103	40	10
4148222	VDS202A08200	4143069	VDS402A08200	8,200	.3228	–	–	49	61	1,4	103	40	10
4148223	VDS202A08300	4143070	VDS402A08300	8,300	.3268	–	–	49	61	1,4	103	40	10
4148224	VDS202A08334	4143071	VDS402A08334	8,334	.3281	21/64	–	49	61	1,4	103	40	10
4148225	VDS202A08400	4143072	VDS402A08400	8,400	.3307	–	–	49	61	1,4	103	40	10
4148226	VDS202A08433	4143083	VDS402A08433	8,433	.3320	–	Q	49	61	1,4	103	40	10
4148227	VDS202A08500	4143084	VDS402A08500	8,500	.3346	–	–	49	61	1,4	103	40	10
4148228	VDS202A08600	4143085	VDS402A08600	8,600	.3386	–	–	49	61	1,5	103	40	10
4148229	VDS202A08700	4143086	VDS402A08700	8,700	.3425	–	–	49	61	1,5	103	40	10
4148230	VDS202A08733	4143087	VDS402A08733	8,733	.3438	11/32	–	49	61	1,5	103	40	10
4148231	VDS202A08800	4143088	VDS402A08800	8,800	.3465	–	–	49	61	1,5	103	40	10
4148232	VDS202A08900	4143089	VDS402A08900	8,900	.3504	–	–	49	61	1,5	103	40	10
4148233	VDS202A09000	4143090	VDS402A09000	9,000	.3543	–	–	49	61	1,5	103	40	10
4148234	VDS202A09100	4143091	VDS402A09100	9,100	.3583	–	–	49	61	1,6	103	40	10
4148235	VDS202A09129	4143092	VDS402A09129	9,129	.3594	23/64	–	49	61	1,6	103	40	10
4148236	VDS202A09200	4143103	VDS402A09200	9,200	.3622	–	–	49	61	1,6	103	40	10
4148237	VDS202A09300	4143104	VDS402A09300	9,300	.3661	–	–	49	61	1,6	103	40	10
4148238	VDS202A09347	4143105	VDS402A09347	9,347	.3680	–	U	49	61	1,6	103	40	10
4148239	VDS202A09400	4143106	VDS402A09400	9,400	.3701	–	–	49	61	1,6	103	40	10
4148240	VDS202A09500	4143107	VDS402A09500	9,500	.3740	–	–	49	61	1,6	103	40	10
4148241	VDS202A09525	4143108	VDS402A09525	9,525	.3750	3/8	–	49	61	1,6	103	40	10
4148242	VDS202A09600	4143109	VDS402A09600	9,600	.3780	–	–	49	61	1,6	103	40	10
4148243	VDS202A09700	4143110	VDS402A09700	9,700	.3819	–	–	49	61	1,7	103	40	10
4148244	VDS202A09800	4143111	VDS402A09800	9,800	.3858	–	–	49	61	1,7	103	40	10
4148245	VDS202A09900	4143112	VDS402A09900	9,900	.3898	–	–	49	61	1,7	103	40	10
4148246	VDS202A09921	4143113	VDS402A09921	9,921	.3906	25/64	–	49	61	1,7	103	40	10
4148258	VDS202A10000	4142823	VDS402A10000	10,000	.3937	–	–	49	61	1,7	103	40	10

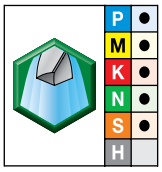
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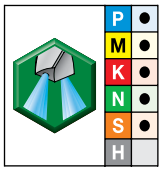
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For information on L, L3, and L4 max, see page C46.





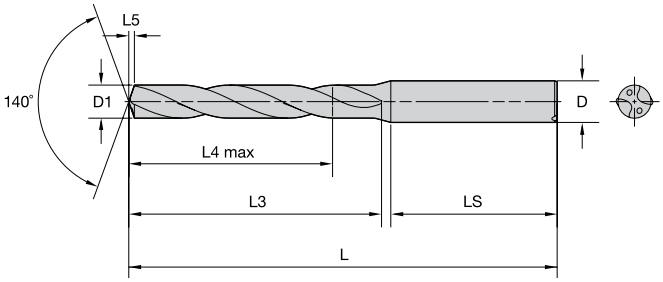
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4148259	VDS202A10100	4142825	VDS402A10100	10,100	.3976	—	—	56	71	1,7	118	45	12
4148260	VDS202A10200	4142827	VDS402A10200	10,200	.4016	—	—	56	71	1,7	118	45	12
4148261	VDS202A10300	4142829	VDS402A10300	10,300	.4055	—	—	56	71	1,8	118	45	12
4148262	VDS202A10320	4142831	VDS402A10320	10,320	.4063	13/32	—	56	71	1,8	118	45	12
4148283	VDS202A10400	4142832	VDS402A10400	10,400	.4094	—	—	56	71	1,8	118	45	12
4148284	VDS202A10500	4142834	VDS402A10500	10,500	.4134	—	—	56	71	1,8	118	45	12
4148285	VDS202A10600	4142836	VDS402A10600	10,600	.4173	—	—	56	71	1,8	118	45	12
4148286	VDS202A10700	4142838	VDS402A10700	10,700	.4213	—	—	56	71	1,8	118	45	12
4148287	VDS202A10716	4142840	VDS402A10716	10,716	.4219	27/64	—	56	71	1,8	118	45	12
4148288	VDS202A10800	4142842	VDS402A10800	10,800	.4252	—	—	56	71	1,9	118	45	12
4148289	VDS202A10900	4142855	VDS402A10900	10,900	.4291	—	—	56	71	1,9	118	45	12
4148290	VDS202A11000	4142857	VDS402A11000	11,000	.4331	—	—	56	71	1,9	118	45	12
4148291	VDS202A11100	4142858	VDS402A11100	11,100	.4370	—	—	56	71	1,9	118	45	12
4148292	VDS202A11113	4142861	VDS402A11113	11,113	.4375	7/16	—	56	71	1,9	118	45	12
4148293	VDS202A11200	4142862	VDS402A11200	11,200	.4409	—	—	56	71	1,9	118	45	12
4148294	VDS202A11300	4142873	VDS402A11300	11,300	.4449	—	—	56	71	1,9	118	45	12
4148295	VDS202A11400	4142874	VDS402A11400	11,400	.4488	—	—	56	71	2,0	118	45	12
4148296	VDS202A11500	4142875	VDS402A11500	11,500	.4528	—	—	56	71	2,0	118	45	12
4148297	VDS202A11509	4142876	VDS402A11509	11,509	.4531	29/64	—	56	71	2,0	118	45	12
4148298	VDS202A11600	4142877	VDS402A11600	11,600	.4567	—	—	56	71	2,0	118	45	12
4148299	VDS202A11700	4142878	VDS402A11700	11,700	.4606	—	—	56	71	2,0	118	45	12
4148300	VDS202A11800	4142879	VDS402A11800	11,800	.4646	—	—	56	71	2,0	118	45	12
4148301	VDS202A11900	4142880	VDS402A11900	11,900	.4685	—	—	56	71	2,0	118	45	12
4148302	VDS202A11908	4142881	VDS402A11908	11,908	.4688	15/32	—	56	71	2,0	118	45	12
4148313	VDS202A12000	4142882	VDS402A12000	12,000	.4724	—	—	56	71	2,1	118	45	12
4148314	VDS202A12100	4142913	VDS402A12100	12,100	.4764	—	—	60	77	2,1	124	45	14
4148315	VDS202A12200	4142914	VDS402A12200	12,200	.4803	—	—	60	77	2,1	124	45	14
4148316	VDS202A12300	4142915	VDS402A12300	12,300	.4843	—	—	60	77	2,1	124	45	14
4148317	VDS202A12304	4142916	VDS402A12304	12,304	.4844	31/64	—	60	77	2,1	124	45	14
4148318	VDS202A12400	4142917	VDS402A12400	12,400	.4882	—	—	60	77	2,1	124	45	14
4148319	VDS202A12500	4142918	VDS402A12500	12,500	.4921	—	—	60	77	2,2	124	45	14
4148320	VDS202A12600	4142919	VDS402A12600	12,600	.4961	—	—	60	77	2,2	124	45	14
4148321	VDS202A12700	4142920	VDS402A12700	12,700	.5000	1/2	—	60	77	2,2	124	45	14
4148322	VDS202A12800	4142921	VDS402A12800	12,800	.5039	—	—	60	77	2,2	124	45	14
4148343	VDS202A12900	4142922	VDS402A12900	12,900	.5079	—	—	60	77	2,2	124	45	14
4148344	VDS202A13000	4142953	VDS402A13000	13,000	.5118	—	—	60	77	2,2	124	45	14
4148345	VDS202A13096	4142954	VDS402A13096	13,096	.5156	33/64	—	60	77	2,3	124	45	14
4148346	VDS202A13100	4142955	VDS402A13100	13,100	.5157	—	—	60	77	2,3	124	45	14
4148347	VDS202A13200	4142956	VDS402A13200	13,200	.5197	—	—	60	77	2,3	124	45	14
4148348	VDS202A13300	4142957	VDS402A13300	13,300	.5236	—	—	60	77	2,3	124	45	14
4148349	VDS202A13400	4142958	VDS402A13400	13,400	.5276	—	—	60	77	2,3	124	45	14
4148350	VDS202A13500	4142959	VDS402A13500	13,500	.5315	—	—	60	77	2,3	124	45	14
4148351	VDS202A13600	4142960	VDS402A13600	13,600	.5354	—	—	60	77	2,3	124	45	14
4148352	VDS202A13700	4142961	VDS402A13700	13,700	.5394	—	—	60	77	2,4	124	45	14
4148353	VDS202A13800	4142962	VDS402A13800	13,800	.5433	—	—	60	77	2,4	124	45	14
4148354	VDS202A13891	4142983	VDS402A13891	13,891	.5469	35/64	—	60	77	2,4	124	45	14
4148355	VDS202A13900	4142984	VDS402A13900	13,900	.5472	—	—	60	77	2,4	124	45	14
4148356	VDS202A14000	4142985	VDS402A14000	14,000	.5512	—	—	60	77	2,4	124	45	14

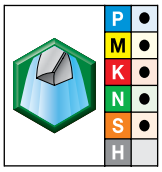
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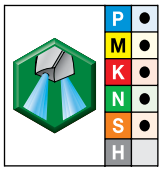
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For information on L, L3, and L4 max, see page C46.





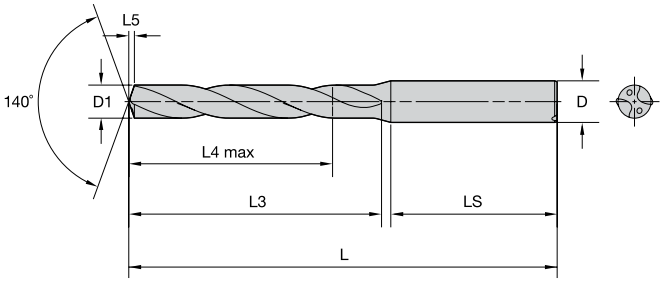
● first choice
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4148357	VDS202A14100	4142986	VDS402A14100	14,100	.5551	–	–	63	83	2,4	133	48	16
4148358	VDS202A14200	4142987	VDS402A14200	14,200	.5591	–	–	63	83	2,5	133	48	16
4148359	VDS202A14288	4142988	VDS402A14288	14,288	.5625	9/16	–	63	83	2,5	133	48	16
4148360	VDS202A14300	4142989	VDS402A14300	14,300	.5630	–	–	63	83	2,5	133	48	16
4148361	VDS202A14400	4142990	VDS402A14400	14,400	.5669	–	–	63	83	2,5	133	48	16
4148362	VDS202A14500	4142991	VDS402A14500	14,500	.5709	–	–	63	83	2,5	133	48	16
4148363	VDS202A14600	4142992	VDS402A14600	14,600	.5748	–	–	63	83	2,5	133	48	16
4148364	VDS202A14684	4143013	VDS402A14684	14,684	.5781	37/64	–	63	83	2,5	133	48	16
4148365	VDS202A14700	4143014	VDS402A14700	14,700	.5787	–	–	63	83	2,5	133	48	16
4148366	VDS202A14800	4143015	VDS402A14800	14,800	.5827	–	–	63	83	2,6	133	48	16
4148367	VDS202A14900	4143016	VDS402A14900	14,900	.5866	–	–	63	83	2,6	133	48	16
4148368	VDS202A15000	4143017	VDS402A15000	15,000	.5906	–	–	63	83	2,6	133	48	16
4148369	VDS202A15083	4143018	VDS402A15083	15,083	.5938	19/32	–	63	83	2,6	133	48	16
4148370	VDS202A15100	4143019	VDS402A15100	15,100	.5945	–	–	63	83	2,6	133	48	16
4148371	VDS202A15200	4143020	VDS402A15200	15,200	.5984	–	–	63	83	2,6	133	48	16
4148372	VDS202A15300	4143021	VDS402A15300	15,300	.6024	–	–	63	83	2,6	133	48	16
	–	4143022	VDS402A15400	15,400	.6063	–	–	63	83	2,7	133	48	16
	–	4143033	VDS402A15479	15,479	.6094	39/64	–	63	83	2,7	133	48	16
4148375	VDS202A15500	4143034	VDS402A15500	15,500	.6102	–	–	63	83	2,7	133	48	16
4148376	VDS202A15600	4143035	VDS402A15600	15,600	.6142	–	–	63	83	2,7	133	48	16
4148377	VDS202A15700	4143036	VDS402A15700	15,700	.6181	–	–	63	83	2,7	133	48	16
4148378	VDS202A15800	4143037	VDS402A15800	15,800	.6220	–	–	63	83	2,7	133	48	16
4148379	VDS202A15875	4143038	VDS402A15875	15,875	.6250	5/8	–	63	83	2,8	133	48	16
4148380	VDS202A15900	4143039	VDS402A15900	15,900	.6260	–	–	63	83	2,8	133	48	16
4148381	VDS202A16000	4143040	VDS402A16000	16,000	.6299	–	–	63	83	2,8	133	48	16
4148382	VDS202A16100	4143041	VDS402A16100	16,100	.6339	–	–	71	93	2,8	143	48	18
4148383	VDS202A16200	4143042	VDS402A16200	16,200	.6378	–	–	71	93	2,8	143	48	18
4148384	VDS202A16271	4143053	VDS402A16271	16,271	.6406	41/64	–	71	93	2,8	143	48	18
4148385	VDS202A16300	4143054	VDS402A16300	16,300	.6417	–	–	71	93	2,8	143	48	18
	–	4143055	VDS402A16400	16,400	.6457	–	–	71	93	2,8	143	48	18
4148387	VDS202A16500	4143056	VDS402A16500	16,500	.6496	–	–	71	93	2,9	143	48	18
4148388	VDS202A16600	4143057	VDS402A16600	16,600	.6535	–	–	71	93	2,9	143	48	18
4148389	VDS202A16670	4143058	VDS402A16670	16,670	.6563	21/32	–	71	93	2,9	143	48	18
	–	4143059	VDS402A16700	16,700	.6575	–	–	71	93	2,9	143	48	18
4148391	VDS202A16800	4143060	VDS402A16800	16,800	.6614	–	–	71	93	2,9	143	48	18
	–	4143061	VDS402A16900	16,900	.6654	–	–	71	93	2,9	143	48	18
4148393	VDS202A17000	4143062	VDS402A17000	17,000	.6693	–	–	71	93	3,0	143	48	18
4148394	VDS202A17100	4143073	VDS402A17100	17,100	.6732	–	–	71	93	3,0	143	48	18
	–	4143074	VDS402A17200	17,200	.6772	–	–	71	93	3,0	143	48	18
4148396	VDS202A17300	4143075	VDS402A17300	17,300	.6811	–	–	71	93	3,0	143	48	18
	–	4143076	VDS402A17400	17,400	.6850	–	–	71	93	3,0	143	48	18
4148398	VDS202A17463	4143077	VDS402A17463	17,463	.6875	11/16	–	71	93	3,0	143	48	18
4148399	VDS202A17500	4143078	VDS402A17500	17,500	.6890	–	–	71	93	3,0	143	48	18
4148400	VDS202A17600	4143079	VDS402A17600	17,600	.6929	–	–	71	93	3,1	143	48	18
4148401	VDS202A17700	4143080	VDS402A17700	17,700	.6969	–	–	71	93	3,1	143	48	18
4148402	VDS202A17800	4143081	VDS402A17800	17,800	.7008	–	–	71	93	3,1	143	48	18
	–	4143082	VDS402A17859	17,859	.7031	45/64	–	71	93	3,1	143	48	18
	–	4143093	VDS402A17900	17,900	.7047	–	–	71	93	3,1	143	48	18

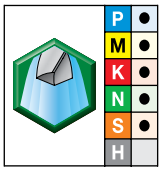
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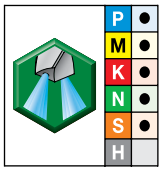
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For information on L, L3, and L4 max, see page C46.



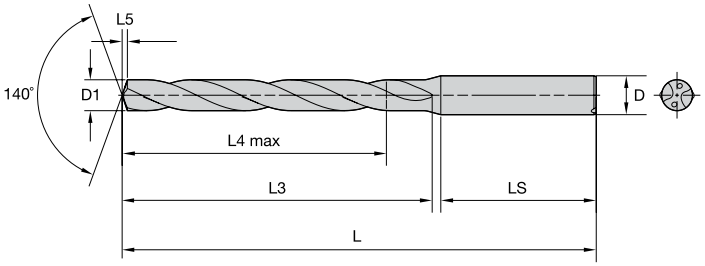


● first choice
○ alternate choice

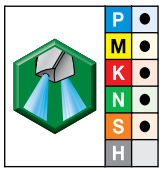
grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4147921	VDS202A18000	4142803	VDS402A18000	18,000	.7087	—	—	71	93	3,1	143	48	18
4147922	VDS202A18100	4142804	VDS402A18100	18,100	.7126	—	—	77	101	3,1	153	50	20
4148303	VDS202A18200	4142805	VDS402A18200	18,200	.7165	—	—	77	101	3,2	153	50	20
4148304	VDS202A18258	4142806	VDS402A18258	18,258	.7188	23/32	—	77	101	3,2	153	50	20
	–	4142807	VDS402A18300	18,300	.7205	—	—	77	101	3,2	153	50	20
	–	4142808	VDS402A18400	18,400	.7244	—	—	77	101	3,2	153	50	20
4148307	VDS202A18500	4142809	VDS402A18500	18,500	.7283	—	—	77	101	3,2	153	50	20
	–	4142810	VDS402A18600	18,600	.7323	—	—	77	101	3,2	153	50	20
	–	4142811	VDS402A18654	18,654	.7344	47/64	—	77	101	3,2	153	50	20
	–	4142812	VDS402A18700	18,700	.7362	—	—	77	101	3,3	153	50	20
4148311	VDS202A18800	4142824	VDS402A18800	18,800	.7402	—	—	77	101	3,3	153	50	20
	–	4142826	VDS402A18900	18,900	.7441	—	—	77	101	3,3	153	50	20
4148323	VDS202A19000	4142828	VDS402A19000	19,000	.7480	—	—	77	101	3,3	153	50	20
4148324	VDS202A19050	4142830	VDS402A19050	19,050	.7500	3/4	—	77	101	3,3	153	50	20
4148325	VDS202A19100	4142833	VDS402A19100	19,100	.7520	—	—	77	101	3,3	153	50	20
	–	4142835	VDS402A19200	19,200	.7559	—	—	77	101	3,3	153	50	20
4148327	VDS202A19300	4142837	VDS402A19300	19,300	.7598	—	—	77	101	3,4	153	50	20
4148328	VDS202A19400	4142839	VDS402A19400	19,400	.7638	—	—	77	101	3,4	153	50	20
4148329	VDS202A19500	4142841	VDS402A19500	19,500	.7677	—	—	77	101	3,4	153	50	20
	–	4142853	VDS402A19600	19,600	.7717	—	—	77	101	3,4	153	50	20
	–	4142854	VDS402A19700	19,700	.7756	—	—	77	101	3,4	153	50	20
4148332	VDS202A19800	4142856	VDS402A19800	19,800	.7795	—	—	77	101	3,4	153	50	20
4148333	VDS202A19900	4142859	VDS402A19900	19,900	.7835	—	—	77	101	3,5	153	50	20
4148334	VDS202A20000	4142860	VDS402A20000	20,000	.7874	—	—	77	101	3,5	153	50	20

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For information on L, L3, and L4 max, see page C46.



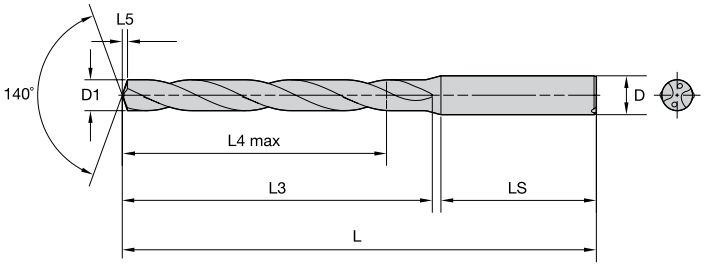
● first choice
○ alternate choice

grade WU25PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
6023126	VDS403A01000	1,000	.0394	–	–	10	12	0,2	58	28	4
6023129	VDS403A01100	1,100	.0433	–	–	10	12	0,2	58	28	4
6023132	VDS403A01200	1,200	.0472	–	–	10	12	0,2	58	28	4
6023133	VDS403A01300	1,300	.0512	–	–	10	12	0,2	58	28	4
6023134	VDS403A01321	1,321	.0520	–	55	10	12	0,2	58	28	4
6023136	VDS403A01400	1,400	.0551	–	–	10	12	0,2	58	28	4
4143700	VDS403A01500	1,500	.0591	–	–	15	18	0,2	58	28	4
4143701	VDS403A01600	1,600	.0630	–	–	15	18	0,2	58	28	4
4143702	VDS403A01700	1,700	.0669	–	–	15	18	0,3	58	28	4
4143723	VDS403A01800	1,800	.0709	–	–	15	18	0,3	58	28	4
4143724	VDS403A01900	1,900	.0748	–	–	15	18	0,3	58	28	4
4143725	VDS403A01984	1,984	.0781	5/64	–	22	26	0,3	66	28	4
4143726	VDS403A02000	2,000	.0787	–	–	22	26	0,3	66	28	4
4143727	VDS403A02100	2,100	.0827	–	–	22	26	0,3	66	28	4
4143728	VDS403A02200	2,200	.0866	–	–	22	26	0,3	66	28	4
4143729	VDS403A02300	2,300	.0906	–	–	22	26	0,4	66	28	4
4143730	VDS403A02383	2,383	.0938	3/32	–	25	30	0,4	66	28	4
4143731	VDS403A02400	2,400	.0945	–	–	25	30	0,4	66	28	4
4143732	VDS403A02439	2,439	.0960	–	41	25	30	0,4	66	28	4
4143733	VDS403A02489	2,489	.0980	–	40	25	30	0,4	66	28	4
4143734	VDS403A02500	2,500	.0984	–	–	25	30	0,4	66	28	4
4143735	VDS403A02578	2,578	.1015	–	38	25	30	0,4	66	28	4
4143736	VDS403A02600	2,600	.1024	–	–	25	30	0,4	66	28	4
4143737	VDS403A02642	2,642	.1040	–	37	25	30	0,4	66	28	4
4143738	VDS403A02700	2,700	.1063	–	–	25	30	0,4	66	28	4
4143739	VDS403A02705	2,705	.1065	–	36	25	30	0,4	66	28	4
4143740	VDS403A02779	2,779	.1094	7/64	–	25	30	0,5	66	28	4
4143741	VDS403A02800	2,800	.1102	–	–	25	30	0,5	66	28	4
4143742	VDS403A02820	2,820	.1110	–	34	25	30	0,5	66	28	4
4143743	VDS403A02870	2,870	.1130	–	33	25	30	0,5	66	28	4
4143744	VDS403A02900	2,900	.1142	–	–	25	30	0,5	66	28	4
4143745	VDS403A02947	2,947	.1160	–	32	25	30	0,5	66	28	4
4143746	VDS403A03000	3,000	.1181	–	–	33	40	0,5	78	36	6
4143747	VDS403A03048	3,048	.1200	–	31	33	40	0,5	78	36	6
4143748	VDS403A03100	3,100	.1220	–	–	33	40	0,5	78	36	6
4143749	VDS403A03175	3,175	.1250	1/8	–	33	40	0,5	78	36	6
4143750	VDS403A03200	3,200	.1260	–	–	33	40	0,5	78	36	6
4143751	VDS403A03264	3,264	.1285	–	30	33	40	0,5	78	36	6
4143752	VDS403A03300	3,300	.1299	–	30	33	40	0,5	78	36	6
4143753	VDS403A03400	3,400	.1339	–	–	33	40	0,6	78	36	6
4143754	VDS403A03455	3,455	.1360	–	29	33	40	0,6	78	36	6
4143755	VDS403A03500	3,500	.1378	–	21	33	40	0,6	78	36	6
4143756	VDS403A03571	3,571	.1406	9/64	–	33	40	0,6	78	36	6
4143757	VDS403A03600	3,600	.1417	–	–	33	40	0,6	78	36	6
4143758	VDS403A03658	3,658	.1440	–	27	33	40	0,6	78	36	6
4143759	VDS403A03700	3,700	.1457	–	–	33	40	0,6	78	36	6
4143760	VDS403A03734	3,734	.1470	–	26	33	40	0,6	78	36	6
4143761	VDS403A03800	3,800	.1496	–	–	41	49	0,6	87	36	6
4143762	VDS403A03900	3,900	.1535	–	–	41	49	0,6	87	36	6
4143763	VDS403A03970	3,970	.1563	5/32	–	41	49	0,7	87	36	6
4143764	VDS403A04000	4,000	.1575	–	–	41	49	0,7	87	36	6
4143765	VDS403A04039	4,039	.1590	–	21	41	49	0,7	87	36	6

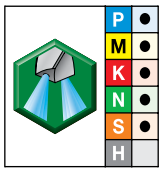
VariDrill • 8 x D • VDS403A • A-Shank

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For information on L, L3, and L4 max, see page C46.



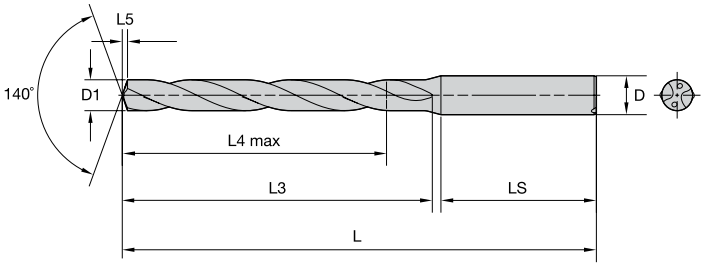
● first choice
○ alternate choice

grade WU25PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4143766	VDS403A04090	4,090	.1610	–	20	41	49	0,7	87	36	6
4143767	VDS403A04100	4,100	.1614	–	–	41	49	0,7	87	36	6
4143768	VDS403A04200	4,200	.1654	–	–	41	49	0,7	87	36	6
4143769	VDS403A04217	4,217	.1660	–	19	41	49	0,7	87	36	6
4143770	VDS403A04300	4,300	.1693	–	14	41	49	0,7	87	36	6
4143771	VDS403A04366	4,366	.1719	11/64	–	41	49	0,7	87	36	6
4143772	VDS403A04400	4,400	.1732	–	–	41	49	0,7	87	36	6
4143773	VDS403A04500	4,500	.1772	–	–	41	49	0,7	87	36	6
4143774	VDS403A04600	4,600	.1811	–	19	41	49	0,8	87	36	6
4143775	VDS403A04623	4,623	.1820	–	14	41	49	0,8	87	36	6
4143776	VDS403A04700	4,700	.1850	–	13	41	49	0,8	87	36	6
4143777	VDS403A04763	4,763	.1875	3/16	13	48	56	0,8	94	36	6
4143778	VDS403A04800	4,800	.1890	–	12	48	56	0,8	94	36	6
4143779	VDS403A04852	4,852	.1910	–	11	48	56	0,8	94	36	6
4143780	VDS403A04900	4,900	.1929	–	–	48	56	0,8	94	36	6
4143781	VDS403A05000	5,000	.1969	–	–	48	56	0,8	94	36	6
4143782	VDS403A05100	5,100	.2008	–	–	48	56	0,9	94	36	6
4143783	VDS403A05106	5,106	.2010	–	7	48	56	0,9	94	36	6
4143784	VDS403A05159	5,159	.2031	13/64	–	48	56	0,9	94	36	6
4143785	VDS403A05200	5,200	.2047	–	–	48	56	0,9	94	36	6
4143786	VDS403A05300	5,300	.2087	–	12	48	56	0,9	94	36	6
4143787	VDS403A05400	5,400	.2126	–	7	48	56	0,9	94	36	6
4143788	VDS403A05410	5,410	.2130	–	3	48	56	0,9	94	36	6
4143789	VDS403A05500	5,500	.2165	–	3	48	56	0,9	94	36	6
4143790	VDS403A05558	5,558	.2188	7/32	2	48	56	0,9	94	36	6
4143791	VDS403A05600	5,600	.2205	–	–	48	56	0,9	94	36	6
4143792	VDS403A05616	5,616	.2211	–	2	48	56	0,9	94	36	6
4143793	VDS403A05700	5,700	.2244	–	–	48	56	1,0	94	36	6
4143794	VDS403A05800	5,800	.2283	–	–	48	56	1,0	94	36	6
4143795	VDS403A05900	5,900	.2323	–	–	48	56	1,0	94	36	6
4143796	VDS403A05954	5,954	.2344	15/64	–	48	56	1,0	94	36	6
4143797	VDS403A06000	6,000	.2362	–	–	48	56	1,0	94	36	6
4143798	VDS403A06100	6,100	.2402	–	–	57	67	1,0	105	36	8
4143799	VDS403A06200	6,200	.2441	–	F	57	67	1,0	105	36	8
4143800	VDS403A06300	6,300	.2480	–	–	57	67	1,1	105	36	8
4143801	VDS403A06350	6,350	.2500	1/4	E	57	67	1,1	105	36	8
4143802	VDS403A06400	6,400	.2520	–	–	57	67	1,1	105	36	8
4143803	VDS403A06500	6,500	.2559	–	–	57	67	1,1	105	36	8
4143804	VDS403A06528	6,528	.2570	–	F	57	67	1,1	105	36	8
4143805	VDS403A06600	6,600	.2598	–	E	57	67	1,1	105	36	8
4143806	VDS403A06630	6,630	.2610	–	G	57	67	1,1	105	36	8
4143807	VDS403A06700	6,700	.2638	–	–	57	67	1,1	105	36	8
4143808	VDS403A06746	6,746	.2656	17/64	–	57	67	1,1	105	36	8
4143809	VDS403A06800	6,800	.2677	–	–	57	67	1,1	105	36	8
4143810	VDS403A06900	6,900	.2717	–	–	57	67	1,2	105	36	8
4143811	VDS403A07000	7,000	.2756	–	–	57	67	1,2	105	36	8
4143812	VDS403A07100	7,100	.2795	–	–	61	72	1,2	110	36	8
4143813	VDS403A07145	7,145	.2813	9/32	–	61	72	1,2	110	36	8
4143814	VDS403A07200	7,200	.2835	–	–	61	72	1,2	110	36	8
4143815	VDS403A07300	7,300	.2874	–	–	61	72	1,2	110	36	8
4143816	VDS403A07400	7,400	.2913	–	–	61	72	1,3	110	36	8
4143817	VDS403A07500	7,500	.2953	–	–	61	72	1,3	110	36	8

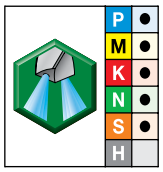
VariDrill • 8 x D • VDS403A • A-Shank

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For information on L, L3, and L4 max, see page C46.



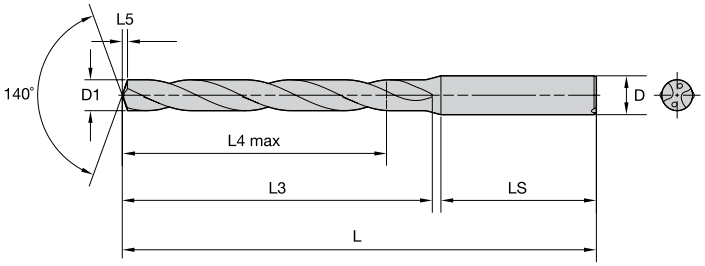
● first choice
○ alternate choice

grade WU25PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4143818	VDS403A07541	7,541	.2969	19/64	–	61	72	1,3	110	36	8
4143819	VDS403A07600	7,600	.2992	–	–	61	72	1,3	110	36	8
4143820	VDS403A07700	7,700	.3031	–	–	61	72	1,3	110	36	8
4143821	VDS403A07800	7,800	.3071	–	–	61	72	1,3	110	36	8
4143822	VDS403A07900	7,900	.3110	–	–	61	72	1,3	110	36	8
4143823	VDS403A07938	7,938	.3125	5/16	Q	61	72	1,3	110	36	8
4143824	VDS403A08000	8,000	.3150	–	–	61	72	1,4	110	36	8
4143825	VDS403A08100	8,100	.3189	–	–	68	80	1,4	122	40	10
4143826	VDS403A08200	8,200	.3228	–	–	68	80	1,4	122	40	10
4143827	VDS403A08300	8,300	.3268	–	–	68	80	1,4	122	40	10
4143828	VDS403A08334	8,334	.3281	21/64	–	68	80	1,4	122	40	10
4143829	VDS403A08400	8,400	.3307	–	–	68	80	1,4	122	40	10
4143830	VDS403A08433	8,433	.3320	–	Q	68	80	1,4	122	40	10
4143831	VDS403A08500	8,500	.3346	–	–	68	80	1,4	122	40	10
4143832	VDS403A08600	8,600	.3386	–	–	68	80	1,5	122	40	10
4143833	VDS403A08700	8,700	.3425	–	–	68	80	1,5	122	40	10
4143834	VDS403A08733	8,733	.3438	11/32	–	68	80	1,5	122	40	10
4143835	VDS403A08800	8,800	.3465	–	–	68	80	1,5	122	40	10
4143836	VDS403A08900	8,900	.3504	–	–	68	80	1,5	122	40	10
4143837	VDS403A09000	9,000	.3543	–	–	68	80	1,5	122	40	10
4143838	VDS403A09100	9,100	.3583	–	–	68	80	1,6	122	40	10
4143839	VDS403A09129	9,129	.3594	23/64	–	68	80	1,6	122	40	10
4143840	VDS403A09200	9,200	.3622	–	–	68	80	1,6	122	40	10
4143841	VDS403A09300	9,300	.3661	–	–	68	80	1,6	122	40	10
4143842	VDS403A09347	9,347	.3680	–	U	68	80	1,6	122	40	10
4143843	VDS403A09400	9,400	.3701	–	–	68	80	1,6	122	40	10
4143844	VDS403A09500	9,500	.3740	–	–	68	80	1,6	122	40	10
4143845	VDS403A09525	9,525	.3750	3/8	–	68	80	1,6	122	40	10
4143846	VDS403A09600	9,600	.3780	–	U	68	80	1,6	122	40	10
4143847	VDS403A09700	9,700	.3819	–	–	68	80	1,7	122	40	10
4143848	VDS403A09800	9,800	.3858	–	–	68	80	1,7	122	40	10
4143849	VDS403A09900	9,900	.3898	–	–	68	80	1,7	122	40	10
4143850	VDS403A09921	9,921	.3906	25/64	–	68	80	1,7	122	40	10
4143421	VDS403A10000	10,000	.3937	–	–	68	80	1,7	122	40	10
4143422	VDS403A10100	10,100	.3976	–	–	79	94	1,7	141	45	12
4143473	VDS403A10200	10,200	.4016	–	–	79	94	1,7	141	45	12
4143474	VDS403A10300	10,300	.4055	–	–	79	94	1,8	141	45	12
4143475	VDS403A10320	10,320	.4063	13/32	–	79	94	1,8	141	45	12
4143476	VDS403A10400	10,400	.4094	–	–	79	94	1,8	141	45	12
4143477	VDS403A10500	10,500	.4134	–	–	79	94	1,8	141	45	12
4143478	VDS403A10600	10,600	.4173	–	–	79	94	1,8	141	45	12
4143479	VDS403A10700	10,700	.4213	–	–	79	94	1,8	141	45	12
4143480	VDS403A10716	10,716	.4219	27/64	–	79	94	1,8	141	45	12
4143481	VDS403A10800	10,800	.4252	–	–	79	94	1,9	141	45	12
4143482	VDS403A10900	10,900	.4291	–	–	79	94	1,9	141	45	12
4143483	VDS403A11000	11,000	.4331	–	–	79	94	1,9	141	45	12
4143484	VDS403A11100	11,100	.4370	–	–	79	94	1,9	141	45	12
4143485	VDS403A11113	11,113	.4375	7/16	–	79	94	1,9	141	45	12
4143486	VDS403A11200	11,200	.4409	–	–	79	94	1,9	141	45	12
4143487	VDS403A11300	11,300	.4449	–	–	79	94	1,9	141	45	12
4143488	VDS403A11400	11,400	.4488	–	–	79	94	2,0	141	45	12
4143489	VDS403A11500	11,500	.4528	–	–	79	94	2,0	141	45	12

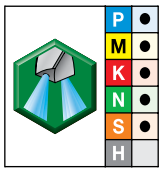
VariDrill • 8 x D • VDS403A • A-Shank

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For information on L, L3, and L4 max, see page C46.



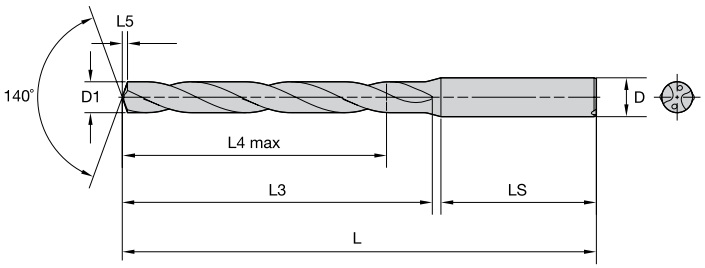
● first choice
○ alternate choice

grade WU25PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4143490	VDS403A11509	11,509	.4531	29/64	–	79	94	2,0	141	45	12
4143491	VDS403A11600	11,600	.4567	–	–	79	94	2,0	141	45	12
4143492	VDS403A11700	11,700	.4606	–	–	79	94	2,0	141	45	12
4143493	VDS403A11800	11,800	.4646	–	–	79	94	2,0	141	45	12
4143494	VDS403A11900	11,900	.4685	–	–	79	94	2,0	141	45	12
4143495	VDS403A11908	11,908	.4688	15/32	–	79	94	2,0	141	45	12
4143496	VDS403A12000	12,000	.4724	–	–	79	94	2,1	141	45	12
4143497	VDS403A12100	12,100	.4764	–	–	91	108	2,1	155	45	14
4143498	VDS403A12200	12,200	.4803	–	–	91	108	2,1	155	45	14
4143499	VDS403A12300	12,300	.4843	–	–	91	108	2,1	155	45	14
4143500	VDS403A12304	12,304	.4844	31/64	–	91	108	2,1	155	45	14
4143501	VDS403A12400	12,400	.4882	–	–	91	108	2,1	155	45	14
4143502	VDS403A12500	12,500	.4921	–	–	91	108	2,2	155	45	14
4143503	VDS403A12600	12,600	.4961	–	–	91	108	2,2	155	45	14
4143504	VDS403A12700	12,700	.5000	1/2	–	91	108	2,2	155	45	14
4143505	VDS403A12800	12,800	.5039	–	–	91	108	2,2	155	45	14
4143506	VDS403A12900	12,900	.5079	–	–	91	108	2,2	155	45	14
4143507	VDS403A13000	13,000	.5118	–	–	91	108	2,2	155	45	14
4143508	VDS403A13096	13,096	.5156	33/64	–	91	108	2,3	155	45	14
4143509	VDS403A13100	13,100	.5157	–	–	91	108	2,3	155	45	14
4143510	VDS403A13200	13,200	.5197	–	–	91	108	2,3	155	45	14
4143511	VDS403A13300	13,300	.5236	–	–	91	108	2,3	155	45	14
4143512	VDS403A13400	13,400	.5276	–	–	91	108	2,3	155	45	14
4143513	VDS403A13500	13,500	.5315	–	–	91	108	2,3	155	45	14
4143514	VDS403A13600	13,600	.5354	–	–	91	108	2,3	155	45	14
4143515	VDS403A13700	13,700	.5394	–	–	91	108	2,4	155	45	14
4143516	VDS403A13800	13,800	.5433	–	–	91	108	2,4	155	45	14
4143517	VDS403A13891	13,891	.5469	35/64	–	91	108	2,4	155	45	14
4143518	VDS403A13900	13,900	.5472	–	–	91	108	2,4	155	45	14
4143519	VDS403A14000	14,000	.5512	–	–	91	108	2,4	155	45	14
4143520	VDS403A14100	14,100	.5551	–	–	101	121	2,4	171	48	16
4143521	VDS403A14200	14,200	.5591	–	–	101	121	2,5	171	48	16
4143522	VDS403A14288	14,288	.5625	9/16	–	101	121	2,5	171	48	16
4143523	VDS403A14300	14,300	.5630	–	–	101	121	2,5	171	48	16
4143524	VDS403A14400	14,400	.5669	–	–	101	121	2,5	171	48	16
4143525	VDS403A14500	14,500	.5709	–	–	101	121	2,5	171	48	16
4143526	VDS403A14600	14,600	.5748	–	–	101	121	2,5	171	48	16
4143527	VDS403A14684	14,684	.5781	37/64	–	101	121	2,5	171	48	16
4143528	VDS403A14700	14,700	.5787	–	–	101	121	2,5	171	48	16
4143529	VDS403A14800	14,800	.5827	–	–	101	121	2,6	171	48	16
4143530	VDS403A14900	14,900	.5866	–	–	101	121	2,6	171	48	16
4143531	VDS403A15000	15,000	.5906	–	–	101	121	2,6	171	48	16
4143532	VDS403A15083	15,083	.5938	19/32	–	101	121	2,6	171	48	16
4143533	VDS403A15100	15,100	.5945	–	–	101	121	2,6	171	48	16
4143534	VDS403A15200	15,200	.5984	–	–	101	121	2,6	171	48	16
4143535	VDS403A15300	15,300	.6024	–	–	101	121	2,6	171	48	16
4143536	VDS403A15400	15,400	.6063	–	–	101	121	2,7	171	48	16
4143537	VDS403A15479	15,479	.6094	39/64	–	101	121	2,7	171	48	16
4143538	VDS403A15500	15,500	.6102	–	–	128	146	2,7	197	48	16
4143539	VDS403A15600	15,600	.6142	–	–	101	121	2,7	171	48	16
4143540	VDS403A15700	15,700	.6181	–	–	101	121	2,7	171	48	16
4143541	VDS403A15800	15,800	.6220	–	–	101	121	2,7	171	48	16

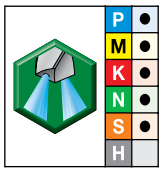
VariDrill • 8 x D • VDS403A • A-Shank

(continued)





For information on L, L3, and L4 max, see page C46.



● first choice
○ alternate choice

grade WU25PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4143542	VDS403A15875	15,875	.6250	5/8	–	101	121	2,8	171	48	16
4143543	VDS403A15900	15,900	.6260	–	–	101	121	2,8	171	48	16
4143544	VDS403A16000	16,000	.6299	–	–	101	121	2,8	171	48	16
4143546	VDS403A16200	16,200	.6378	–	–	113	135	2,8	185	48	18
4143547	VDS403A16271	16,271	.6406	41/64	–	113	135	2,8	185	48	18
4143548	VDS403A16300	16,300	.6417	–	–	113	135	2,8	185	48	18
4143549	VDS403A16400	16,400	.6457	–	–	113	135	2,8	185	48	18
4143550	VDS403A16500	16,500	.6496	–	–	113	135	2,9	185	48	18
4143551	VDS403A16600	16,600	.6535	–	–	113	135	2,9	185	48	18
4143552	VDS403A16670	16,670	.6563	21/32	–	113	135	2,9	185	48	18
4143553	VDS403A16700	16,700	.6575	–	–	113	135	2,9	185	48	18
4143554	VDS403A16800	16,800	.6614	–	–	113	135	2,9	185	48	18
4143555	VDS403A16900	16,900	.6654	–	–	113	135	2,9	185	48	18
4143556	VDS403A17000	17,000	.6693	–	–	113	135	3,0	185	48	18
4143557	VDS403A17100	17,100	.6732	–	–	113	135	3,0	185	48	18
4143558	VDS403A17200	17,200	.6772	–	–	113	135	3,0	185	48	18
4143559	VDS403A17300	17,300	.6811	–	–	113	135	3,0	185	48	18
4143560	VDS403A17400	17,400	.6850	–	–	113	135	3,0	185	48	18
4143561	VDS403A17463	17,463	.6875	11/16	–	113	135	3,0	185	48	18
4143562	VDS403A17500	17,500	.6890	–	–	113	135	3,0	185	48	18
4143563	VDS403A17600	17,600	.6929	–	–	113	135	3,1	185	48	18
4143564	VDS403A17700	17,700	.6969	–	–	113	135	3,1	185	48	18
4143565	VDS403A17800	17,800	.7008	–	–	113	135	3,1	185	48	18
4144209	VDS403A18000	18,000	.7087	–	–	113	135	3,1	185	48	18
4144211	VDS403A18100	18,100	.7126	–	–	124	148	3,1	200	50	20
4144212	VDS403A18200	18,200	.7165	–	–	124	148	3,2	200	50	20
4144246	VDS403A18300	18,300	.7205	–	–	124	148	3,2	200	50	20
4144248	VDS403A18400	18,400	.7244	–	–	124	148	3,2	200	50	20
4144250	VDS403A18500	18,500	.7283	–	–	124	148	3,2	200	50	20
4144252	VDS403A18600	18,600	.7323	–	–	124	148	3,2	200	50	20
4144256	VDS403A18700	18,700	.7362	–	–	124	148	3,3	200	50	20
4144258	VDS403A18800	18,800	.7402	–	–	124	148	3,3	200	50	20
4144260	VDS403A18900	18,900	.7441	–	–	124	148	3,3	200	50	20
4144262	VDS403A19000	19,000	.7480	–	–	124	148	3,3	200	50	20
4144275	VDS403A19050	19,050	.7500	3/4	–	124	148	3,3	200	50	20
4144277	VDS403A19100	19,100	.7520	–	–	124	148	3,3	200	50	20
4144281	VDS403A19300	19,300	.7598	–	–	124	148	3,4	200	50	20
4144283	VDS403A19400	19,400	.7638	–	–	124	148	3,4	200	50	20
4144285	VDS403A19500	19,500	.7677	–	–	124	148	3,4	200	50	20
4144289	VDS403A19700	19,700	.7756	–	–	124	148	3,4	200	50	20
4144291	VDS403A19800	19,800	.7795	–	–	124	148	3,4	200	50	20
4144303	VDS403A19900	19,900	.7835	–	–	124	148	3,5	200	50	20
4144305	VDS403A20000	20,000	.7874	–	–	124	148	3,5	200	50	20

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Material Group		Cutting Speed — vc Range — SFM min	–	max	Tool Diameter (inch)	Recommended Feed Rate (f) by Diameter .0469–3/64	.0781–5/64	.125–1/8	.188–3/16	.250–1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4
P	0	230	–	380	IPR	.001—.003	.002—.004	.002—.004	.003—.005	.004—.007	.004—.009	.005—.010	.006—.012	.007—.014	.009—.018
	1	200	–	330	IPR	.002—.004	.002—.004	.002—.005	.004—.006	.004—.009	.005—.010	.006—.012	.007—.014	.009—.017	.011—.021
	2	260	–	330	IPR	.002—.004	.002—.004	.002—.005	.003—.006	.005—.009	.006—.010	.007—.012	.008—.014	.009—.017	.012—.021
	3	160	–	300	IPR	.002—.004	.002—.005	.003—.006	.004—.007	.005—.009	.006—.011	.007—.013	.009—.015	.010—.019	.013—.023
	4	160	–	330	IPR	.002—.005	.002—.005	.002—.006	.003—.007	.005—.009	.006—.011	.007—.013	.007—.015	.009—.019	.011—.023
	5	100	–	200	IPR	.001—.002	.002—.002	.002—.003	.002—.004	.003—.006	.004—.007	.005—.009	.006—.009	.007—.013	.009—.016
	6	100	–	200	IPR	.001—.002	.002—.002	.002—.003	.002—.004	.003—.006	.004—.007	.005—.009	.006—.009	.007—.013	.009—.016
M	1	70	–	130	IPR	.001—.002	.001—.002	.002—.003	.002—.004	.003—.004	.004—.005	.004—.006	.005—.006	.006—.007	.006—.008
	2	100	–	160	IPR	.001—.002	.001—.003	.002—.003	.002—.004	.003—.005	.004—.006	.004—.006	.005—.007	.006—.008	.006—.009
	3	70	–	130	IPR	.001—.002	.001—.002	.002—.003	.002—.004	.003—.004	.004—.005	.004—.006	.005—.006	.006—.007	.006—.008
K	1	260	–	560	IPR	.004—.007	.004—.008	.004—.009	.005—.009	.006—.012	.008—.015	.009—.017	.010—.019	.012—.024	.015—.029
	2	300	–	390	IPR	.002—.005	.003—.006	.004—.007	.005—.007	.006—.010	.008—.012	.009—.014	.010—.016	.012—.019	.015—.024
	3	260	–	430	IPR	.002—.004	.002—.005	.003—.006	.004—.007	.005—.010	.006—.012	.007—.014	.007—.016	.010—.019	.012—.024
N	1	300	–	890	IPR	.002—.005	.002—.005	.003—.006	.004—.006	.005—.008	.006—.009	.008—.011	.009—.013	.011—.016	.013—.019
	2	300	–	890	IPR	.002—.003	.002—.005	.003—.006	.004—.008	.005—.009	.006—.011	.008—.013	.009—.014	.011—.017	.013—.020
	3	300	–	740	IPR	.004—.005	.004—.006	.005—.006	.005—.006	.006—.008	.006—.009	.008—.011	.009—.013	.011—.016	.013—.017
	4	300	–	890	IPR	.002—.003	.002—.005	.003—.006	.004—.008	.005—.009	.006—.011	.008—.013	.009—.014	.011—.016	.013—.019
S	1	70	–	100	IPR	.001—.002	.001—.002	.001—.002	.002—.003	.002—.004	.003—.005	.004—.005	.004—.006	.005—.006	.006—.007
	2	30	–	100	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.003—.004	.003—.004	.004—.005	.004—.006	.004—.006
	3	70	–	130	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.002—.004	.003—.004	.003—.004	.004—.005	.004—.006
	4	70	–	160	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.003—.004	.003—.004	.004—.005	.004—.006	.004—.006
H	1	20	–	30	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.003—.004	.003—.004	.004—.005	.004—.006	.004—.006
	2	10	–	30	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.002—.004	.003—.004	.003—.004	.004—.005	.004—.006

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Material Group		Cutting Speed — vc Range — m/min min	–	max	Tool Diameter (mm)	Recommended Feed Rate (f) by Diameter 1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	70	–	115	mm/r	0,03–0,08	0,04–0,09	0,05–0,11	0,08–0,14	0,09–0,19	0,11–0,22	0,13–0,26	0,15–0,30	0,19–0,36	0,24–0,46
	1	60	–	100	mm/r	0,04–0,09	0,05–0,11	0,06–0,13	0,09–0,16	0,11–0,22	0,13–0,26	0,15–0,31	0,18–0,35	0,22–0,42	0,28–0,54
	2	80	–	100	mm/r	0,04–0,09	0,05–0,11	0,06–0,13	0,08–0,16	0,12–0,22	0,14–0,26	0,17–0,31	0,20–0,35	0,24–0,42	0,31–0,53
	3	50	–	90	mm/r	0,05–0,11	0,06–0,13	0,07–0,15	0,09–0,17	0,13–0,23	0,15–0,28	0,19–0,33	0,22–0,38	0,26–0,47	0,34–0,59
	4	50	–	100	mm/r	0,04–0,12	0,05–0,13	0,06–0,15	0,08–0,17	0,12–0,23	0,14–0,28	0,17–0,33	0,19–0,38	0,23–0,47	0,29–0,59
	5	30	–	60	mm/r	0,03–0,05	0,04–0,06	0,05–0,07	0,06–0,10	0,08–0,14	0,10–0,18	0,12–0,22	0,14–0,24	0,18–0,32	0,23–0,41
	6	30	–	60	mm/r	0,03–0,05	0,04–0,06	0,05–0,07	0,06–0,10	0,08–0,14	0,10–0,18	0,12–0,22	0,14–0,24	0,18–0,32	0,23–0,41
M	1	20	–	40	mm/r	0,02–0,05	0,03–0,06	0,04–0,07	0,05–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20
	2	30	–	50	mm/r	0,02–0,06	0,03–0,07	0,04–0,08	0,06–0,10	0,08–0,12	0,09–0,14	0,10–0,16	0,12–0,18	0,14–0,20	0,16–0,22
	3	20	–	40	mm/r	0,02–0,05	0,03–0,06	0,04–0,07	0,06–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20
K	1	80	–	170	mm/r	0,09–0,18	0,10–0,20	0,11–0,22	0,12–0,24	0,16–0,31	0,20–0,38	0,23–0,44	0,25–0,49	0,31–0,60	0,38–0,74
	2	90	–	120	mm/r	0,06–0,13	0,08–0,15	0,10–0,17	0,12–0,19	0,16–0,25	0,20–0,31	0,23–0,36	0,25–0,40	0,31–0,48	0,38–0,60
	3	80	–	130	mm/r	0,05–0,11	0,06–0,13	0,07–0,15	0,09–0,19	0,12–0,25	0,14–0,30	0,17–0,35	0,19–0,40	0,25–0,48	0,30–0,60
N	1	90	–	270	mm/r	0,05–0,12	0,06–0,13	0,08–0,14	0,10–0,16	0,12–0,20	0,16–0,24	0,20–0,28	0,24–0,32	0,28–0,40	0,32–0,48
	2	90	–	270	mm/r	0,04–0,08	0,06–0,12	0,08–0,16	0,10–0,20	0,12–0,24	0,16–0,28	0,20–0,32	0,24–0,36	0,28–0,44	0,32–0,52
	3	90	–	225	mm/r	0,10–0,13	0,11–0,14	0,12–0,14	0,13–0,16	0,14–0,20	0,16–0,24	0,20–0,28	0,24–0,32	0,28–0,40	0,32–0,44
	4	90	–	270	mm/r	0,04–0,08	0,06–0,12	0,08–0,16	0,10–0,20	0,12–0,24	0,16–0,28	0,20–0,32	0,24–0,36	0,28–0,40	0,32–0,48
S	1	20	–	30	mm/r	0,01–0,04	0,02–0,05	0,03–0,06	0,04–0,08	0,06–0,10	0,08–0,12	0,09–0,13	0,10–0,14	0,12–0,16	0,14–0,18
	2	10	–	30	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16
	3	20	–	40	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,02–0,05	0,04–0,07	0,06–0,09	0,07–0,10	0,08–0,11	0,09–0,13	0,10–0,15
	4	20	–	50	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16
H	1	10	–	30	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16
	2	10	–	30	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,02–0,05	0,04–0,07	0,06–0,09	0,07–0,10	0,08–0,11	0,09–0,13	0,10–0,15

nominal size range	Inch tolerance D1 tolerance	D tolerance h6
.0394–.1181	.0000/-.0006 (h8)	.0000/-.0002
>.1181–.2362	.0000/-.0005 (h7)	.0000/-.0003
>.2362–.3937	.0000/-.0006 (h7)	.0000/-.0004
>.3937–.7087	.0000/-.0007 (h7)	.0000/-.0004
>.7087–.7874	.0000/-.0008 (h7)	.0000/-.0005

nominal size range	Metric tolerance D1 tolerance	D tolerance h6
1–3	0,000/-0,014 (h8)	0,000/-0,006
>3–6	0,000/-0,012 (h7)	0,000/-0,008
>6–10	0,000/-0,015 (h7)	0,000/-0,009
>10–18	0,000/-0,018 (h7)	0,000/-0,011
>18–20	0,000/-0,021 (h7)	0,000/-0,013

Application Data • VDS4 Series • WU25PD • Through Coolant • Inch



Material Group		Cutting Speed — vc Range — SFM min	–	max	Tool Diameter (inch)	Recommended Feed Rate (f) by Diameter .0469–3/64	.0781–5/64	.125–1/8	.188–3/16	.250–1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4
P	0	230	–	380	IPR	.001—.003	.002—.004	.002—.004	.003—.005	.004—.007	.004—.009	.005—.010	.006—.012	.007—.014	.009—.018
	1	230	–	460	IPR	.002—.004	.002—.005	.003—.006	.003—.006	.004—.009	.005—.010	.006—.012	.007—.014	.009—.017	.011—.021
	2	300	–	460	IPR	.002—.004	.002—.005	.003—.006	.003—.006	.005—.009	.006—.010	.007—.012	.008—.014	.009—.017	.012—.021
	3	200	–	330	IPR	.002—.004	.002—.005	.003—.006	.004—.007	.005—.009	.006—.011	.007—.013	.009—.015	.010—.019	.013—.023
	4	160	–	330	IPR	.002—.004	.002—.005	.003—.006	.003—.007	.005—.009	.006—.011	.007—.013	.007—.015	.009—.019	.011—.023
	5	100	–	200	IPR	.001—.002	.002—.002	.002—.003	.002—.004	.003—.006	.004—.007	.005—.009	.006—.009	.007—.013	.009—.016
	6	130	–	230	IPR	.001—.002	.002—.002	.002—.003	.002—.004	.003—.006	.004—.007	.005—.009	.006—.009	.007—.013	.009—.016
M	1	70	–	130	IPR	.001—.002	.001—.002	.002—.003	.002—.004	.003—.004	.004—.005	.004—.006	.005—.006	.006—.007	.006—.008
	2	100	–	160	IPR	.001—.002	.001—.003	.002—.003	.002—.004	.003—.005	.004—.006	.004—.006	.005—.007	.006—.008	.006—.009
	3	70	–	130	IPR	.001—.002	.001—.002	.002—.003	.002—.004	.003—.004	.004—.005	.004—.006	.005—.006	.006—.007	.006—.008
K	1	260	–	560	IPR	.003—.006	.004—.007	.004—.009	.005—.009	.006—.012	.008—.015	.009—.017	.010—.019	.012—.024	.015—.029
	2	260	–	460	IPR	.004—.006	.004—.006	.005—.006	.005—.007	.006—.010	.008—.012	.009—.014	.010—.016	.012—.019	.015—.024
	3	260	–	430	IPR	.002—.005	.003—.006	.003—.007	.004—.007	.005—.010	.006—.012	.007—.014	.007—.016	.009—.019	.012—.024
N	1	290	–	1030	IPR	.002—.005	.002—.005	.003—.006	.004—.006	.005—.008	.006—.009	.008—.011	.009—.013	.011—.016	.013—.019
	2	290	–	890	IPR	.002—.003	.002—.005	.003—.006	.004—.008	.005—.009	.006—.011	.008—.013	.009—.014	.011—.017	.013—.020
	3	290	–	890	IPR	.004—.005	.004—.006	.005—.006	.005—.006	.006—.008	.006—.009	.008—.011	.009—.013	.011—.016	.013—.017
	4	290	–	590	IPR	.002—.003	.002—.005	.003—.006	.004—.008	.005—.009	.006—.011	.008—.013	.009—.014	.011—.016	.013—.019
S	1	30	–	100	IPR	.001—.002	.001—.002	.001—.002	.002—.003	.002—.004	.003—.005	.004—.005	.004—.006	.005—.006	.006—.007
	2	30	–	80	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.003—.004	.003—.004	.004—.005	.004—.006	.004—.006
	3	30	–	100	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.002—.004	.003—.004	.003—.004	.004—.005	.004—.006
	4	30	–	130	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.003—.004	.003—.004	.004—.005	.004—.006	.004—.006
H	1	20	–	30	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.003—.004	.003—.004	.004—.005	.004—.006	.004—.006
	2	10	–	30	IPR	.001—.001	.001—.001	.001—.002	.001—.002	.002—.003	.002—.004	.003—.004	.003—.004	.004—.005	.004—.006

Application Data • VDS4 Series • WU25PD™ • Through Coolant • Metric



Material Group		Cutting Speed — vc Range — m/min min	–	max	Tool Diameter (mm)	Recommended Feed Rate (f) by Diameter 1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	70	–	115	mm/r	0,03–0,08	0,04–0,09	0,05–0,11	0,08–0,14	0,09–0,19	0,11–0,22	0,13–0,26	0,15–0,30	0,19–0,36	0,24–0,46
	1	70	–	140	mm/r	0,04–0,09	0,05–0,12	0,07–0,14	0,08–0,16	0,11–0,22	0,13–0,26	0,15–0,31	0,18–0,35	0,22–0,42	0,28–0,54
	2	90	–	140	mm/r	0,04–0,09	0,05–0,12	0,07–0,14	0,08–0,16	0,12–0,22	0,14–0,26	0,17–0,31	0,20–0,35	0,24–0,42	0,31–0,53
	3	60	–	100	mm/r	0,05–0,10	0,06–0,13	0,08–0,15	0,09–0,17	0,13–0,23	0,15–0,28	0,19–0,33	0,22–0,38	0,26–0,47	0,34–0,59
	4	50	–	100	mm/r	0,05–0,10	0,06–0,13	0,07–0,15	0,08–0,17	0,12–0,23	0,14–0,28	0,17–0,33	0,19–0,38	0,23–0,47	0,29–0,59
	5	30	–	60	mm/r	0,03–0,05	0,04–0,06	0,05–0,07	0,06–0,10	0,08–0,14	0,10–0,18	0,12–0,22	0,14–0,24	0,18–0,32	0,23–0,41
	6	40	–	70	mm/r	0,03–0,05	0,04–0,06	0,05–0,08	0,06–0,10	0,08–0,14	0,10–0,18	0,13–0,22	0,14–0,24	0,18–0,32	0,23–0,41
M	1	20	–	40	mm/r	0,02–0,05	0,03–0,06	0,04–0,07	0,05–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20
	2	30	–	50	mm/r	0,02–0,06	0,03–0,07	0,04–0,08	0,06–0,10	0,08–0,12	0,09–0,14	0,10–0,16	0,12–0,18	0,14–0,20	0,16–0,22
	3	20	–	40	mm/r	0,02–0,05	0,03–0,06	0,04–0,07	0,05–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20
K	1	80	–	170	mm/r	0,08–0,16	0,09–0,17	0,11–0,22	0,12–0,24	0,16–0,31	0,20–0,38	0,23–0,44	0,25–0,49	0,31–0,60	0,38–0,74
	2	80	–	140	mm/r	0,10–0,14	0,11–0,15	0,12–0,16	0,13–0,19	0,16–0,25	0,20–0,31	0,23–0,36	0,25–0,40	0,31–0,48	0,38–0,60
	3	80	–	130	mm/r	0,05–0,13	0,07–0,15	0,08–0,17	0,09–0,19	0,12–0,25	0,14–0,30	0,17–0,35	0,19–0,40	0,24–0,48	0,30–0,60
N	1	90	–	315	mm/r	0,05–0,12	0,06–0,13	0,08–0,14	0,10–0,16	0,12–0,20	0,16–0,24	0,20–0,28	0,24–0,32	0,28–0,40	0,32–0,48
	2	90	–	270	mm/r	0,04–0,08	0,06–0,12	0,08–0,16	0,10–0,20	0,12–0,24	0,16–0,28	0,20–0,32	0,24–0,36	0,28–0,44	0,32–0,52
	3	90	–	270	mm/r	0,10–0,13	0,11–0,14	0,12–0,14	0,13–0,16	0,14–0,20	0,16–0,24	0,20–0,28	0,24–0,32	0,28–0,40	0,32–0,44
	4	90	–	180	mm/r	0,04–0,08	0,06–0,12	0,08–0,16	0,10–0,20	0,12–0,24	0,16–0,28	0,20–0,32	0,24–0,36	0,28–0,40	0,32–0,48
S	1	10	–	30	mm/r	0,01–0,04	0,02–0,05	0,03–0,06	0,04–0,08	0,06–0,10	0,08–0,12	0,09–0,13	0,10–0,14	0,12–0,16	0,14–0,18
	2	10	–	25	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16
	3	10	–	30	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,02–0,05	0,04–0,07	0,06–0,09	0,07–0,10	0,08–0,11	0,09–0,13	0,10–0,15
	4	10	–	40	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16
H	1	10	–	30	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16
	2	10	–	30	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,02–0,05	0,04–0,07	0,06–0,09	0,07–0,10	0,08–0,11	0,09–0,13	0,10–0,15

nominal size range	Inch tolerance D1 tolerance	D tolerance h6
.0394–.1181	.0000/-.0006 (h8)	.0000/-.0002
>.1181–.2362	.0000/-.0005 (h7)	.0000/-.0003
>.2362–.3937	.0000/-.0006 (h7)	.0000/-.0004
>.3937–.7087	.0000/-.0007 (h7)	.0000/-.0004
>.7087–.7874	.0000/-.0008 (h7)	.0000/-.0005

nominal size range	Metric tolerance D1 tolerance	D tolerance h6
1–3	0,000/-0,014 (h8)	0,000/-0,006
>3–6	0,000/-0,012 (h7)	0,000/-0,008
>6–10	0,000/-0,015 (h7)	0,000/-0,009
>10–18	0,000/-0,018 (h7)	0,000/-0,011
>18–20	0,000/-0,021 (h7)	0,000/-0,013

TOP DRILL S+™

Solid Carbide Drills 12 x D • TDS+

TDS+ solid carbide drills are for shop floors seeking a drill with optimal performance and hole quality in steel, stainless steel, and cast iron materials using one universal geometry and grade.

135° point geometry
Low thrust with excellent centering capabilities

4-margin design to full length
Provides stability in interrupted cut with optimal hole quality

30° helix with optimized flute profile
Reduces risk of chip jamming and catastrophic failure

Sub-micron grain substrate
Superior resistance against drill breakage



TDS+ 12 x D drills are capable of drilling holes in steel and cast iron without a pilot drill due to its 135° P point geometry and four full-length margins

WU20PD



P M K

Sub-micron grain carbide
TiAlN multilayer for steel, stainless steel, and cast iron

OPTIMAL PERFORMANCE

PRODUCT

TDS P Point with 135° P point angle for excellent centering and low thrust

DIAMETER RANGE

.1181–.7874" (3–20mm)

INDUSTRY

ENERGY

GENERAL ENGINEERING

TRANSPORTATION

MATERIALS

FIRST CHOICE

P K

SECOND CHOICE

M

APPLICATIONS

DRILLING	INCLINED EXIT	STACKED PLATES	DRILLING DEPTH: 12X	2 FLUTE/4 MARGIN/ COOLANT	THROUGH COOLANT	MQL (MINIMUM QUANTITY LUBRICANT)	HELIX ANGLE: 30°	PLAIN SHANK: ≤H6	DIN 6535

SERIES	COOLANT	LENGTH RATIO	DIAMETER RANGE
TDS504	Through Coolant	12 x D	.1181–.7874" (3–20mm)

Shank Style

A - Shank DIN 6535 HA
(round cylindrical, 2mm steps)



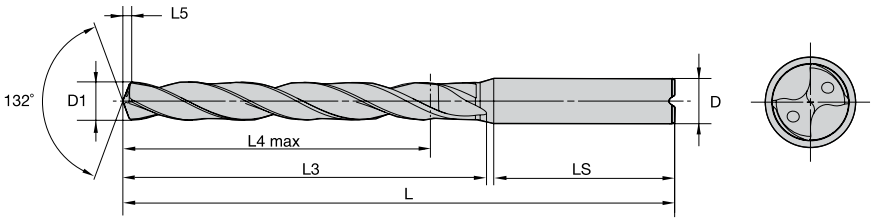
TDS+ • Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

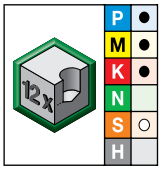
TDS	5	0	4	A	06350	WU20PD
Top Drill Spiral	Flute Style - Coolant	Point	Length	Shank	Diameter in letric	
	5 = 2 Flute Through Coolant	**0** = Conventional Cone Point **1** = Conventional Cone Point with Chamfer	**1** = ~ 3 x D **2** = ~ 5 x D **3** = ~ 8 x D **4** = ~ 12 x D	**A** = Cylindrical Shank, DIN 6535 - 2mm steps **F** = Whistle Notch 2, DIN 6535 - 2mm steps	**03000** = 3,000mm **06350** = 1/4" = E	**W**IDIA™; **Un**iversal, Application **20** = medium carbide, **P**VD coated, **D**rill

TOP DRILL S+™ • 12 x D • TDS504A • A-Shank





For information on L, L3, and L4 max, see page C46



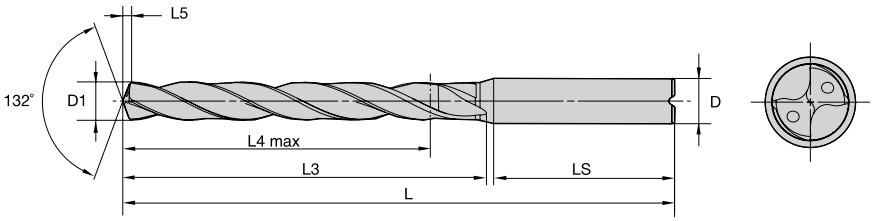
● first choice
○ alternate choice

grade WU20PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	L	L4 max	L3	L5	LS	D
4173459	TDS504A03000	3,000	.1181	–	–	93	44	52,0	0,6	36	6
4173460	TDS504A03175	3,175	.1250	1/8	–	93	44	52,0	0,7	36	6
4173461	TDS504A03264	3,264	.1285	–	30	93	44	53,0	0,7	36	6
4173545	TDS504A03455	3,455	.1360	–	29	93	44	53,0	0,7	36	6
4173462	TDS504A03500	3,500	.1378	–	–	93	44	53,0	0,7	36	6
4173546	TDS504A03734	3,734	.1470	–	26	93	45	54,0	0,8	36	6
4173463	TDS504A03970	3,970	.1563	5/32	–	107	56	66,0	0,8	36	6
4173464	TDS504A04000	4,000	.1575	–	–	107	56	66,0	0,8	36	6
4173465	TDS504A04500	4,500	.1772	–	–	107	56	67,0	0,9	36	6
4173466	TDS504A04600	4,600	.1811	–	–	107	57	68,0	1,0	36	6
4173467	TDS504A04763	4,763	.1875	3/16	–	125	69	82,0	1,0	36	6
4173468	TDS504A04800	4,800	.1890	–	12	125	69	82,0	1,0	36	6
4173469	TDS504A05000	5,000	.1969	–	–	125	70	83,0	1,1	36	6
4173470	TDS504A05100	5,100	.2008	–	–	125	70	83,0	1,1	36	6
4173471	TDS504A05200	5,200	.2047	–	–	125	70	83,0	1,1	36	6
4173472	TDS504A05300	5,300	.2087	–	–	125	71	84,0	1,1	36	6
4173473	TDS504A05410	5,410	.2130	–	3	125	71	84,0	1,1	36	6
4173474	TDS504A05500	5,500	.2165	–	–	125	71	84,0	1,2	36	6
4173475	TDS504A05558	5,558	.2188	7/32	–	125	71	84,0	1,2	36	6
4173476	TDS504A05600	5,600	.2205	–	–	125	72	85,0	1,2	36	6
4173477	TDS504A05700	5,700	.2244	–	–	125	72	85,0	1,2	36	6
4173478	TDS504A05800	5,800	.2283	–	–	125	71	85,0	1,2	36	6
4173479	TDS504A06000	6,000	.2362	–	–	125	72	86,0	1,3	36	6
4173480	TDS504A06200	6,200	.2441	–	–	139	82	97,0	1,3	36	8
4173481	TDS504A06350	6,350	.2500	1/4	E	139	83	98,0	1,3	36	8
4173482	TDS504A06500	6,500	.2559	–	–	139	83	98,0	1,4	36	8
4173484	TDS504A06600	6,600	.2598	–	–	139	84	99,0	1,4	36	8
4173485	TDS504A06746	6,746	.2656	17/64	–	139	83	99,0	1,4	36	8
4173486	TDS504A06800	6,800	.2677	–	–	139	83	99,0	1,4	36	8
4173487	TDS504A06909	6,909	.2720	–	I	139	84	100,0	1,5	36	8
4173488	TDS504A07000	7,000	.2756	–	–	139	84	100,0	1,5	36	8
4173489	TDS504A07145	7,145	.2813	9/32	–	153	94	111,0	1,5	36	8
4173490	TDS504A07500	7,500	.2953	–	–	153	95	112,0	1,6	36	8
4173491	TDS504A07541	7,541	.2969	19/64	–	153	95	112,0	1,6	36	8
4173492	TDS504A07700	7,700	.3031	–	–	153	96	113,0	1,6	36	8
4173493	TDS504A07800	7,800	.3071	–	–	153	95	113,0	1,7	36	8
4173494	TDS504A07938	7,938	.3125	5/16	–	153	96	114,0	1,7	36	8
4173495	TDS504A08000	8,000	.3150	–	–	153	96	114,0	1,7	36	8
4173496	TDS504A08100	8,100	.3189	–	–	185	116	136,0	1,7	40	10
4173497	TDS504A08334	8,334	.3281	21/64	–	185	117	137,0	1,8	40	10
4173498	TDS504A08433	8,433	.3320	–	Q	185	117	137,0	1,8	40	10
4173499	TDS504A08500	8,500	.3346	–	–	185	117	137,0	1,8	40	10
4173500	TDS504A08700	8,700	.3425	–	–	185	118	138,0	1,9	40	10
4173501	TDS504A08733	8,733	.3438	11/32	–	185	117	138,0	1,9	40	10
4173502	TDS504A09000	9,000	.3543	–	–	185	118	139,0	1,9	40	10
4173503	TDS504A09100	9,100	.3583	–	–	185	118	139,0	1,9	40	10
4173504	TDS504A09129	9,129	.3594	23/64	–	185	118	139,0	1,9	40	10
4173547	TDS504A09347	9,347	.3680	–	U	185	119	140,0	2,0	40	10

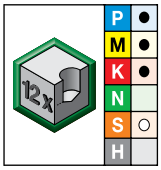
TOP DRILL S+™ • 12 x D • TDS504A • A-Shank

(continued)





For information on L, L3, and L4 max, see page C46



● first choice
○ alternate choice

grade WU20PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	L	L4 max	L3	L5	LS	D
4173505	TDS504A09500	9,500	.3740	–	–	185	119	140,0	2,0	40	10
4173506	TDS504A09525	9,525	.3750	3/8	–	185	119	140,0	2,0	40	10
4173507	TDS504A09921	9,921	.3906	25/64	–	185	120	142,0	2,1	40	10
4173508	TDS504A10000	10,000	.3937	–	–	185	120	142,0	2,1	40	10
4173509	TDS504A10200	10,200	.4016	–	–	218	140	164,0	2,2	45	12
4173510	TDS504A10300	10,300	.4055	–	–	218	141	165,0	2,2	45	12
4173511	TDS504A10320	10,320	.4063	13/32	–	218	141	165,0	2,2	45	12
4173512	TDS504A10500	10,500	.4134	–	–	218	141	165,0	2,2	45	12
4173513	TDS504A10716	10,716	.4219	27/64	–	218	142	166,0	2,3	45	12
4173514	TDS504A10800	10,800	.4252	–	–	218	141	166,0	2,3	45	12
4173515	TDS504A11000	11,000	.4331	–	–	218	142	167,0	2,4	45	12
4173516	TDS504A11113	11,113	.4375	7/16	–	218	142	167,0	2,4	45	12
4173517	TDS504A11500	11,500	.4528	–	–	218	143	168,0	2,5	45	12
4173518	TDS504A11800	11,800	.4646	–	–	218	143	169,0	2,5	45	12
4173519	TDS504A12000	12,000	.4724	–	–	218	144	170,0	2,6	45	12
4173520	TDS504A12100	12,100	.4764	–	–	246	164	192,0	2,6	45	14
4148906	TDS504A12500	12,500	.4921	–	–	246	165	193,0	2,7	45	14
4173522	TDS504A12700	12,700	.5000	1/2	–	246	166	194,0	2,7	45	14
4173523	TDS504A13000	13,000	.5118	–	–	246	166	195,0	2,8	45	14
4173524	TDS504A13100	13,100	.5157	–	–	246	166	195,0	2,8	45	14
4173525	TDS504A13500	13,500	.5315	–	–	246	167	196,0	2,9	45	14
4173526	TDS504A14000	14,000	.5512	–	–	246	168	198,0	3,0	45	14
4173527	TDS504A14100	14,100	.5551	–	–	277	188	220,0	3,0	48	16
4173528	TDS504A14288	14,288	.5625	9/16	–	277	188	220,0	3,1	48	16
4173529	TDS504A14500	14,500	.5709	–	–	277	189	221,0	3,1	48	16
4173530	TDS504A14684	14,684	.5781	37/64	–	277	190	222,0	3,2	48	16
4173531	TDS504A15000	15,000	.5906	–	–	277	190	223,0	3,2	48	16
4173533	TDS504A15875	15,875	.6250	5/8	–	277	192	225,0	3,4	48	16
4173534	TDS504A16000	16,000	.6299	–	–	277	192	226,0	3,4	48	16
4173535	TDS504A16500	16,500	.6496	–	–	305	213	249,0	3,6	48	18
4173536	TDS504A17000	17,000	.6693	–	–	305	214	250,0	3,7	48	18
4173537	TDS504A17463	17,463	.6875	11/16	–	305	215	252,0	3,8	48	18
4173538	TDS504A17500	17,500	.6890	–	–	305	215	252,0	3,8	48	18
4173539	TDS504A18000	18,000	.7087	–	–	305	216	253,0	3,9	48	18
4173541	TDS504A19000	19,000	.7480	–	–	334	238	278,0	4,1	50	20
4173543	TDS504A19500	19,500	.7677	–	–	334	239	280,0	4,2	50	20
4173544	TDS504A20000	20,000	.7874	–	–	334	240	281,0	4,3	50	20

Application Data • TDS+ Series • WU20PD™ • Through Coolant • Inch





Material Group		Cutting Speed — vc Range — SFM min	–	max	Tool Diameter (inch)	Recommended Feed Rate (f) by Diameter .125–1/8	.188–3/16	.250–1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4
P	0	260	–	520	IPR	.002—.005	.003—.005	.004—.007	.004—.009	.005—.010	.006—.012	.007—.014	.009—.018
	1	230	–	460	IPR	.003—.006	.003—.006	.004—.009	.005—.010	.006—.012	.007—.014	.009—.017	.011—.021
	2	300	–	460	IPR	.003—.006	.003—.006	.005—.009	.006—.010	.007—.012	.008—.014	.009—.017	.012—.021
	3	200	–	330	IPR	.003—.006	.004—.007	.005—.009	.006—.011	.007—.013	.009—.015	.010—.019	.013—.023
	4	160	–	330	IPR	.003—.006	.003—.007	.005—.009	.006—.011	.007—.013	.007—.015	.009—.019	.011—.023
	5	160	–	260	IPR	.003—.005	.004—.006	.005—.007	.006—.009	.008—.011	.009—.012	.011—.015	.013—.017
	6	130	–	230	IPR	.002—.003	.002—.004	.003—.006	.004—.007	.005—.009	.006—.009	.007—.013	.009—.016
M	1	100	–	160	IPR	.002—.003	.002—.004	.003—.004	.004—.005	.004—.006	.005—.006	.006—.007	.006—.008
	2	130	–	200	IPR	.002—.003	.002—.004	.003—.005	.004—.006	.004—.006	.005—.007	.006—.008	.006—.009
	3	100	–	160	IPR	.002—.003	.002—.004	.003—.004	.004—.005	.004—.006	.005—.006	.006—.007	.006—.008
K	1	260	–	560	IPR	.004—.009	.005—.009	.006—.012	.008—.015	.009—.017	.010—.019	.012—.024	.015—.029
	2	260	–	460	IPR	.005—.006	.005—.007	.006—.010	.008—.012	.009—.014	.010—.016	.012—.019	.015—.024
	3	260	–	430	IPR	.003—.007	.004—.007	.005—.010	.006—.012	.007—.014	.007—.016	.009—.019	.012—.024
N	1	300	–	1030	IPR	.003—.006	.004—.006	.005—.008	.006—.009	.008—.011	.009—.013	.011—.016	.013—.019
	2	300	–	890	IPR	.003—.006	.004—.008	.005—.009	.006—.011	.008—.013	.009—.014	.011—.017	.013—.020
	3	300	–	890	IPR	.005—.006	.005—.006	.006—.008	.006—.009	.008—.011	.009—.013	.011—.016	.013—.017
	4	300	–	590	IPR	.003—.006	.001—.008	.005—.009	.006—.011	.008—.013	.009—.014	.011—.016	.013—.019
S	1	30	–	100	IPR	.001—.002	.002—.003	.002—.004	.003—.005	.004—.005	.004—.006	.005—.006	.006—.007
	2	30	–	80	IPR	.001—.002	.001—.002	.002—.003	.003—.004	.003—.004	.004—.005	.004—.006	.004—.006
	3	30	–	100	IPR	.001—.002	.001—.002	.002—.003	.002—.004	.003—.004	.003—.004	.004—.005	.004—.006
	4	30	–	130	IPR	.001—.002	.001—.002	.002—.003	.003—.004	.003—.004	.004—.005	.004—.006	.004—.006

Application Data • TDS+ Series • WU20PD™ • Through Coolant • Metric





Material Group		Cutting Speed — vc Range — m/min min	–	max	Tool Diameter (mm)	Recommended Feed Rate (f) by Diameter 3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	80	–	160	mm/r	0,06—0,12	0,07—0,14	0,09—0,19	0,11—0,22	0,13—0,26	0,15—0,30	0,19—0,36	0,24—0,46
	1	70	–	140	mm/r	0,07—0,14	0,08—0,16	0,11—0,22	0,13—0,26	0,15—0,31	0,18—0,35	0,22—0,42	0,28—0,54
	2	90	–	140	mm/r	0,07—0,14	0,08—0,16	0,12—0,22	0,14—0,26	0,17—0,31	0,20—0,35	0,24—0,42	0,31—0,53
	3	60	–	100	mm/r	0,08—0,15	0,09—0,17	0,13—0,23	0,15—0,28	0,19—0,33	0,22—0,38	0,26—0,47	0,34—0,59
	4	50	–	100	mm/r	0,07—0,15	0,08—0,17	0,12—0,23	0,14—0,28	0,17—0,33	0,19—0,38	0,23—0,47	0,29—0,59
	5	50	–	80	mm/r	0,08—0,13	0,10—0,15	0,12—0,19	0,16—0,24	0,20—0,27	0,24—0,30	0,28—0,38	0,32—0,44
	6	40	–	70	mm/r	0,05—0,08	0,06—0,10	0,08—0,14	0,10—0,18	0,13—0,22	0,14—0,24	0,18—0,32	0,23—0,41
M	1	30	–	50	mm/r	0,04—0,07	0,05—0,09	0,08—0,11	0,09—0,12	0,10—0,14	0,12—0,16	0,14—0,18	0,16—0,20
	2	40	–	60	mm/r	0,04—0,08	0,06—0,10	0,08—0,12	0,09—0,14	0,10—0,16	0,12—0,18	0,14—0,20	0,16—0,22
	3	30	–	50	mm/r	0,04—0,07	0,05—0,09	0,08—0,11	0,09—0,12	0,10—0,14	0,12—0,16	0,14—0,18	0,16—0,20
K	1	80	–	170	mm/r	0,11—0,22	0,12—0,24	0,16—0,31	0,20—0,38	0,23—0,44	0,25—0,49	0,31—0,60	0,38—0,74
	2	80	–	140	mm/r	0,12—0,16	0,13—0,19	0,16—0,25	0,20—0,31	0,23—0,36	0,25—0,40	0,31—0,48	0,38—0,60
	3	80	–	130	mm/r	0,08—0,17	0,09—0,19	0,12—0,25	0,14—0,30	0,17—0,35	0,19—0,40	0,24—0,48	0,30—0,60
N	1	90	–	315	mm/r	0,08—0,14	0,10—0,16	0,12—0,20	0,16—0,24	0,20—0,28	0,24—0,32	0,28—0,40	0,32—0,48
	2	90	–	270	mm/r	0,08—0,16	0,10—0,20	0,12—0,24	0,16—0,28	0,20—0,32	0,24—0,36	0,28—0,44	0,32—0,52
	3	90	–	270	mm/r	0,12—0,14	0,13—0,16	0,14—0,20	0,16—0,24	0,20—0,28	0,24—0,32	0,28—0,40	0,32—0,44
	4	90	–	180	mm/r	0,08—0,16	0,01—0,20	0,12—0,24	0,16—0,28	0,20—0,32	0,24—0,36	0,28—0,40	0,32—0,48
S	1	10	–	30	mm/r	0,03—0,06	0,04—0,08	0,06—0,10	0,08—0,12	0,09—0,13	0,10—0,14	0,12—0,16	0,14—0,18
	2	10	–	25	mm/r	0,02—0,04	0,03—0,06	0,05—0,08	0,07—0,10	0,08—0,11	0,09—0,12	0,10—0,14	0,11—0,16
	3	10	–	30	mm/r	0,02—0,04	0,02—0,05	0,04—0,07	0,06—0,09	0,07—0,10	0,08—0,11	0,09—0,13	0,10—0,15
	4	10	–	40	mm/r	0,02—0,04	0,03—0,06	0,05—0,08	0,07—0,10	0,08—0,11	0,09—0,12	0,10—0,14	0,11—0,16

nominal size range	Inch tolerance D1 tolerance m7	D tolerance h6
>.1181–.2362	.0000/.0005	.0000/-.0003
>.2360–.3937	.0000/.0006	.0000/-.0004
>.3937–.7087	.0000/.0007	.0000/-.0004
>.7078–1.0000	.0000/.0009	.0000/-.0005

nominal size range	Metric tolerance D1 tolerance m7	D tolerance h6
>3–6	0,004/0,016	0,000/-0,008
>6–10	0,006/0,021	0,000/-0,009
>10–18	0,007/0,025	0,000/-0,011
>18–25,4	0,008/0,029	0,000/-0,013

TOP DRILL™ Deep Hole

Solid Carbide Deep Hole Drills • TDD

TDD solid carbide deep hole drills consistently deliver high MRRs in steel and cast iron materials using one universal grade.



132° cone point geometry
Improves hole quality, and productivity.

4-margin design
Improves process stability, increases tool life, enables interrupted cuts.

30° helix with optimized flute profile
Reduces risk of chip jamming and catastrophic failure.

Ultra-fine grain substrate
Superior resistance against drill breakage.

The Solid Carbide Deep Hole Drills are enhanced with a cone point geometry which enables the drill to outperform gun drills and HSS deep hole drills in deep hole applications up to 30 x D.

WU20PD



P M K

Ultra-fine grain carbide
TiAlN multilayer for steel and cast iron

CONSISTENT PERFORMANCE

PRODUCT

POINT GEOMETRY/GRADE

UP 132° cone point geometry, low thrust, excellent centering

DIAMETER RANGE

.1181–.5118" (3,0–13,0mm)

INDUSTRY

ENERGY

GENERAL ENGINEERING

TRANSPORTATION

MATERIALS

FIRST CHOICE

P K

SECOND CHOICE

M N S

APPLICATIONS



DRILLING | INCLINED EXIT | STACKED PLATES | 2 FLUTE/4 MARGIN/ COOLANT | THROUGH COOLANT | MQL (MINIMUM QUANTITY LUBRICANT) | HELIX ANGLE: 30° | PLAIN SHANK: ≤H5

SERIES	LENGTH RATIO	DIAMETER RANGE
TDD105Z (H101Z)	15 x D	.1181–.5118" (3,0–13,0mm)
TDD106Z (H102Z)	20 x D	.1181–.5118" (3,0–13,0mm)
TDD107Z (H103Z)	25 x D	.1181–.5118" (3,0–13,0mm)
TDD108Z (H104Z)	30 x D	.1181–.5118" (3,0–13,0mm)

Z–SHANK

Round cylindrical, 1mm steps



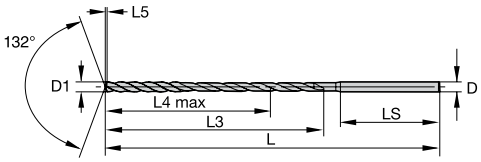


TDD • Catalog Numbering System

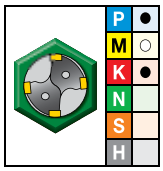
Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

TD	D	105	Z	06350	WU20PD
Top Drill	Deep Hole Drills	Length	Shank	Diameter in Inch	
TD = Top Drill		**5** = 15 x D (H101) **6** = 20 x D (H102) **7** = 25 x D (H103) **8** = 30 x D (H104)	**Z** = Cylindrical Shank, 1mm steps	**03000** = 3,000mm **06350** = 1/4"	**W**IDIA™, **U**niversal, **P**VD, **D**rilling

TOP DRILL Deep Hole • 15 x D • TDD105 • 2 Flute



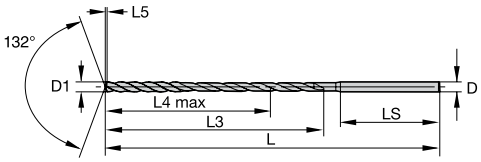
For information on L, L3, and L4 max, see page C46



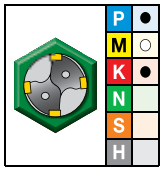
● first choice
○ alternate choice

grade WU20PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L
3899626	TDD105Z03000	3,000	.1181	–	–	3	52	45	0,6	30	86
3899627	TDD105Z03175	3,175	.1250	1/8	–	4	67	58	0,6	32	105
3899628	TDD105Z03500	3,500	.1378	–	–	4	68	59	0,7	32	105
3899629	TDD105Z03571	3,571	.1406	9/64	–	4	68	59	0,7	32	105
3899630	TDD105Z03800	3,800	.1496	–	–	4	69	60	0,8	32	105
3899631	TDD105Z03970	3,970	.1563	5/32	–	4	70	60	0,8	32	105
3899632	TDD105Z04000	4,000	.1575	–	–	4	70	60	0,8	32	105
3899683	TDD105Z04039	4,039	.1590	–	21	5	84	73	0,8	34	124
3899684	TDD105Z04300	4,300	.1693	–	–	5	85	74	0,9	34	124
3899685	TDD105Z04500	4,500	.1772	–	–	5	85	74	0,9	34	124
3899686	TDD105Z04623	4,623	.1820	–	14	5	86	75	1,0	34	124
3899687	TDD105Z04763	4,763	.1875	3/16	–	5	86	75	1,0	34	124
3899688	TDD105Z05000	5,000	.1969	–	–	5	87	75	1,0	34	124
3899689	TDD105Z05159	5,159	.2031	13/64	–	6	101	88	1,1	36	143
3899690	TDD105Z05410	5,410	.2130	–	3	6	102	89	1,1	36	143
3899691	TDD105Z05500	5,500	.2165	–	–	6	102	89	1,1	36	143
3899692	TDD105Z05558	5,558	.2188	7/32	–	6	102	89	1,2	36	143
3899693	TDD105Z05800	5,800	.2283	–	–	6	103	89	1,2	36	143
3899694	TDD105Z06000	6,000	.2362	–	–	6	104	90	1,2	36	143
3899695	TDD105Z06200	6,200	.2441	–	–	7	118	103	1,3	38	162
3899696	TDD105Z06350	6,350	.2500	1/4	E	7	119	104	1,3	38	162
3899697	TDD105Z06500	6,500	.2559	–	–	7	119	104	1,4	38	162
3899698	TDD105Z06528	6,528	.2570	–	F	7	119	104	1,4	38	162
3899699	TDD105Z06746	6,746	.2656	17/64	–	7	120	104	1,4	38	162
3899700	TDD105Z06800	6,800	.2677	–	–	7	120	104	1,4	38	162
3899701	TDD105Z06909	6,909	.2720	–	I	7	121	105	1,4	38	162
3899702	TDD105Z07000	7,000	.2756	–	–	7	121	105	1,5	38	162
3900612	TDD105Z07145	7,145	.2813	9/32	–	8	135	118	1,5	40	181
3900633	TDD105Z07500	7,500	.2953	–	–	8	136	119	1,6	40	181
3899764	TDD106Z07500	7,500	.2953	–	–	8	174	157	1,6	40	221
3900635	TDD105Z07938	7,938	.3125	5/16	–	8	138	120	1,7	40	181
3900636	TDD105Z08000	8,000	.3150	–	–	8	138	120	1,7	40	181
3900637	TDD105Z08334	8,334	.3281	21/64	–	9	153	134	1,8	42	200
3900638	TDD105Z08433	8,433	.3320	–	Q	9	153	134	1,8	42	200
3900639	TDD105Z08500	8,500	.3346	–	–	9	153	134	1,8	42	200
3900640	TDD105Z08733	8,733	.3438	11/32	–	9	154	134	1,8	42	200
3900641	TDD105Z09000	9,000	.3543	–	–	9	155	135	1,9	42	200
3900643	TDD105Z09500	9,500	.3740	–	–	10	170	149	2,0	44	219
3900644	TDD105Z09525	9,525	.3750	3/8	–	10	170	149	2,0	44	219
3900645	TDD105Z09750	9,750	.3839	–	–	10	171	149	2,1	44	219
3900647	TDD105Z10000	10,000	.3937	–	–	10	172	150	2,1	44	219
3900648	TDD105Z10200	10,200	.4016	–	–	11	186	163	2,2	46	238
3900649	TDD105Z10320	10,317	.4062	13/32	–	11	187	164	2,2	46	238
3900650	TDD105Z10500	10,500	.4134	–	–	11	187	164	2,2	46	238
3900652	TDD105Z11000	11,000	.4331	–	–	11	189	165	2,3	46	238
3900653	TDD105Z11113	11,113	.4375	7/16	–	12	203	178	2,4	48	257
3900654	TDD105Z11500	11,500	.4528	–	–	12	204	179	2,4	48	257
3900656	TDD105Z12000	12,000	.4724	–	–	12	206	180	2,5	48	257
3900657	TDD105Z12304	12,304	.4844	31/64	–	13	221	194	2,6	50	276
3900658	TDD105Z12500	12,500	.4921	–	–	13	221	194	2,7	50	276
3900659	TDD105Z12700	12,700	.5000	1/2	–	13	222	195	2,7	50	276
3900660	TDD105Z13000	13,000	.5118	–	–	13	223	195	2,8	50	276

TOP DRILL Deep Hole • 20 x D • TDD106 • 2 Flute



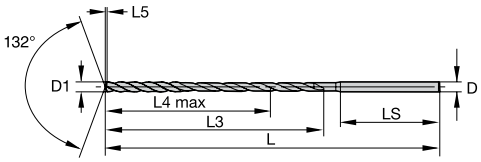
For information on L, L3, and L4 max, see page C46



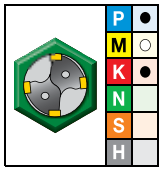
● first choice
○ alternate choice

grade WU20PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L
3899782	TDD106Z03000	3,000	.1181	–	–	3	67	60	0,6	30	101
3899803	TDD106Z03175	3,175	.1250	1/8	–	4	83	74	0,6	32	125
3899804	TDD106Z03500	3,500	.1378	–	–	4	86	77	0,7	32	125
3899805	TDD106Z03571	3,571	.1406	9/64	–	4	86	77	0,7	32	125
3899806	TDD106Z03800	3,800	.1496	–	–	4	88	79	0,8	32	125
3899807	TDD106Z03970	3,970	.1563	5/32	–	4	89	79	0,8	32	125
3899808	TDD106Z04000	4,000	.1575	–	–	4	90	80	0,8	32	125
3899809	TDD106Z04039	4,039	.1590	–	21	5	104	93	0,8	34	149
3899810	TDD106Z04300	4,300	.1693	–	–	5	106	95	0,9	34	149
3899811	TDD106Z04500	4,500	.1772	–	–	5	108	97	0,9	34	149
3899812	TDD106Z04623	4,623	.1820	–	14	5	109	98	1,0	34	149
3899813	TDD106Z04763	4,763	.1875	3/16	–	5	110	99	1,0	34	149
3899814	TDD106Z05000	5,000	.1969	–	–	5	112	100	1,0	34	149
3899815	TDD106Z05159	5,159	.2031	13/64	–	6	127	114	1,1	36	173
3899816	TDD106Z05410	5,410	.2130	–	3	6	129	116	1,1	36	173
3899818	TDD106Z05500	5,500	.2165	–	–	6	130	117	1,1	36	173
3899819	TDD106Z05558	5,558	.2188	7/32	–	6	130	117	1,2	36	173
3899820	TDD106Z05800	5,800	.2283	–	–	6	132	118	1,2	36	173
3899821	TDD106Z06000	6,000	.2362	–	–	6	134	120	1,2	36	173
3899822	TDD106Z06200	6,200	.2441	–	–	7	149	134	1,3	38	197
3899823	TDD106Z06350	6,350	.2500	1/4	E	7	151	136	1,3	38	197
3899824	TDD106Z06500	6,500	.2559	–	–	7	152	137	1,4	38	197
3899825	TDD106Z06528	6,528	.2570	–	F	7	152	137	1,4	38	197
3899826	TDD106Z06746	6,746	.2656	17/64	–	7	154	138	1,4	38	197
3899827	TDD106Z06800	6,800	.2677	–	–	7	154	138	1,4	38	197
3899829	TDD106Z07000	7,000	.2756	–	–	7	156	140	1,5	38	197
3899763	TDD106Z07145	7,145	.2813	9/32	–	8	171	154	1,5	40	221
3899765	TDD106Z07541	7,541	.2969	19/64	–	8	174	157	1,6	40	221
3899766	TDD106Z07938	7,938	.3125	5/16	–	8	177	159	1,7	40	221
3899767	TDD106Z08000	8,000	.3150	–	–	8	178	160	1,7	40	221
3899769	TDD106Z08433	8,433	.3320	–	Q	9	195	176	1,8	42	245
3899770	TDD106Z08500	8,500	.3346	–	–	9	196	177	1,8	42	245
3899771	TDD106Z08733	8,733	.3438	11/32	–	9	198	178	1,8	42	245
3899772	TDD106Z09000	9,000	.3543	–	–	9	200	180	1,9	42	245
3899784	TDD106Z09500	9,500	.3740	–	–	10	218	197	2,0	44	269
3899785	TDD106Z09525	9,525	.3750	3/8	–	10	218	197	2,0	44	269
3899787	TDD106Z09921	9,921	.3906	25/64	–	10	221	199	2,1	44	269
3899788	TDD106Z10000	10,000	.3937	–	–	10	222	200	2,1	44	269
3899789	TDD106Z10200	10,200	.4016	–	–	11	237	214	2,2	46	293
3899790	TDD106Z10320	10,317	.4062	13/32	–	11	238	215	2,2	46	293
3899791	TDD106Z10500	10,500	.4134	–	–	11	240	217	2,2	46	293
3899792	TDD106Z10716	10,716	.4219	27/64	–	11	242	219	2,3	46	293
3899793	TDD106Z11000	11,000	.4331	–	–	11	244	220	2,3	46	293
3899794	TDD106Z11113	11,113	.4375	7/16	–	12	259	234	2,4	48	317
3899795	TDD106Z11500	11,500	.4528	–	–	12	262	237	2,4	48	317
3899797	TDD106Z12000	12,000	.4724	–	–	12	266	240	2,5	48	317
3899799	TDD106Z12500	12,500	.4921	–	–	13	284	257	2,7	50	341
3899800	TDD106Z12700	12,700	.5000	1/2	–	13	285	258	2,7	50	341
3899801	TDD106Z13000	13,000	.5118	–	–	13	288	260	2,8	50	341

TOP DRILL Deep Hole • 25 x D • TDD107 • 2 Flute



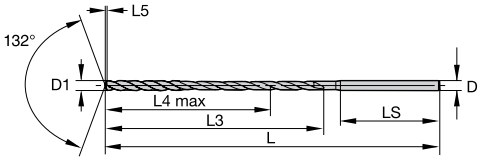
For information on L, L3, and L4 max, see page C46



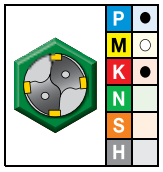
● first choice
○ alternate choice

grade WU20PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L
3899708	TDD107Z03000	3,000	.1181	–	–	3	82	75	0,6	30	116
3899709	TDD107Z03175	3,175	.1250	1/8	–	4	99	90	0,6	32	145
3899710	TDD107Z03500	3,500	.1378	–	–	4	103	94	0,7	32	145
3899712	TDD107Z03800	3,800	.1496	–	–	4	107	98	0,8	32	145
3899733	TDD107Z03970	3,970	.1563	5/32	–	4	109	99	0,8	32	145
3899734	TDD107Z04000	4,000	.1575	–	–	4	110	100	0,8	32	145
3899737	TDD107Z04500	4,500	.1772	–	–	5	130	119	0,9	34	174
3899739	TDD107Z04763	4,763	.1875	3/16	–	5	134	123	1,0	34	174
3899740	TDD107Z05000	5,000	.1969	–	–	5	137	125	1,0	34	174
3899743	TDD107Z05500	5,500	.2165	–	–	6	157	144	1,1	36	203
3899744	TDD107Z05558	5,558	.2188	7/32	–	6	158	145	1,2	36	203
3899745	TDD107Z05800	5,800	.2283	–	–	6	161	147	1,2	36	203
3899746	TDD107Z06000	6,000	.2362	–	–	6	164	150	1,2	36	203
3899748	TDD107Z06350	6,350	.2500	1/4	E	7	182	167	1,3	38	232
3899749	TDD107Z06500	6,500	.2559	–	–	7	184	169	1,4	38	232
3899750	TDD107Z06528	6,528	.2570	–	F	7	185	170	1,4	38	232
3899753	TDD107Z06909	6,909	.2720	–	I	7	190	174	1,4	38	232
3899754	TDD107Z07000	7,000	.2756	–	–	7	191	175	1,5	38	232
3899567	TDD107Z07541	7,541	.2969	19/64	–	8	212	195	1,6	40	261
3899569	TDD107Z08000	8,000	.3150	–	–	8	218	200	1,7	40	261
3899571	TDD107Z08433	8,433	.3320	–	Q	9	237	218	1,8	42	290
3899572	TDD107Z08500	8,500	.3346	–	–	9	238	219	1,8	42	290
3899604	TDD107Z09000	9,000	.3543	–	–	9	245	225	1,9	42	290
3899606	TDD107Z09500	9,500	.3740	–	–	10	265	244	2,0	44	319
3899607	TDD107Z09525	9,525	.3750	3/8	–	10	266	245	2,0	44	319
3899610	TDD107Z10000	10,000	.3937	–	–	10	272	250	2,1	44	319
3899611	TDD107Z10300	10,300	.4055	–	–	11	290	267	2,2	46	348
3899612	TDD107Z10320	10,320	.4063	13/32	–	11	290	267	2,2	46	348
3899613	TDD107Z10500	10,500	.4134	–	–	11	292	269	2,2	46	348
3899614	TDD107Z10716	10,716	.4219	27/64	–	11	295	272	2,3	46	348
3899615	TDD107Z11000	11,000	.4331	–	–	11	299	275	2,3	46	348
3899616	TDD107Z11113	11,113	.4375	7/16	–	12	314	289	2,4	48	377
3899617	TDD107Z11500	11,500	.4528	–	–	12	319	294	2,4	48	377
3899619	TDD107Z12000	12,000	.4724	–	–	12	326	300	2,5	48	377
3899621	TDD107Z12500	12,500	.4921	–	–	13	346	319	2,7	50	406
3899622	TDD107Z12700	12,700	.5000	1/2	–	13	349	322	2,7	50	406
3899623	TDD107Z13000	13,000	.5118	–	–	13	353	325	2,8	50	406

TOP DRILL Deep Hole • 30 x D • TDD108 • 2 Flute



For information on L, L3, and L4 max, see page C46



● first choice
○ alternate choice

grade WU20PD TiAlN		D1 diameter									
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L
3899539	TDD108Z03000	3,000	.1181	–	–	3	97	90	0,6	30	131
3899540	TDD108Z03175	3,175	.1250	1/8	–	4	115	106	0,6	32	165
3899541	TDD108Z03500	3,500	.1378	–	–	4	121	112	0,7	32	165
3899573	TDD108Z03800	3,800	.1496	–	–	4	126	117	0,8	32	165
3899574	TDD108Z03970	3,970	.1563	5/32	–	4	129	119	0,8	32	165
3899575	TDD108Z04000	4,000	.1575	–	–	4	130	120	0,8	32	165
3899576	TDD108Z04039	4,039	.1590	–	21	5	144	133	0,8	34	199
3899577	TDD108Z04300	4,300	.1693	–	–	5	149	138	0,9	34	199
3899578	TDD108Z04500	4,500	.1772	–	–	5	153	142	0,9	34	199
3899579	TDD108Z04623	4,623	.1820	–	14	5	155	144	1,0	34	199
3899580	TDD108Z04763	4,763	.1875	3/16	–	5	157	146	1,0	34	199
3899581	TDD108Z05000	5,000	.1969	–	–	5	162	150	1,0	34	199
3899582	TDD108Z05159	5,159	.2031	13/64	–	6	179	166	1,1	36	233
3899583	TDD108Z05410	5,410	.2130	–	3	6	183	170	1,1	36	233
3899584	TDD108Z05500	5,500	.2165	–	–	6	185	172	1,1	36	233
3899586	TDD108Z05800	5,800	.2283	–	–	6	190	176	1,2	36	233
3899587	TDD108Z06000	6,000	.2362	–	–	6	194	180	1,2	36	233
3899588	TDD108Z06200	6,200	.2441	–	–	7	211	196	1,3	38	267
3899589	TDD108Z06350	6,350	.2500	1/4	E	7	214	199	1,3	38	267
3899590	TDD108Z06500	6,500	.2559	–	–	7	217	202	1,4	38	267
3899592	TDD108Z06746	6,746	.2656	17/64	–	7	221	205	1,4	38	267
3899593	TDD108Z06800	6,800	.2677	–	–	7	222	206	1,4	38	267
3899594	TDD108Z06909	6,909	.2720	–	I	7	224	208	1,4	38	267
3899595	TDD108Z07000	7,000	.2756	–	–	7	226	210	1,5	38	267
3899600	TDD108Z07145	7,145	.2813	9/32	–	8	242	225	1,5	40	301
3899601	TDD108Z07500	7,500	.2953	–	–	8	249	232	1,6	40	301
3899653	TDD108Z07938	7,938	.3125	5/16	–	8	257	239	1,7	40	301
3899654	TDD108Z08000	8,000	.3150	–	–	8	258	240	1,7	40	301
3899657	TDD108Z08500	8,500	.3346	–	–	9	281	262	1,8	42	335
3899659	TDD108Z09000	9,000	.3543	–	–	9	290	270	1,9	42	335
3899661	TDD108Z09500	9,500	.3740	–	–	10	313	292	2,0	44	369
3899662	TDD108Z09525	9,525	.3750	3/8	–	10	313	292	2,0	44	369
3899663	TDD108Z09750	9,750	.3839	–	–	10	317	295	2,1	44	369
3899665	TDD108Z10000	10,000	.3937	–	–	10	322	300	2,1	44	369
3899666	TDD108Z10200	10,200	.4016	–	–	11	339	316	2,2	46	403
3899667	TDD108Z10320	10,317	.4062	13/32	–	11	341	318	2,2	46	403
3899668	TDD108Z10500	10,500	.4134	–	–	11	345	322	2,2	46	403
3899670	TDD108Z11000	11,000	.4331	–	–	11	354	330	2,3	46	403
3899671	TDD108Z11113	11,113	.4375	7/16	–	12	370	345	2,4	48	437
3899672	TDD108Z11500	11,500	.4528	–	–	12	377	352	2,4	48	437
3899674	TDD108Z12000	12,000	.4724	–	–	12	386	360	2,5	48	437
3899675	TDD108Z12304	12,304	.4844	31/64	–	13	405	378	2,6	50	471
3899676	TDD108Z12500	12,500	.4921	–	–	13	409	382	2,7	50	471
3899677	TDD108Z12700	12,700	.5000	1/2	–	13	412	385	2,7	50	471
3899678	TDD108Z13000	13,000	.5118	–	–	13	418	390	2,8	50	471

Application Data • TDD Series • WU20PD • Through Coolant • Inch



Material Group		Cutting Speed — vc Range — SFM min	–	max	Tool Diameter (inch)	Recommended Feed Rate (f) by Diameter 0.125–1/8	0.188–3/16	0.250–1/4	0.313–5/16	0.375–3/8	0.500–1/2	0.625–5/8	0.750–3/4
P	1	295	–	425	IPR	0.003–0.005	0.005–0.007	0.007–0.008	0.008–0.009	0.009–0.010	0.010–0.011	0.011–0.012	0.012–0.013
	2	260	–	375	IPR	0.003–0.005	0.005–0.007	0.007–0.008	0.008–0.009	0.009–0.010	0.010–0.011	0.011–0.012	0.012–0.013
	3	230	–	360	IPR	0.002–0.004	0.004–0.006	0.006–0.007	0.007–0.008	0.008–0.009	0.009	0.009–0.010	0.010–0.011
	4	215	–	310	IPR	0.002–0.004	0.004–0.006	0.006–0.007	0.007–0.008	0.008–0.009	0.009	0.009–0.010	0.010–0.011
K	1	345	–	475	IPR	0.004–0.006	0.006–0.008	0.008–0.010	0.010–0.011	0.011–0.012	0.012–0.013	0.013–0.014	0.014–0.015
	2	280	–	390	IPR	0.004–0.006	0.006–0.008	0.008–0.010	0.010–0.011	0.011–0.012	0.012–0.013	0.013–0.014	0.014–0.015
	3	325	–	460	IPR	0.004–0.006	0.006–0.008	0.008–0.010	0.010–0.011	0.011–0.012	0.012–0.013	0.013–0.014	0.014–0.015

Application Data • TDD Series • WU20PD™ • Through Coolant • Metric



Material Group		Cutting Speed — vc Range — m/min min	–	max	Tool Diameter (mm)	Recommended Feed Rate (f) by Diameter 3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	1	90	–	130	mm/r	0,08–0,12	0,12–0,18	0,18–0,20	0,20–0,22	0,22–0,25	0,25–0,28	0,28–0,30	0,30–0,34
	2	80	–	115	mm/r	0,08–0,12	0,12–0,18	0,18–0,20	0,20–0,22	0,22–0,25	0,25–0,28	0,28–0,30	0,30–0,34
	3	70	–	110	mm/r	0,05–0,10	0,10–0,16	0,16–0,18	0,18–0,20	0,20–0,22	0,22–0,24	0,24–0,26	0,26–0,28
	4	65	–	95	mm/r	0,05–0,10	0,10–0,16	0,16–0,18	0,18–0,20	0,20–0,22	0,22–0,24	0,24–0,26	0,26–0,28
K	1	105	–	145	mm/r	0,10–0,15	0,15–0,20	0,20–0,25	0,25–0,28	0,28–0,30	0,30–0,33	0,33–0,36	0,36–0,38
	2	85	–	120	mm/r	0,10–0,15	0,15–0,20	0,20–0,25	0,25–0,28	0,28–0,30	0,30–0,33	0,33–0,36	0,36–0,38
	3	100	–	140	mm/r	0,10–0,15	0,15–0,20	0,20–0,25	0,25–0,28	0,28–0,30	0,30–0,33	0,33–0,36	0,36–0,38

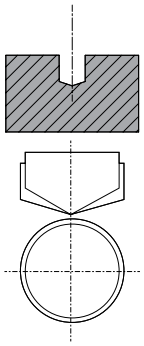
Inch tolerance

D1	D1 tolerance m7	D	D tolerance h6
> .1181–.2362	.0000/-.0005	> .1181–.2362	.0000/-.0003
> .2362–.3937	.0000/-.0006	> .2362–.3937	.0000/-.0004
> .3937–.5118	.0000/-.0007	> .3937–.5118	.0000/-.0004

Metric tolerance

nominal size range	D1 tolerance	D1 tolerance	D tolerance h6
>3–6	0,000/-0,012	>3–6	0,000/-0,008
>6–10	0,000/-0,015	>6–10	0,000/-0,009
>10–13	0,000/-0,018	>10–13	0,000/-0,011

Deep-Hole Drills Application Rules

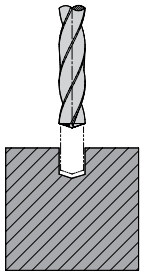


1) Pilot Drill Hole — IMPORTANT!

- The point angle of the pilot drill must be greater than one of the following deep-hole drills to protect its cutting corners.
- The diameter size of the pilot drill must be greater than one of the deep-hole drills to enable easy fit and protect margin lands. The required difference in diameter is covered by design with the different position of tolerance.
- Drill Ø = nominal Ø up to nominal +.0004" (+0,010mm).
- Depth of pilot hole: minimum 2 x D.
- Deeper pilot holes are preferable.

Recommendations:

- Use a conical (TDS*) or split-point drill to pilot (do not use a TDG, VariDrill™, or TDS 12 x D or any competitive drill).
- Check the pilot drill for wear, which can lead to premature wear on the TDD10* cutting edge and possibly catastrophic failure.
- TOP DRILL S™ for steel or cast iron (TDS4* series) and TOP DRILL S +™ for multiple applications (TDS501* series 3 x D and TD502* series 5 x D) with a 140° point angle are recommended.
- TDS503* series 8 x D and TDS504* series 12 x D is not recommended as the point angle is 132°!

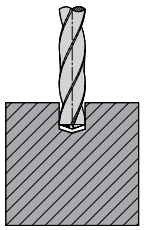


2) Feed TDD10* into Pilot Hole

- Max 500 RPM and recommended feed rate; no rapid traverse.
- Run counter-clockwise, especially in horizontal applications to protect the cutting edge, when entering the pilot hole.
- Depth: .039" (1mm) above the bottom of pilot hole.
- Feed TDD10* into pilot hole

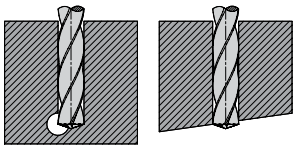
Recommendations:

- Reduce cutting speed to minimize imbalances in machine spindle/adapter!



3) Drill Hole

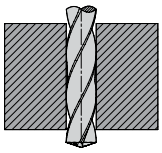
Cutting Parameters: Start recommended speed and feed rate at .039" (1mm) from the bottom of the pilot hole, clockwise.



Recommendations:

- DO NOT PECK OR DWELL up to 30 x D!
- With long-chipping steel materials, it may be necessary to increase feed rate by 10–20% to provide optimal chip control.
- For long-chipping aluminum materials, it may be necessary to decrease feed rate and increase speed.
- Reduce feed rate on angled exits and crossholes by 50–60%.

HP feed recommendations are usually higher than with competitive SC drills!



4) Drill Retraction

Cutting Parameters: 50–500 RPM and feed rate 2–6 m/min.

Recommendations:

To achieve the best tool performance, we recommend using the deep-hole drill with a hydraulic chuck.

Reduce cutting speed to minimize imbalances in machine spindle/adapter!





5) Vertical Applications

- If the pilot holes are close to each other, chips can fall into the neighboring hole.
- Do not enter a pilot hole that might contain chips with a deep hole drill to avoid chip jamming, wear, or breakage.
- If required holes are close to each other, use smart drilling strategies, make sure the pilot holes are getting properly cleaned, or switch to horizontal drilling.

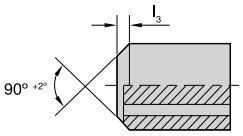
Horizontal drilling process preferred for optimum chip evacuation.

Deep-Hole Drills Application Rules



6) Coolant

- For increased stability, the coolant channels of the TDD10* are smaller than on typical WIDIA™ drills.
- Steady supply of coolant delivered to the cutting edges necessary. If coolant supply is not steady or is unequal through both channels, check:
  - Coolant filtering system.
  - Sealing of adapter/spindle.
  - Chips blocking the coolant hole on the drill shank.
- Make sure that the coolant supply reaches the cutting edge before drilling begins.
- Pressure by diameter: <5mm 40–50 bar maximum; >5mm 25 bar minimum.



MQL back end according to DIN 69090-3

7) Minimal Quantity Lubrication

- On MQL applications, make sure that the coolant is directly supplied from the chuck into the back end of the drill shank (without gap) to avoid leakage.
- Pressure should be between 1–10 bar depending on coolant hole size.
- Spray contains an amount of oil less than 50 ml/h.
- If required, the shank can be evenly optimized for MQL applications with enlarged 90° chamfer instead of 40°.



8) Shanks

- Other than normal SC Drills, TDD10* series have a “Z” shank, increasing with 1mm steps.
- For drills with uneven shank size, use reduction sleeves to adapt the shank to the customer´s toolholder.
- The clamping force is better with increasing diameter.
- If required, DIN shanks (even, 2mm steps) are available as custom solutions.

Achieve the best tool performance with hydraulic chucks.

	12mm hydraulic reducer sleeve		20mm hydraulic reducer sleeve		25mm hydraulic reducer sleeve		32mm hydraulic reducer sleeve		.500" hydraulic reducer sleeve		.750" hydraulic reducer sleeve	
D1	order number	catalog number	order number	catalog number	order number	catalog number	order number	catalog number	order number	catalog number	order number	catalog number
3	3026450	12MHC030M	3026648	20MHC030M	3026662	25MHC030M	–	–	2248993	50HC030M	2248995	75HC030M
4	3026451	12MHC040M	3026649	20MHC040M	3026663	25MHC040M	–	–	1606050	50HC040M	2248996	75HC040M
5	3026452	12MHC050M	3026650	20MHC050M	3026664	25MHC050M	–	–	2248994	50HC050M	2248997	75HC050M
6	3026643	12MHC060M	3026651	20MHC060M	3026665	25MHC060M	3026675	32MHC060M	1606061	50HC060M	1093271	75HC060M
7	3026644	12MHC070M	3026652	20MHC070M	3026666	25MHC070M	3026676	32MHC070M	–	–	–	–
8	3026645	12MHC080M	3026653	20MHC080M	3026667	25MHC080M	3026677	32MHC080M	1606062	50HC080M	1093272	75HC080M
9	3026646	12MHC090M	3026654	20MHC090M	3026668	25MHC090M	3026678	32MHC090M	–	–	–	–
10	3026647	12MHC100M	3026655	20MHC100M	3026669	25MHC100M	3026679	32MHC100M	1606064	50HC100M	1093273	75HC100M
11	–	–	3026656	20MHC110M	–	–	3026680	32MHC110M	–	–	–	–
12	–	–	3026657	20MHC120M	3026669	25MHC120M	3026681	32MHC120M	–	–	1093524	75HC120M
13	–	–	3026658	20MHC130M	–	–	3026682	32MHC130M	–	–	–	–
14	–	–	3026659	20MHC140M	3026671	25MHC140M	3026683	32MHC140M	–	–	1093525	75HC140M
15	–	–	3026660	20MHC150M	–	–	3026684	32MHC150M	–	–	–	–
16	–	–	3026661	20MHC160M	3026672	25MHC160M	3026685	32MHC160M	–	–	1093526	75HC160M

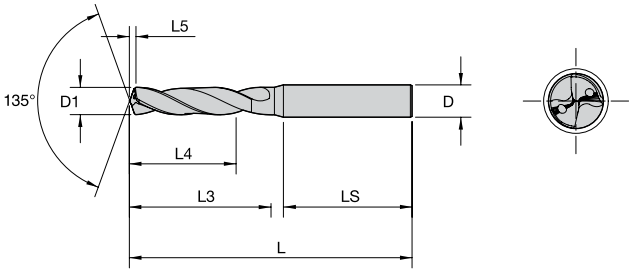
Shank Designs to DIN 6535



Form HE,
2° angle design F



Form HA,
straight design A



inch Ø		DIN 6535		SHORT* ~3 x D			LONG* ~5 x D			EXTRA LONG** ~8 x D		
D1 min	D1 max	D	LS	L	L3	L4 max	L	L3	L4 max	L	L3	L4 max
.0394	.0551	.1575	1.10	2.28	.28	.20	2.28	.35	.24	2.28	.47	.39
.0552	.0748	.1575	1.10	2.28	.35	.24	2.28	.47	.35	2.28	.71	.59
.0748	.0906	.1575	1.10	2.28	.51	.35	2.28	.71	.55	2.60	1.02	.87
.0906	.1177	.1575	1.10	2.28	.67	.47	2.28	.87	.67	2.60	1.18	.98
.1181	.1476	.2362	1.42	2.44	.79	.55	2.60	1.10	.91	3.07	1.57	1.30
.1477	.1870	.2362	1.42	2.60	.94	.67	2.91	1.42	1.14	3.43	1.93	1.61
.1870	.2362	.2362	1.42	2.60	1.10	.79	3.23	1.73	1.38	3.70	2.20	1.89
.2363	.2756	.3150	1.42	3.11	1.34	.94	3.58	2.09	1.69	4.13	2.64	2.24
.2756	.3150	.3150	1.42	3.11	1.61	1.14	3.58	2.09	1.69	4.33	2.83	2.40
.3150	.3937	.3937	1.57	3.50	1.85	1.38	4.06	2.40	1.93	4.80	3.15	2.68
.3937	.4724	.4724	1.77	4.02	2.17	1.57	4.65	2.80	2.20	5.55	3.70	3.11
.4725	.5512	.5512	1.77	4.21	2.36	1.69	4.88	3.03	2.36	6.10	4.25	3.58
.5512	.6299	.6299	1.89	4.53	2.56	1.77	5.24	3.27	2.48	6.73	4.76	3.98
.6300	.7087	.7087	1.89	4.84	2.87	2.01	5.63	3.66	2.80	7.28	5.32	4.45
.7087	.7874	.7874	1.97	5.16	3.11	2.17	6.02	3.98	3.03	7.87	5.83	4.88
.7874	.8661	.7874	1.97	5.55	3.39	2.36	6.57	4.41	3.35	8.54	6.38	5.35
.8662	.9843	.9843	2.20	6.02	3.74	2.56	7.24	4.96	3.86	9.37	7.09	5.91

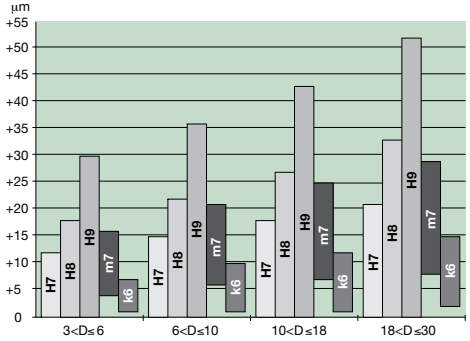
mm Ø		DIN 6535		SHORT* ~3 x D			REGULAR* ~5 x D			LONG** ~8 x D		
D1 min	D1 max	D	LS min	L	L3	L4	L	L3	L4	L	L3	L4
1,000	1,400	4	28	58	7	5	58	9	6	58	12	10
1,401	1,900	4	28	58	9	6	58	12	9	58	18	15
1,901	2,300	4	28	58	13	9	58	18	14	66	26	22
2,301	2,990	4	28	58	17	12	58	22	17	66	30	25
3,000	3,750	6	36	62	20	14	66	28	23	78	40	33
3,751	4,750	6	36	66	24	17	74	36	29	87	49	41
4,751	6,000	6	36	66	28	20	82	44	35	94	56	48
6,001	7,000	8	36	79	34	24	91	53	43	105	67	57
7,001	8,000	8	36	79	41	29	91	53	43	110	72	61
8,001	10,000	10	40	89	47	35	103	61	49	122	80	68
10,001	12,000	12	45	102	55	40	118	71	56	141	94	79
12,001	14,000	14	45	107	60	43	124	77	60	155	108	91
14,001	16,000	16	48	115	65	45	133	83	63	171	121	101
16,001	18,000	18	48	123	73	51	143	93	71	185	135	113
18,001	20,000	20	50	131	79	55	153	101	77	200	148	124
20,001	22,000	20	50	141	86	60	167	112	85	217	162	136
22,001	25,000	25	56	153	95	65	184	126	98	238	180	150

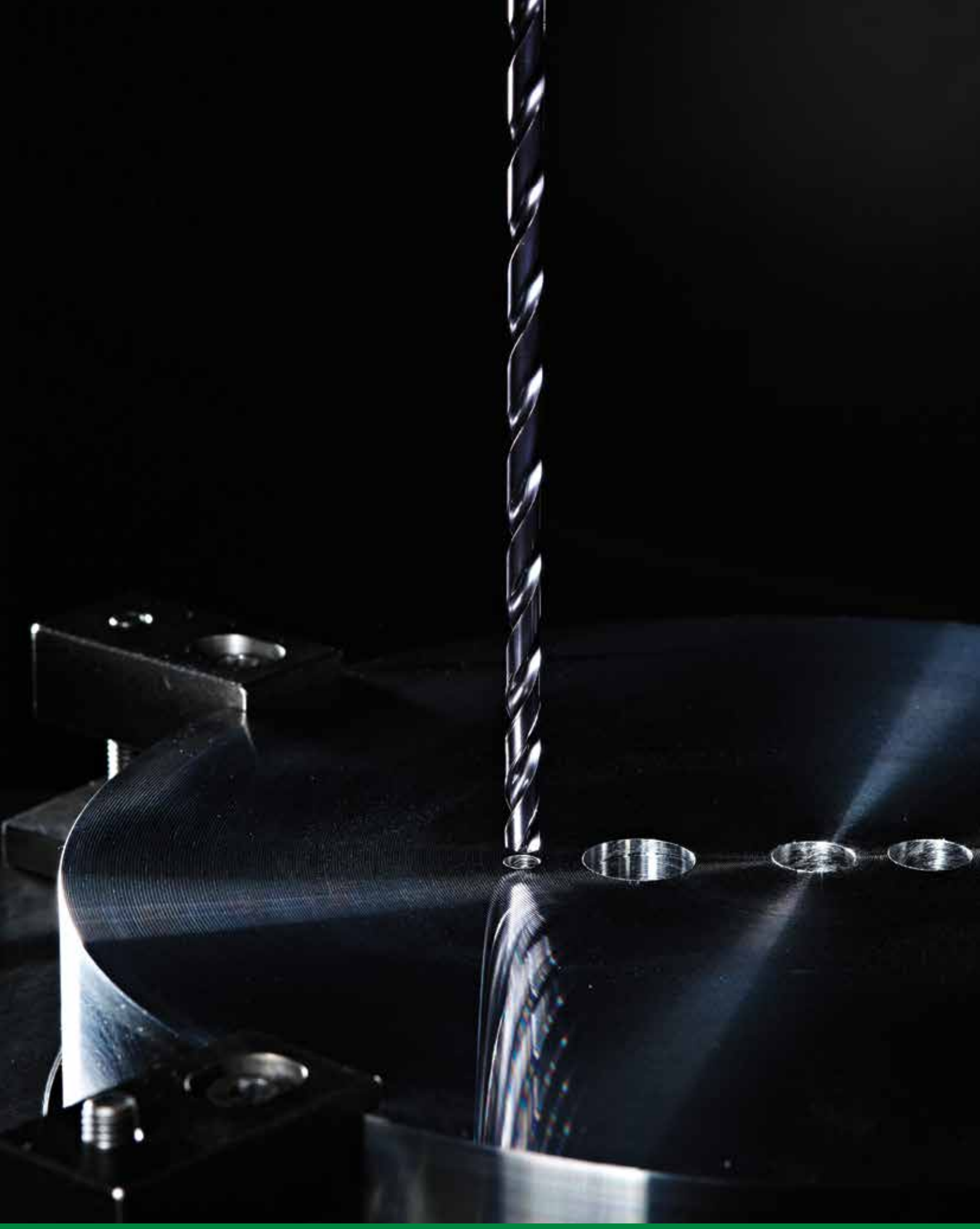
* D1 < 20mm to DIN 6537K
D1 > 20mm to factory standard
**To factory standard

Tolerances of Drills and Holes

High-performance solid carbide drills with tolerances of m7 create holes with tolerances of H9. H8 can be achieved in very good conditions. The drill should be used for holes in H8, and in favorable conditions, H7 can be achieved. Solid carbide drills with H7 create holes in K9–11. Other drilling tolerances require special solid carbide drill versions.

Tolerances of diameter D1 on:
Spiral Flute
TDG Drill





widia.com

WIDIA™

TOP DRILL™ Modular X

TDMX

The TDMX modular drill will deliver maximum clamping stability between the carbide insert and the pocket seat, enabling safe operations under unstable conditions using material-specific point geometries and grades.

Extra stable pocket seat design to increase stability to securely face high demanding applications.

Coolant channels exit behind the cutting edge to ensure the best coolant delivery.

Two standard screws clamp and unclamp the insert, without disassembling the tool from the holder.

Margin lands on the entire body length to ensure straightness and increased hole quality.

Polished flutes
Improved chip evacuation.



The TDMX modular drilling line features material-specific inserts seated in an advanced pocket seat design which maximizes the insert clamping rigidity and enables higher productivity even under unstable machining conditions.

TDMX heads can be re-conditioned to increase the total life cycle of the tool.

PK



P K

First choice for steel and cast iron drilling.

FPE



P M K

Flat bottom drilling, stacked plates, piloting for deep hole drilling.

MS



M S

First choice for stainless steel and super alloys.

MODULAR STABILITY

PRODUCT

POINT GEOMETRY/GRADE

FPE / WP40PD
PK / WP40PD
MS / WM15PD

DIAMETER RANGE

.629–1.574" (16–40mm)

INDUSTRY

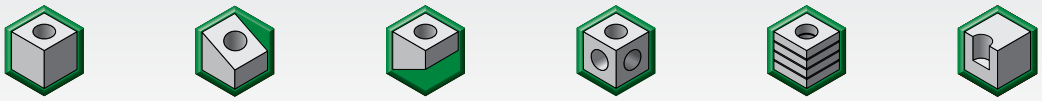
ENERGY
GENERAL ENGINEERING
TRANSPORTATION

MATERIALS

FIRST CHOICE

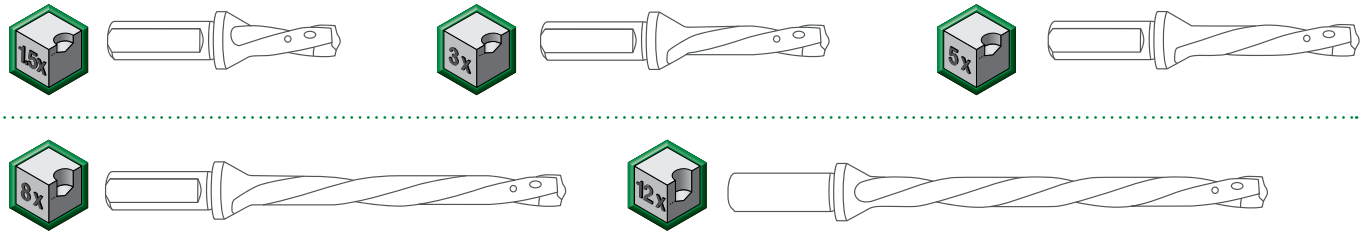
P M K S

APPLICATIONS



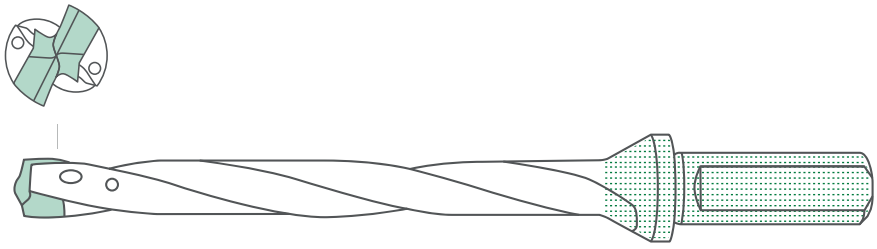
DRILLING | INCLINED ENTRY | INCLINED EXIT | CROSS HOLES | STACKED PLATES | FLAT BOTTOM

STEEL BODIES



FLANGED SHANK

Increase overall drill stability in deep-drilling applications. Suitable for machining and turning centers.



TDMX Inserts • Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

TDMX	08130	PK	WP40PD
Top Drill Modular X	Insert Diameter	Insert Geometry	Grade
	Inch = .813"	**PK** = steel and cast iron	**W**IDIA™; **P** = Primarily steel Application **30 & 40** = tough carbide, **P**VD coated, Modular **D**rilling Insert

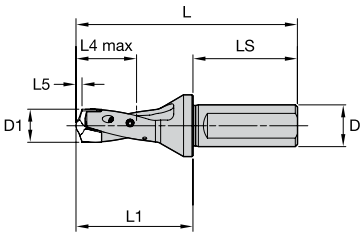
TDMX Bodies • Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

TDMX	0788	R5	SL	100
Top Drill Modular X	Drill Body Diameter	L/D Ratio	Shank Style	Shank Diameter
	Inch = .788"	5 x D	**S**ide **L**ock	1.00"

TOP DRILL Modular X • 1.5 x D • Side Lock Shank • Inch



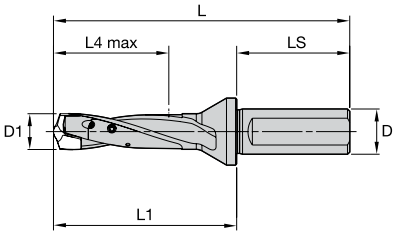


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6680912	TDMX0630R1SL075	A	.6300	.6692	1.97	.75	4.17	2.20	1.02
6680914	TDMX0670R1SL075	B	.6693	.7086	1.97	.75	4.29	2.32	1.06
6680915	TDMX0709R1SL100	C	.7087	.7480	2.20	1.00	4.65	2.44	1.14
6680916	TDMX0749R1SL100	D	.7481	.7874	2.20	1.00	4.76	2.56	1.18
6680917	TDMX0788R1SL100	E	.7875	.8267	2.20	1.00	4.88	2.68	1.26
6680918	TDMX0827R1SL100	F	.8268	.8661	2.20	1.00	5.00	2.80	1.30
6680919	TDMX0867R1SL100	G	.8662	.9055	2.20	1.00	5.12	2.91	1.38
6680920	TDMX0906R1SL100	H	.9056	.9448	2.20	1.00	5.24	3.03	1.42
6680931	TDMX0945R1SL125	I	.9449	.9842	2.36	1.25	5.51	3.15	1.50
6680932	TDMX0985R1SL125	J	.9843	1.0236	2.36	1.25	5.63	3.27	1.54
6680933	TDMX1024R1SL125	K	1.0237	1.0629	2.36	1.25	5.75	3.39	1.61
6680934	TDMX1063R1SL125	L	1.0630	1.1023	2.36	1.25	5.87	3.50	1.65
6680935	TDMX1103R1SL125	M	1.1024	1.1417	2.36	1.25	5.98	3.62	1.73
6680937	TDMX1142R1SL125	N	1.1418	1.1811	2.36	1.25	6.10	3.74	1.77
6680938	TDMX1182R1SL125	O	1.1812	1.2204	2.36	1.25	6.22	3.86	1.85
6680940	TDMX1221R1SL125	P	1.2205	1.2598	2.36	1.25	6.34	3.98	1.89

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TOP DRILL Modular X • 3 x D • Side Lock Shank • Inch



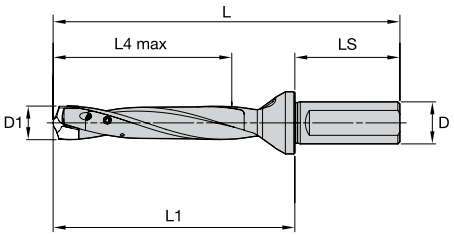


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572186	TDMX0630R3SL075	A	.6300	.6692	1.97	.75	5.16	3.19	2.01
6572187	TDMX0670R3SL075	B	.6693	.7086	1.97	.75	5.35	3.39	2.13
6572188	TDMX0709R3SL100	C	.7087	.7480	2.20	1.00	5.75	3.54	2.24
6572189	TDMX0749R3SL100	D	.7481	.7874	2.20	1.00	5.94	3.74	2.36
6572190	TDMX0788R3SL100	E	.7875	.8267	2.20	1.00	6.10	3.90	2.48
6572191	TDMX0827R3SL100	F	.8268	.8661	2.20	1.00	6.30	4.09	2.60
6572192	TDMX0867R3SL100	G	.8662	.9055	2.20	1.00	6.46	4.25	2.72
6572193	TDMX0906R3SL100	H	.9056	.9448	2.20	1.00	6.65	4.45	2.83
6572194	TDMX0945R3SL125	I	.9449	.9842	2.36	1.25	6.97	4.61	2.95
6572195	TDMX0985R3SL125	J	.9843	1.0236	2.36	1.25	7.17	4.80	3.07
6572196	TDMX1024R3SL125	K	1.0237	1.0629	2.36	1.25	7.32	4.96	3.19
6572197	TDMX1063R3SL125	L	1.0630	1.1023	2.36	1.25	7.52	5.16	3.31
6572198	TDMX1103R3SL125	M	1.1024	1.1417	2.36	1.25	7.68	5.32	3.43
6572199	TDMX1142R3SL125	N	1.1418	1.1811	2.36	1.25	7.87	5.51	3.54
6572200	TDMX1182R3SL125	O	1.1812	1.2204	2.36	1.25	8.03	5.67	3.66
6572201	TDMX1221R3SL125	P	1.2205	1.2598	2.36	1.25	8.23	5.87	3.78
6572202	TDMX1260R3SL150	Q	1.2599	1.3385	2.76	1.50	8.98	6.22	4.02
6572203	TDMX1339R3SL150	R	1.3386	1.4173	2.76	1.50	9.33	6.57	4.25
6572204	TDMX1418R3SL150	S	1.4174	1.4960	2.76	1.50	9.69	6.93	4.49
6572205	TDMX1497R3SL150	T	1.4961	1.5748	2.76	1.50	10.04	7.28	4.72

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TOP DRILL Modular X • 5 x D • Side Lock Shank • Inch



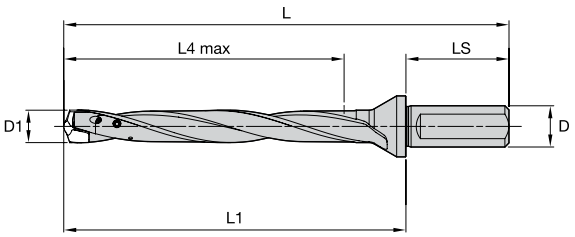


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572206	TDMX0630R5SL075	A	.6300	.6692	1.97	.75	6.50	4.53	3.35
6572207	TDMX0670R5SL075	B	.6693	.7086	1.97	.75	6.77	4.80	3.54
6572208	TDMX0709R5SL100	C	.7087	.7480	2.20	1.00	7.24	5.04	3.74
6572210	TDMX0749R5SL100	D	.7481	.7874	2.20	1.00	7.52	5.32	3.94
6572231	TDMX0788R5SL100	E	.7875	.8267	2.20	1.00	7.76	5.55	4.13
6572232	TDMX0827R5SL100	F	.8268	.8661	2.20	1.00	8.03	5.83	4.33
6572233	TDMX0867R5SL100	G	.8662	.9055	2.20	1.00	8.27	6.06	4.53
6572234	TDMX0906R5SL100	H	.9056	.9448	2.20	1.00	8.54	6.34	4.72
6572235	TDMX0945R5SL125	I	.9449	.9842	2.36	1.25	8.94	6.57	4.92
6572236	TDMX0985R5SL125	J	.9843	1.0236	2.36	1.25	9.21	6.85	5.12
6572237	TDMX1024R5SL125	K	1.0237	1.0629	2.36	1.25	9.45	7.09	5.32
6572238	TDMX1063R5SL125	L	1.0630	1.1023	2.36	1.25	9.72	7.36	5.51
6572239	TDMX1103R5SL125	M	1.1024	1.1417	2.36	1.25	9.96	7.60	5.71
6572240	TDMX1142R5SL125	N	1.1418	1.1811	2.36	1.25	10.24	7.87	5.91
6572241	TDMX1182R5SL125	O	1.1812	1.2204	2.36	1.25	10.47	8.11	6.10
6572242	TDMX1221R5SL125	P	1.2205	1.2598	2.36	1.25	10.75	8.39	6.30
6572243	TDMX1260R5SL150	Q	1.2599	1.3385	2.76	1.50	11.65	8.90	6.69
6572244	TDMX1339R5SL150	R	1.3386	1.4173	2.76	1.50	12.17	9.41	7.09
6572245	TDMX1418R5SL150	S	1.4174	1.4960	2.76	1.50	12.68	9.92	7.48
6572246	TDMX1497R5SL150	T	1.4961	1.5748	2.76	1.50	13.19	10.43	7.87

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L5 is dependent on the insert.

TOP DRILL Modular X • 8 x D • Side Lock Shank • Inch



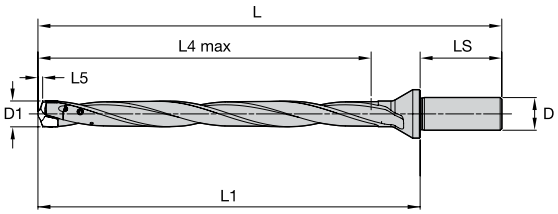


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572247	TDMX0630R8SL075	A	.6300	.6692	1.97	.75	8.50	6.54	5.35
6572248	TDMX0670R8SL075	B	.6693	.7086	1.97	.75	8.90	6.93	5.67
6572249	TDMX0709R8SL100	C	.7087	.7480	2.20	1.00	9.49	7.28	5.98
6572250	TDMX0749R8SL100	D	.7481	.7874	2.20	1.00	9.88	7.68	6.30
6572251	TDMX0788R8SL100	E	.7875	.8267	2.20	1.00	10.24	8.03	6.61
6572252	TDMX0827R8SL100	F	.8268	.8661	2.20	1.00	10.63	8.43	6.93
6572253	TDMX0867R8SL100	G	.8662	.9055	2.20	1.00	10.98	8.78	7.24
6572254	TDMX0906R8SL100	H	.9056	.9448	2.20	1.00	11.38	9.17	7.56
6572255	TDMX0945R8SL125	I	.9449	.9842	2.36	1.25	11.89	9.53	7.87
6572256	TDMX0985R8SL125	J	.9843	1.0236	2.36	1.25	12.28	9.92	8.19
6572257	TDMX1024R8SL125	K	1.0237	1.0629	2.36	1.25	12.64	10.28	8.50
6572258	TDMX1063R8SL125	L	1.0630	1.1023	2.36	1.25	13.03	10.67	8.82
6572259	TDMX1103R8SL125	M	1.1024	1.1417	2.36	1.25	13.39	11.02	9.13
6572260	TDMX1142R8SL125	N	1.1418	1.1811	2.36	1.25	13.78	11.42	9.45
6572261	TDMX1182R8SL125	O	1.1812	1.2204	2.36	1.25	14.13	11.77	9.76
6572262	TDMX1221R8SL125	P	1.2205	1.2598	2.36	1.25	14.53	12.17	10.08
6572263	TDMX1260R8SL150	Q	1.2599	1.3385	2.76	1.50	15.67	12.91	10.71
6572264	TDMX1339R8SL150	R	1.3386	1.4173	2.76	1.50	16.42	13.66	11.34
6572265	TDMX1418R8SL150	S	1.4174	1.4960	2.76	1.50	17.17	14.41	11.97
6572266	TDMX1497R8SL150	T	1.4961	1.5748	2.76	1.50	17.91	15.16	12.60

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TOP DRILL Modular X • 12 x D • Flanged Round Shank • Inch



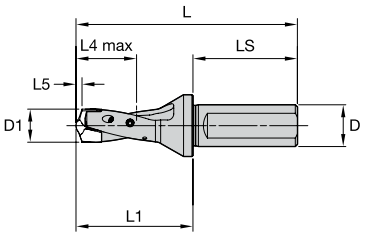


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6680978	TDMX0630R12SF075	A	.6300	.6692	1.97	.75	11.18	9.21	8.03
6680979	TDMX0670R12SF075	B	.6693	.7086	1.97	.75	11.73	9.76	8.50
6680980	TDMX0709R12SF100	C	.7087	.7480	2.20	1.00	12.48	10.28	8.98
6681001	TDMX0749R12SF100	D	.7481	.7874	2.20	1.00	13.03	10.83	9.45
6681002	TDMX0788R12SF100	E	.7875	.8267	2.20	1.00	13.54	11.34	9.92
6681003	TDMX0827R12SF100	F	.8268	.8661	2.20	1.00	14.09	11.89	10.39
6681004	TDMX0867R12SF100	G	.8662	.9055	2.20	1.00	14.61	12.40	10.87
6681005	TDMX0906R12SF100	H	.9056	.9448	2.20	1.00	15.16	12.95	11.34
6681006	TDMX0945R12SF125	I	.9449	.9842	2.36	1.25	15.83	13.46	11.81
6681007	TDMX0985R12SF125	J	.9843	1.0236	2.36	1.25	16.38	14.02	12.28
6681008	TDMX1024R12SF125	K	1.0237	1.0629	2.36	1.25	16.89	14.53	12.76
6681010	TDMX1063R12SF125	L	1.0630	1.1023	2.36	1.25	17.44	15.08	13.23
6681011	TDMX1103R12SF125	M	1.1024	1.1417	2.36	1.25	17.95	15.59	13.70
6681012	TDMX1142R12SF125	N	1.1418	1.1811	2.36	1.25	18.50	16.14	14.17
6681013	TDMX1182R12SF125	O	1.1812	1.2204	2.36	1.25	19.02	16.65	14.65
6681015	TDMX1221R12SF125	P	1.2205	1.2598	2.36	1.25	19.57	17.20	15.12

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TOP DRILL Modular X • 1.5 x D • Side Lock Shank • Metric



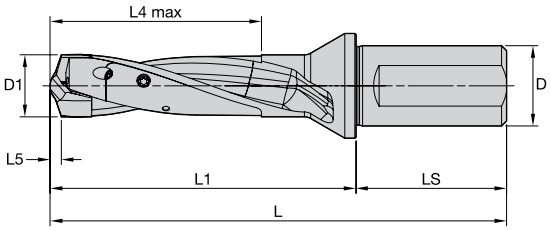


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6680951	TDMX160R1SL20M	A	16,000	16,999	50	20	106	56	26
6680952	TDMX170R1SL20M	B	17,000	17,999	50	20	109	59	27
6680953	TDMX180R1SL25M	C	18,000	18,999	56	25	118	62	29
6680954	TDMX190R1SL25M	D	19,000	19,999	56	25	121	65	30
6680955	TDMX200R1SL25M	E	20,000	20,999	56	25	124	68	32
6680956	TDMX210R1SL25M	F	21,000	21,999	56	25	127	71	33
6680957	TDMX220R1SL25M	G	22,000	22,999	56	25	130	74	35
6680958	TDMX230R1SL25M	H	23,000	23,999	56	25	133	77	36
6680959	TDMX240R1SL32M	I	24,000	24,999	60	32	140	80	38
6680960	TDMX250R1SL32M	J	25,000	25,999	60	32	143	83	39
6680971	TDMX260R1SL32M	K	26,000	26,999	60	32	146	86	41
6680972	TDMX270R1SL32M	L	27,000	27,999	60	32	149	89	42
6680973	TDMX280R1SL32M	M	28,000	28,999	60	32	152	92	44
6680974	TDMX290R1SL32M	N	29,000	29,999	60	32	155	95	45
6680975	TDMX300R1SL32M	O	30,000	30,999	60	32	158	98	47
6680976	TDMX310R1SL32M	P	31,000	31,999	60	32	161	101	48

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TOP DRILL Modular X • 3 x D • Side Lock Shank • Metric



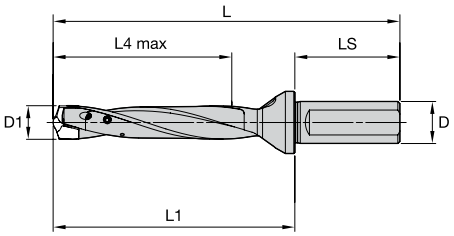


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572091	TDMX160R3SL20M	A	16,000	16,999	50	20	131	81	51
6572092	TDMX170R3SL20M	B	17,000	17,999	50	20	136	86	54
6572093	TDMX180R3SL25M	C	18,000	18,999	56	25	146	90	57
6572094	TDMX190R3SL25M	D	19,000	19,999	56	25	151	95	60
6572096	TDMX200R3SL25M	E	20,000	20,999	56	25	155	99	63
6572097	TDMX210R3SL25M	F	21,000	21,999	56	25	160	104	66
6572098	TDMX220R3SL25M	G	22,000	22,999	56	25	164	108	69
6572099	TDMX230R3SL25M	H	23,000	23,999	56	25	169	113	72
6572100	TDMX240R3SL32M	I	24,000	24,999	60	32	177	117	75
6572101	TDMX250R3SL32M	J	25,000	25,999	60	32	182	122	78
6572102	TDMX260R3SL32M	K	26,000	26,999	60	32	186	126	81
6572104	TDMX270R3SL32M	L	27,000	27,999	60	32	191	131	84
6572105	TDMX280R3SL32M	M	28,000	28,999	60	32	195	135	87
6572106	TDMX290R3SL32M	N	29,000	29,999	60	32	200	140	90
6572107	TDMX300R3SL32M	O	30,000	30,999	60	32	204	144	93
6572108	TDMX310R3SL32M	P	31,000	31,999	60	32	209	149	96
6572109	TDMX320R3SL40M	Q	32,000	33,999	70	40	228	158	102
6572110	TDMX340R3SL40M	R	34,000	35,999	70	40	237	167	108
6572121	TDMX360R3SL40M	S	36,000	37,999	70	40	246	176	114
6572122	TDMX380R3SL40M	T	38,000	40,000	70	40	255	185	120

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TOP DRILL Modular X • 5 x D • Side Lock Shank • Metric



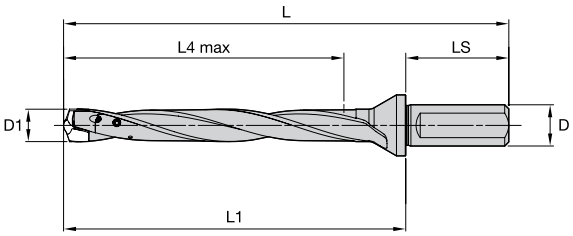


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572125	TDMX160R5SL20M	A	16,000	16,999	50	20	165	115	85
6572126	TDMX170R5SL20M	B	17,000	17,999	50	20	172	122	90
6572127	TDMX180R5SL25M	C	18,000	18,999	56	25	184	128	95
6572128	TDMX190R5SL25M	D	19,000	19,999	56	25	191	135	100
6572129	TDMX200R5SL25M	E	20,000	20,999	56	25	197	141	105
6572130	TDMX210R5SL25M	F	21,000	21,999	56	25	204	148	110
6572141	TDMX220R5SL25M	G	22,000	22,999	56	25	210	154	115
6572142	TDMX230R5SL25M	H	23,000	23,999	56	25	217	161	120
6572143	TDMX240R5SL32M	I	24,000	24,999	60	32	227	167	125
6572144	TDMX250R5SL32M	J	25,000	25,999	60	32	234	174	130
6572145	TDMX260R5SL32M	K	26,000	26,999	60	32	240	180	135
6572146	TDMX270R5SL32M	L	27,000	27,999	60	32	247	187	140
6572147	TDMX280R5SL32M	M	28,000	28,999	60	32	253	193	145
6572148	TDMX290R5SL32M	N	29,000	29,999	60	32	260	200	150
6572149	TDMX300R5SL32M	O	30,000	30,999	60	32	266	206	155
6572150	TDMX310R5SL32M	P	31,000	31,999	60	32	273	213	160
6572151	TDMX320R5SL40M	Q	32,000	33,999	70	40	296	226	170
6572152	TDMX340R5SL40M	R	34,000	35,999	70	40	309	239	180
6572153	TDMX360R5SL40M	S	36,000	37,999	70	40	322	252	190
6572154	TDMX380R5SL40M	T	38,000	40,000	70	40	335	265	200

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TOP DRILL Modular X • 8 x D • Side Lock Shank • Metric



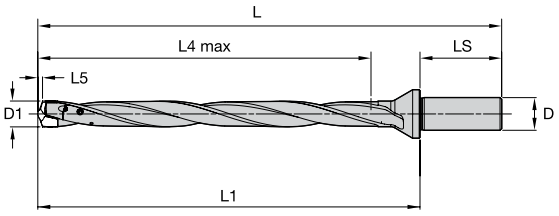


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572155	TDMX160R8SL20M	A	16,000	16,999	50	20	216	166	136
6572156	TDMX170R8SL20M	B	17,000	17,999	50	20	226	176	144
6572157	TDMX180R8SL25M	C	18,000	18,999	56	25	241	185	152
6572158	TDMX190R8SL25M	D	19,000	19,999	56	25	251	195	160
6572159	TDMX200R8SL25M	E	20,000	20,999	56	25	260	204	168
6572160	TDMX210R8SL25M	F	21,000	21,999	56	25	270	214	176
6572171	TDMX220R8SL25M	G	22,000	22,999	56	25	279	223	184
6572172	TDMX230R8SL25M	H	23,000	23,999	56	25	289	233	192
6572173	TDMX240R8SL32M	I	24,000	24,999	60	32	302	242	200
6572174	TDMX250R8SL32M	J	25,000	25,999	60	32	312	252	208
6572175	TDMX260R8SL32M	K	26,000	26,999	60	32	321	261	216
6572176	TDMX270R8SL32M	L	27,000	27,999	60	32	331	271	224
6572177	TDMX280R8SL32M	M	28,000	28,999	60	32	340	280	232
6572178	TDMX290R8SL32M	N	29,000	29,999	60	32	350	290	240
6572179	TDMX300R8SL32M	O	30,000	30,999	60	32	359	299	248
6572180	TDMX310R8SL32M	P	31,000	31,999	60	32	369	309	256
6572181	TDMX320R8SL40M	Q	32,000	33,999	70	40	398	328	272
6572182	TDMX340R8SL40M	R	34,000	35,999	70	40	417	374	288
6572183	TDMX360R8SL40M	S	36,000	37,999	70	40	436	366	304
6572184	TDMX380R8SL40M	T	38,000	40,000	70	40	455	385	320

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L5 is dependent on the insert.

TOP DRILL Modular X • 12 x D • Flanged Round Shank • Metric



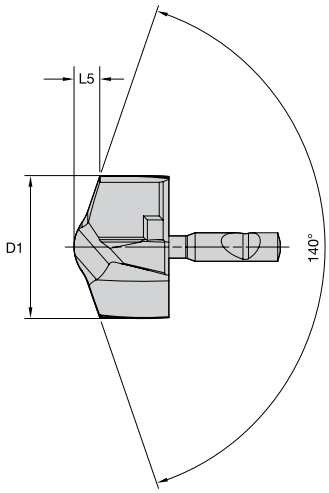


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6681017	TDMX160R12SF20M	A	16,000	16,999	50	20	284	234	204
6681018	TDMX170R12SF20M	B	17,000	17,999	50	20	298	248	216
6681019	TDMX180R12SF25M	C	18,000	18,999	56	25	317	261	228
6681020	TDMX190R12SF25M	D	19,000	19,999	56	25	331	275	240
6681041	TDMX200R12SF25M	E	20,000	20,999	56	25	344	288	252
6681042	TDMX210R12SF25M	F	21,000	21,999	56	25	358	302	264
6681043	TDMX220R12SF25M	G	22,000	22,999	56	25	371	315	276
6681044	TDMX230R12SF25M	H	23,000	23,999	56	25	385	329	288
6681045	TDMX240R12SF32M	I	24,000	24,999	60	32	402	342	300
6681046	TDMX250R12SF32M	J	25,000	25,999	60	32	416	356	312
6681047	TDMX260R12SF32M	K	26,000	26,999	60	32	429	369	324
6681049	TDMX270R12SF32M	L	27,000	27,999	60	32	443	383	336
6681050	TDMX280R12SF32M	M	28,000	28,999	60	32	456	396	348
6681051	TDMX290R12SF32M	N	29,000	29,999	60	32	470	410	360
6681052	TDMX300R12SF32M	O	30,000	30,999	60	32	483	423	372
6681053	TDMX310R12SF32M	P	31,000	31,999	60	32	497	437	384

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TOP DRILL™ Modular X • Inserts • PK





● first choice
○ alternate choice

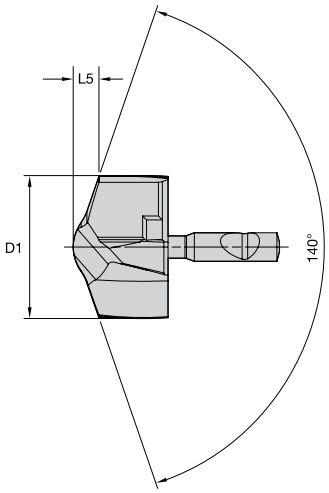
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	D1		L5			
catalog number	mm	in	mm	in	SSC	WP40PD
TDMX16000PKM	16,00	.630	3,21	.126	A	6568446
TDMX16200PKM	16,20	.638	3,25	.128	A	6568447
TDMX16281PKM	16,28	.641	3,26	.128	A	6568448
TDMX16500PKM	16,50	.650	3,30	.130	A	6568449
TDMX16667PKM	16,67	.656	3,33	.131	A	6568450
TDMX17000PKM	17,00	.669	3,39	.134	B	6568461
TDMX17064PKM	17,06	.672	3,41	.134	B	6568462
TDMX17463PKM	17,46	.688	3,48	.137	B	6568464
TDMX17500PKM	17,50	.689	3,49	.137	B	6568465
TDMX17600PKM	17,60	.693	3,50	.138	B	6568467
TDMX17800PKM	17,80	.701	3,54	.139	B	6568471
TDMX17859PKM	17,86	.703	3,55	.140	B	6568472
TDMX18000PKM	18,00	.709	3,58	.141	C	6568473
TDMX18255PKM	18,26	.719	3,64	.143	C	6568474
TDMX18500PKM	18,50	.728	3,68	.145	C	6568475
TDMX18651PKM	18,65	.734	3,71	.146	C	6568476
TDMX18800PKM	18,80	.740	3,74	.147	C	6568477
TDMX19000PKM	19,00	.748	3,78	.149	D	6568478
TDMX19050PKM	19,05	.750	3,78	.149	D	6568479
TDMX19200PKM	19,20	.756	3,81	.150	D	6568480
TDMX19270PKM	19,27	.759	3,82	.150	D	6568481
TDMX19450PKM	19,45	.766	3,86	.152	D	6568482
TDMX19500PKM	19,50	.768	3,87	.152	D	6568483
TDMX19700PKM	19,70	.776	3,90	.154	D	6568484
TDMX19840PKM	19,84	.781	3,93	.155	D	6568485
TDMX20000PKM	20,00	.787	3,97	.156	E	6568813
TDMX20100PKM	20,10	.791	3,99	.157	E	6568814
TDMX20200PKM	20,20	.795	4,01	.158	E	6568815
TDMX20239PKM	20,24	.797	4,02	.158	E	6568816
TDMX20300PKM	20,30	.799	4,03	.159	E	6568817
TDMX20400PKM	20,40	.803	4,05	.159	E	6568818
TDMX20500PKM	20,50	.807	4,06	.160	E	6568819
TDMX20600PKM	20,60	.811	4,08	.161	E	6568820
TDMX20650PKM	20,65	.813	4,09	.161	E	6568841
TDMX20700PKM	20,70	.815	4,10	.161	E	6568842
TDMX20800PKM	20,80	.819	4,12	.162	E	6568843
TDMX20900PKM	20,90	.823	4,14	.163	E	6568844
TDMX21000PKM	21,00	.827	4,16	.164	F	6568845
TDMX21430PKM	21,43	.844	4,23	.167	F	6568846
TDMX21500PKM	21,50	.847	4,25	.167	F	6568847
TDMX22000PKM	22,00	.866	4,35	.171	G	6568848
TDMX22225PKM	22,23	.875	4,39	.173	G	6568849
TDMX22450PKM	22,45	.884	4,44	.175	G	6568850
TDMX22500PKM	22,50	.886	4,44	.175	G	6568851
TDMX23000PKM	23,00	.906	4,54	.179	H	6568852
TDMX23500PKM	23,50	.925	4,63	.182	H	6568853
TDMX23813PKM	23,81	.938	4,68	.184	H	6568854
TDMX24000PKM	24,00	.945	4,73	.186	I	6568856
TDMX24500PKM	24,50	.965	4,82	.190	I	6568857
TDMX24605PKM	24,61	.969	4,84	.191	I	6568858
TDMX25000PKM	25,00	.984	4,91	.193	J	6568859
TDMX25400PKM	25,40	1.000	4,99	.197	J	6568860

TOP DRILL™ Modular X • Inserts • PK

(continued)





● first choice
○ alternate choice

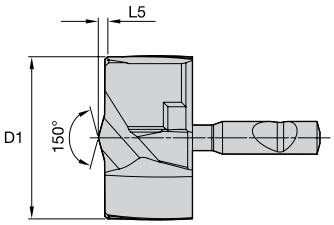
P		●
M		○
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	D1		L5			
catalog number	mm	in	mm	in	SSC	WP40PD
TDMX25500PKM	25,50	1.004	5,01	.197	J	6568861
TDMX25670PKM	25,67	1.011	5,04	.198	J	6568862
TDMX25700PKM	25,70	1.012	5,04	.198	J	6568863
TDMX25760PKM	25,76	1.014	5,05	.199	J	6568864
TDMX25796PKM	25,80	1.016	5,06	.199	J	6568865
TDMX26000PKM	26,00	1.024	5,11	.201	K	6568866
TDMX26192PKM	26,19	1.031	5,15	.203	K	6568867
TDMX26400PKM	26,40	1.039	5,18	.204	K	6568868
TDMX26500PKM	26,50	1.043	5,20	.205	K	6568869
TDMX26589PKM	26,59	1.047	5,22	.206	K	6568870
TDMX27000PKM	27,00	1.063	5,29	.208	L	6568871
TDMX27500PKM	27,50	1.083	5,38	.212	L	6568872
TDMX27780PKM	27,78	1.094	5,43	.214	L	6568873
TDMX28000PKM	28,00	1.102	5,49	.216	M	6568874
TDMX28176PKM	28,18	1.109	5,52	.217	M	6568875
TDMX28500PKM	28,50	1.122	5,58	.220	M	6568876
TDMX28575PKM	28,58	1.125	5,59	.220	M	6568877
TDMX29000PKM	29,00	1.142	5,67	.223	N	6568878
TDMX29367PKM	29,37	1.156	5,74	.226	N	6568879
TDMX29500PKM	29,50	1.161	5,76	.227	N	6568880
TDMX29764PKM	29,76	1.172	5,81	.229	N	6568891
TDMX30000PKM	30,00	1.181	5,87	.231	O	6568892
TDMX30163PKM	30,16	1.188	5,90	.232	O	6568893
TDMX30500PKM	30,50	1.201	5,96	.235	O	6568896
TDMX30955PKM	30,96	1.219	6,04	.238	O	6568897
TDMX31000PKM	31,00	1.221	6,05	.238	P	6568898
TDMX31500PKM	31,50	1.240	6,14	.242	P	6568899
TDMX31750PKM	31,75	1.250	6,18	.243	P	6568900
TDMX32000PKM	32,00	1.260	6,25	.246	Q	6568901
TDMX32500PKM	32,50	1.280	6,34	.250	Q	6568902
TDMX33000PKM	33,00	1.299	6,43	.253	Q	6568903
TDMX33338PKM	33,34	1.313	6,49	.256	Q	6568904
TDMX34000PKM	34,00	1.339	6,61	.260	R	6568905
TDMX34130PKM	34,13	1.344	6,64	.261	R	6568906
TDMX34925PKM	34,93	1.375	6,78	.267	R	6568907
TDMX35000PKM	35,00	1.378	6,79	.267	R	6568908
TDMX35500PKM	35,50	1.398	6,89	.271	R	6568909
TDMX36000PKM	36,00	1.417	7,00	.276	S	6568910
TDMX36500PKM	36,50	1.437	7,09	.279	S	6568911
TDMX37000PKM	37,00	1.457	7,18	.283	S	6568912
TDMX37500PKM	37,50	1.476	7,27	.286	S	6568913
TDMX38000PKM	38,00	1.496	7,36	.290	T	6568914
TDMX38100PKM	38,10	1.500	7,38	.291	T	6568915
TDMX38500PKM	38,50	1.516	7,46	.294	T	6568916
TDMX39000PKM	39,00	1.535	7,55	.297	T	6568917
TDMX39289PKM	39,29	1.547	7,60	.299	T	6568918
TDMX39500PKM	39,50	1.555	7,64	.301	T	6568919
TDMX40000PKM	40,00	1.575	7,73	.304	T	6568920

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

TOP DRILL™ Modular X • Inserts • FPE





● first choice
○ alternate choice

P	●
M	○
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catalog number	D1 mm	D1 in	L5 mm	L5 in	SSC	WP40PD
TDMX16000FPEM	16,00	.630	1,16	.046	A	**6693048**
TDMX16281FPEM	16,28	.641	1,17	.046	A	**6693049**
TDMX16500FPEM	16,50	.650	1,17	.046	A	**6693050**
TDMX16667FPEM	16,67	.656	1,17	.046	A	**6693111**
TDMX17000FPEM	17,00	.669	1,18	.047	B	**6693112**
TDMX17064FPEM	17,06	.672	1,18	.047	B	**6693113**
TDMX17500FPEM	17,50	.689	1,19	.047	B	**6693114**
TDMX18000FPEM	18,00	.709	1,28	.050	C	**6693115**
TDMX18500FPEM	18,50	.728	1,28	.050	C	**6693116**
TDMX19000FPEM	19,00	.748	1,29	.051	D	**6693117**
TDMX19050FPEM	19,05	.750	1,29	.051	D	**6693118**
TDMX19500FPEM	19,50	.768	1,30	.051	D	**6693119**
TDMX19840FPEM	19,84	.781	1,31	.052	D	**6693120**
TDMX20000FPEM	20,00	.787	1,39	.055	E	**6693131**
TDMX20500FPEM	20,50	.807	1,40	.055	E	**6693132**
TDMX21000FPEM	21,00	.827	1,40	.055	F	**6693133**
TDMX21500FPEM	21,50	.847	1,41	.056	F	**6693134**
TDMX22000FPEM	22,00	.866	1,50	.059	G	**6693135**
TDMX22500FPEM	22,50	.886	1,51	.059	G	**6693136**
TDMX23000FPEM	23,00	.906	1,51	.059	H	**6693137**
TDMX23500FPEM	23,50	.925	1,52	.060	H	**6693138**
TDMX24000FPEM	24,00	.945	1,61	.063	I	**6693139**
TDMX24500FPEM	24,50	.965	1,62	.064	I	**6693140**
TDMX25000FPEM	25,00	.984	1,62	.064	J	**6693151**
TDMX25400FPEM	25,40	1.000	1,63	.064	J	**6693152**
TDMX25500FPEM	25,50	1.004	1,63	.064	J	**6693153**
TDMX26000FPEM	26,00	1.024	1,72	.068	K	**6693154**
TDMX26400FPEM	26,40	1.039	1,72	.068	K	**6693194**
TDMX26500FPEM	26,50	1.043	1,72	.068	K	**6693155**
TDMX27000FPEM	27,00	1.063	1,73	.068	L	**6693156**
TDMX27500FPEM	27,50	1.083	1,74	.069	L	**6693157**
TDMX28000FPEM	28,00	1.102	1,83	.072	M	**6693158**
TDMX28500FPEM	28,50	1.122	1,83	.072	M	**6693160**
TDMX29000FPEM	29,00	1.142	1,84	.072	N	**6693161**
TDMX29500FPEM	29,50	1.161	1,85	.073	N	**6693162**
TDMX30000FPEM	30,00	1.181	1,93	.076	O	**6693163**
TDMX30500FPEM	30,50	1.201	1,94	.076	O	**6693164**
TDMX31000FPEM	31,00	1.221	1,94	.076	P	**6693165**
TDMX31500FPEM	31,50	1.240	1,95	.077	P	**6693166**
TDMX31750FPEM	31,75	1.250	1,95	.077	P	**6693167**
TDMX32000FPEM	32,00	1.260	2,08	.082	Q	**6693168**
TDMX32500FPEM	32,50	1.280	2,08	.082	Q	**6693169**
TDMX33000FPEM	33,00	1.299	2,09	.082	Q	**6693170**
TDMX34000FPEM	34,00	1.339	2,10	.083	R	**6693181**
TDMX35000FPEM	35,00	1.378	2,11	.083	R	**6693182**
TDMX35500FPEM	35,50	1.398	2,12	.084	R	**6693183**
TDMX36000FPEM	36,00	1.417	2,29	.090	S	**6693184**
TDMX36500FPEM	36,50	1.437	2,29	.090	S	**6693185**
TDMX37000FPEM	37,00	1.457	2,30	.091	S	**6693186**
TDMX37500FPEM	37,50	1.476	2,30	.091	S	**6693187**
TDMX38000FPEM	38,00	1.496	2,31	.091	T	**6693188**
TDMX38100FPEM	38,10	1.500	2,31	.091	T	**6693189**
TDMX38500FPEM	38,50	1.516	2,32	.091	T	**6693190**
TDMX39000FPEM	39,00	1.535	2,32	.091	T	**6693191**
TDMX39500FPEM	39,50	1.555	2,33	.092	T	**6693192**
TDMX40000FPEM	40,00	1.575	2,33	.092	T	**6693193**

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Inch tolerance

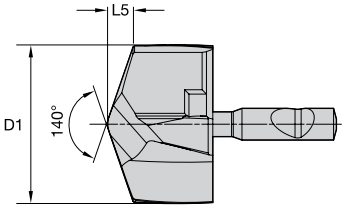
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.3125–.3906	.000/+.0009
>.3906–.6250	.000/+.0011
>.6692–.7090	.000/+.0010
>.7090–.8228	.000/+.0013

Metric tolerance

D1	tolerance k8
8–10	0,000/+0,022
>10–17	0,000/+0,027
>17–18	0,000/+0,027
>18–21	0,000/+0,033

TOP DRILL™ Modular X • Inserts • MS





● first choice
○ alternate choice

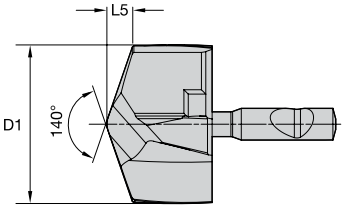
P		
M		●
K		○
N		○
S		●
H		

	D1		L5			
catalog number	mm	in	mm	in	SSC	WM15PD
TDMX16000MSM	16,00	.630	2,84	.112	A	6568922
TDMX16200MSM	16,20	.638	2,88	.113	A	6568923
TDMX16281MSM	16,28	.641	2,89	.114	A	6568924
TDMX16500MSM	16,50	.650	2,93	.115	A	6568925
TDMX16667MSM	16,67	.656	2,96	.117	A	6568926
TDMX17000MSM	17,00	.669	3,01	.119	B	6568927
TDMX17064MSM	17,06	.672	3,02	.119	B	6568929
TDMX17463MSM	17,46	.688	3,09	.122	B	6568930
TDMX17500MSM	17,50	.689	3,10	.122	B	6568931
TDMX17600MSM	17,60	.693	3,12	.123	B	6568932
TDMX17800MSM	17,80	.701	3,15	.124	B	6568933
TDMX17859MSM	17,86	.703	3,16	.124	B	6568934
TDMX18000MSM	18,00	.709	3,19	.126	C	6568935
TDMX18255MSM	18,26	.719	3,24	.128	C	6568938
TDMX18500MSM	18,50	.728	3,28	.129	C	6568939
TDMX18651MSM	18,65	.734	3,30	.130	C	6568940
TDMX18800MSM	18,80	.740	3,33	.131	C	6568941
TDMX19000MSM	19,00	.748	3,36	.132	D	6568942
TDMX19050MSM	19,05	.750	3,37	.133	D	6568943
TDMX19200MSM	19,20	.756	3,40	.134	D	6568944
TDMX19270MSM	19,27	.759	3,41	.134	D	6568945
TDMX19450MSM	19,45	.766	3,44	.135	D	6568946
TDMX19500MSM	19,50	.768	3,45	.136	D	6568947
TDMX19700MSM	19,70	.776	3,48	.137	D	6568948
TDMX19840MSM	19,84	.781	3,51	.138	D	6568949
TDMX20000MSM	20,00	.787	3,54	.139	E	6568961
TDMX20100MSM	20,10	.791	3,56	.140	E	6568962
TDMX20200MSM	20,20	.795	3,57	.141	E	6568963
TDMX20239MSM	20,24	.797	3,58	.141	E	6568964
TDMX20300MSM	20,30	.799	3,59	.141	E	6568965
TDMX20400MSM	20,40	.803	3,61	.142	E	6568966
TDMX20500MSM	20,50	.807	3,63	.143	E	6568967
TDMX20600MSM	20,60	.811	3,64	.143	E	6568968
TDMX20650MSM	20,65	.813	3,65	.144	E	6568969
TDMX20700MSM	20,70	.815	3,66	.144	E	6568973
TDMX20800MSM	20,80	.819	3,68	.145	E	6568980
TDMX20900MSM	20,90	.823	3,69	.145	E	6568981
TDMX21000MSM	21,00	.827	3,71	.146	F	6568982
TDMX21430MSM	21,43	.844	3,79	.149	F	6568983
TDMX21500MSM	21,50	.847	3,80	.150	F	6568984
TDMX22000MSM	22,00	.866	3,89	.153	G	6568985
TDMX22225MSM	22,23	.875	3,93	.155	G	6568986
TDMX22450MSM	22,45	.884	3,97	.156	G	6568987
TDMX22500MSM	22,50	.886	3,97	.156	G	6568988
TDMX23000MSM	23,00	.906	4,06	.160	H	6568989
TDMX23500MSM	23,50	.925	4,15	.163	H	6568990
TDMX23813MSM	23,81	.938	4,20	.165	H	6568991
TDMX24000MSM	24,00	.945	4,24	.167	I	6568993
TDMX24500MSM	24,50	.965	4,32	.170	I	6568994
TDMX24605MSM	24,61	.969	4,34	.171	I	6568995
TDMX25000MSM	25,00	.984	4,41	.174	J	6568996
TDMX25400MSM	25,40	1.000	4,48	.176	J	6568998
TDMX25500MSM	25,50	1.004	4,49	.177	J	6568999
TDMX25670MSM	25,67	1.011	4,52	.178	J	6569000
TDMX25700MSM	25,70	1.012	4,53	.178	J	6569001
TDMX25760MSM	25,76	1.014	4,54	.179	J	6569002
TDMX25796MSM	25,80	1.016	4,55	.179	J	6569003
TDMX26000MSM	26,00	1.024	4,59	.181	K	6569006
TDMX26192MSM	26,19	1.031	4,62	.182	K	6569007
TDMX26400MSM	26,40	1.039	4,65	.183	K	6569008
TDMX26500MSM	26,50	1.043	4,67	.184	K	6569009
TDMX26589MSM	26,59	1.047	4,69	.185	K	6569010
TDMX27000MSM	27,00	1.063	4,76	.187	L	6569502
TDMX27500MSM	27,50	1.083	4,84	.191	L	6569503

TOP DRILL™ Modular X • Inserts • MS

(continued)





● first choice
○ alternate choice

P		
M		●
K		○
N		○
S		●
H		

	D1		L5			
catalog number	mm	in	mm	in	SSC	WM15PD
TDMX27780MSM	27,78	1.094	4,89	.193	L	**6569504**
TDMX28000MSM	28,00	1.102	4,93	.194	M	**6569505**
TDMX28176MSM	28,18	1.109	4,96	.195	M	**6569506**
TDMX28500MSM	28,50	1.122	5,02	.198	M	**6569507**
TDMX28575MSM	28,58	1.125	5,03	.198	M	**6569508**
TDMX29000MSM	29,00	1.142	5,11	.201	N	**6569509**
TDMX29367MSM	29,37	1.156	5,17	.204	N	**6569510**
TDMX29500MSM	29,50	1.161	5,19	.204	N	**6569521**
TDMX29764MSM	29,76	1.172	5,24	.206	N	**6569522**
TDMX30000MSM	30,00	1.181	5,28	.208	O	**6569523**
TDMX30163MSM	30,16	1.188	5,31	.209	O	**6569524**
TDMX30500MSM	30,50	1.201	5,37	.211	O	**6569525**
TDMX30955MSM	30,96	1.219	5,45	.215	O	**6569526**
TDMX31000MSM	31,00	1.221	5,45	.215	P	**6569527**
TDMX31500MSM	31,50	1.240	5,54	.218	P	**6569528**
TDMX31750MSM	31,75	1.250	5,58	.220	P	**6569529**
TDMX32000MSM	32,00	1.260	5,63	.222	Q	**6569530**
TDMX32500MSM	32,50	1.280	5,72	.225	Q	**6569531**
TDMX33000MSM	33,00	1.299	5,80	.228	Q	**6569532**
TDMX33338MSM	33,34	1.313	5,86	.231	Q	**6569533**
TDMX34000MSM	34,00	1.339	5,98	.235	R	**6569534**
TDMX34130MSM	34,13	1.344	6,00	.236	R	**6569535**
TDMX34925MSM	34,93	1.375	6,13	.241	R	**6569536**
TDMX35000MSM	35,00	1.378	6,15	.242	R	**6569537**
TDMX35500MSM	35,50	1.398	6,23	.245	R	**6569538**
TDMX36000MSM	36,00	1.417	6,33	.249	S	**6569539**
TDMX36500MSM	36,50	1.437	6,41	.252	S	**6569540**
TDMX37000MSM	37,00	1.457	6,50	.256	S	**6569551**
TDMX37500MSM	37,50	1.476	6,59	.259	S	**6569552**
TDMX38000MSM	38,00	1.496	6,67	.263	T	**6569553**
TDMX38100MSM	38,10	1.500	6,69	.263	T	**6569554**
TDMX38289MSM	38,29	1.507	6,72	.265	T	**6569557**
TDMX38500MSM	38,50	1.516	6,76	.266	T	**6569555**
TDMX39000MSM	39,00	1.535	6,84	.269	T	**6569556**
TDMX39500MSM	39,50	1.555	6,93	.273	T	**6569558**
TDMX40000MSM	40,00	1.575	7,01	.276	T	**6569559**

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Application Data • PK • WP40PD™ • Inch





Material Group		Cutting Speed — Vc Range — SFM			Recommended Feed Rate (f) by Diameter					
		min	Starting Value	max	Tool Diameter (inch)	.630	.787	1.000	1.260	1.575
P	1	295	**410**	558	IPR	.007–.018	.010–.019	.010–.020	.011–.022	.011–.024
	2	344	**459**	590	IPR	.009–.018	.011–.020	.012–.020	.013–.022	.014–.024
	3	164	**246**	328	IPR	.009–.018	.011–.020	.012–.020	.013–.022	.014–.024
	4	164	**246**	328	IPR	.007–.018	.009–.019	.010–.020	.011–.022	.011–.023
	5	164	**213**	262	IPR	.006–.013	.007–.014	.009–.017	.009–.018	.010–.019
	6	164	**213**	262	IPR	.006–.013	.007–.014	.009–.017	.009–.018	.010–.019
M	1	131	**262**	361	IPR	.004–.010	.005–.012	.005–.013	.006–.014	.006–.015
	2	115	**180**	246	IPR	.004–.010	.005–.012	.005–.013	.006–.014	.006–.015
	3	66	**115**	164	IPR	.004–.010	.005–.012	.005–.013	.006–.014	.006–.015
K	1	197	**312**	558	IPR	.010–.019	.011–.020	.013–.022	.014–.024	.015–.026
	2	197	**246**	295	IPR	.010–.019	.011–.020	.013–.022	.014–.024	.015–.026
	3	131	**213**	295	IPR	.008–.017	.009–.019	.010–.020	.011–.022	.011–.023

NOTE: Through coolant recommended for greater than 3 x D applications.
Material group M is recommended for secondary applications.

Application Data • PK • WP40PD • Metric





Material Group		Cutting Speed — Vc Range — m/min			Recommended Feed Rate (f) by Diameter					
		min	Starting Value	max	Tool Diameter (mm)	16,0	20,0	25,0	32,0	40,0
P	1	90	**125**	170	mm/r	0,19–0,45	0,25–0,48	0,25–0,52	0,28–0,57	0,29–0,60
	2	105	**140**	180	mm/r	0,23–0,46	0,28–0,50	0,30–0,52	0,33–0,57	0,35–0,60
	3	50	**75**	100	mm/r	0,23–0,46	0,28–0,50	0,30–0,52	0,33–0,57	0,35–0,60
	4	50	**75**	100	mm/r	0,19–0,45	0,22–0,48	0,25–0,50	0,28–0,55	0,29–0,58
	5	50	**65**	80	mm/r	0,16–0,32	0,18–0,36	0,22–0,42	0,24–0,46	0,25–0,48
	6	50	**65**	80	mm/r	0,16–0,32	0,18–0,36	0,22–0,42	0,24–0,46	0,25–0,48
M	1	40	**80**	110	mm/r	0,11–0,26	0,13–0,28	0,13–0,32	0,14–0,35	0,15–0,37
	2	35	**55**	75	mm/r	0,11–0,26	0,13–0,28	0,13–0,32	0,14–0,35	0,15–0,37
	3	20	**35**	50	mm/r	0,11–0,26	0,13–0,28	0,13–0,32	0,14–0,35	0,15–0,37
K	1	60	**95**	170	mm/r	0,25–0,48	0,28–0,52	0,32–0,56	0,35–0,62	0,37–0,65
	2	60	**75**	90	mm/r	0,25–0,48	0,28–0,52	0,32–0,56	0,35–0,62	0,37–0,65
	3	40	**65**	90	mm/r	0,21–0,44	0,23–0,48	0,25–0,50	0,28–0,55	0,29–0,58

NOTE: Through coolant recommended for greater than 3 x D applications.
Material group M is recommended for secondary applications.

Application Data • FPE • WP40PD™ • Inch





Material Group		Cutting Speed — Vc Range — SFM min	Starting Value	max	Recommended Feed Rate (f) by Diameter Tool Diameter (inch)	.630	.787	1.000	1.260	1.575
P	1	360	**460**	560	IPR	.007–.010	.007–.011	.009–.015	.010–.017	.013–.030
	2	330	**390**	460	IPR	.007–.010	.009–.011	.011–.015	.013–.017	.013–.030
	3	260	**330**	390	IPR	.006–.009	.007–.010	.009–.013	.010–.015	.013–.026
	4	230	**300**	360	IPR	.005–.009	.006–.010	.007–.013	.008–.015	.010–.026
M	1	130	**200**	260	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012
	2	110	**180**	230	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012
	3	70	**130**	200	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012
K	1	300	**440**	570	IPR	.007–.010	.009–.011	.011–.015	.013–.017	.013–.030
	2	260	**390**	460	IPR	.007–.010	.009–.011	.011–.015	.013–.017	.013–.030
	3	230	**360**	410	IPR	.007–.010	.008–.011	.009–.015	.010–.017	.011–.022
S	1	70	**130**	200	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012
	3	50	**100**	150	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012

NOTE: Through coolant recommended for greater than 3 x D applications.
Material group M is recommended for secondary applications.

Application Data • FPE • WP40PD • Metric





Material Group		Cutting Speed — Vc Range — SFM min	Starting Value	max	Recommended Feed Rate (f) by Diameter Tool Diameter (inch)	.630	.787	1.000	1.260	1.575
P	1	295	**410**	558	IPR	.007–.018	.010–.019	.010–.020	.011–.022	.011–.024
	2	344	**459**	590	IPR	.009–.018	.011–.020	.012–.020	.013–.022	.014–.024
	3	164	**246**	328	IPR	.009–.018	.011–.020	.012–.020	.013–.022	.014–.024
	4	164	**246**	328	IPR	.007–.018	.009–.019	.010–.020	.011–.022	.011–.023
	5	164	**213**	262	IPR	.006–.013	.007–.014	.009–.017	.009–.018	.010–.019
	6	164	**213**	262	IPR	.006–.013	.007–.014	.009–.017	.009–.018	.010–.019
M	1	131	**262**	361	IPR	.004–.010	.005–.012	.005–.013	.006–.014	.006–.015
	2	115	**180**	246	IPR	.004–.010	.005–.012	.005–.013	.006–.014	.006–.015
	3	66	**115**	164	IPR	.004–.010	.005–.012	.005–.013	.006–.014	.006–.015
K	1	197	**312**	558	IPR	.010–.019	.011–.020	.013–.022	.014–.024	.015–.026
	2	197	**246**	295	IPR	.010–.019	.011–.020	.013–.022	.014–.024	.015–.026
	3	131	**213**	295	IPR	.008–.017	.009–.019	.010–.020	.011–.022	.011–.023

NOTE: Through coolant recommended for greater than 3 x D applications.
Material group M is recommended for secondary applications.

Application Data • MS • WM15PD™ • Inch





Material Group		Cutting Speed — Vc Range — SFM			Recommended Feed Rate (f) by Diameter					
		min	Starting Value	max	Tool Diameter (inch)	0.630	0.787	1.000	1.260	1.575
M	1	131	**262**	361	IPR	.004 – .010	.005 – .012	.005 – .013	.006 – .014	.006 – .015
	2	115	**180**	246	IPR	.004 – .010	.005 – .012	.005 – .013	.006 – .014	.006 – .015
	3	66	**115**	164	IPR	.004 – .010	.005 – .012	.005 – .013	.006 – .014	.006 – .015
K	1	295	**443**	574	IPR	.007 – .010	.009 – .019	.011 – .015	.013 – .017	.013 – .020
	2	262	**394**	459	IPR	.007 – .010	.009 – .019	.011 – .015	.013 – .017	.013 – .020
	3	230	**361**	410	IPR	.007 – .010	.009 – .019	.009 – .015	.010 – .017	.011 – .020
N	1	295	**508**	722	IPR	.010 – .020	.011 – .022	.013 – .025	.013 – .028	.013 – .028
	2	295	**508**	722	IPR	.010 – .020	.011 – .022	.013 – .025	.013 – .028	.013 – .028
	3	262	**394**	525	IPR	.010 – .020	.011 – .022	.013 – .025	.013 – .028	.013 – .028
	4	295	**508**	722	IPR	.010 – .020	.011 – .022	.013 – .025	.013 – .028	.013 – .028
	5	525	**656**	787	IPR	.010 – .020	.011 – .022	.013 – .025	.013 – .028	.013 – .028
	6	525	**656**	787	IPR	.010 – .020	.011 – .022	.013 – .025	.013 – .028	.013 – .028
S	1	66	**131**	197	IPR	.003 – .005	.004 – .006	.004 – .007	.005 – .008	.006 – .010
	2	49	**98**	148	IPR	.003 – .005	.004 – .006	.004 – .007	.005 – .008	.006 – .010
	3	49	**98**	148	IPR	.003 – .005	.004 – .006	.004 – .007	.005 – .008	.006 – .010
	4	33	**82**	131	IPR	.003 – .005	.005 – .008	.006 – .010	.007 – .011	.008 – .012

NOTE: Through coolant recommended for greater than 3 x D applications.

Application Data • MS • WM15PD • Metric





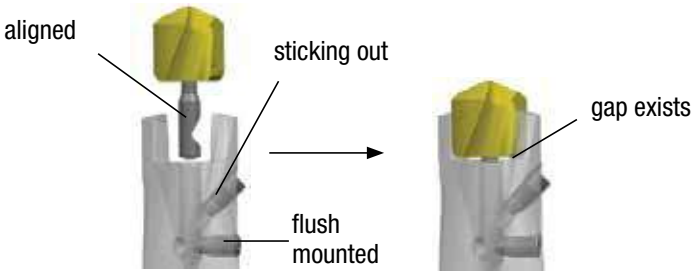
Material Group		Cutting Speed — Vc Range — m/min			Recommended Feed Rate (f) by Diameter					
		min	Starting Value	max	Tool Diameter (mm)	16,0	20,0	25,4	32,0	40,0
M	1	40	**80**	110	mm/r	0,11 – 0,26	0,13 – 0,28	0,13 – 0,32	0,14 – 0,35	0,15 – 0,37
	2	35	**55**	75	mm/r	0,11 – 0,26	0,13 – 0,28	0,13 – 0,32	0,14 – 0,35	0,15 – 0,37
	3	20	**35**	50	mm/r	0,11 – 0,26	0,13 – 0,28	0,13 – 0,32	0,14 – 0,35	0,15 – 0,37
K	1	90	**135**	175	mm/r	0,19 – 0,25	0,22 – 0,29	0,29 – 0,38	0,32 – 0,43	0,33 – 0,50
	2	80	**120**	140	mm/r	0,19 – 0,25	0,22 – 0,29	0,29 – 0,38	0,32 – 0,43	0,33 – 0,50
	3	70	**110**	125	mm/r	0,18 – 0,26	0,21 – 0,29	0,23 – 0,37	0,25 – 0,42	0,27 – 0,46
N	1	90	**155**	220	mm/r	0,25 – 0,50	0,28 – 0,56	0,32 – 0,63	0,32 – 0,70	0,32 – 0,70
	2	90	**155**	220	mm/r	0,25 – 0,50	0,28 – 0,56	0,32 – 0,63	0,32 – 0,70	0,32 – 0,70
	3	80	**120**	160	mm/r	0,25 – 0,50	0,28 – 0,56	0,32 – 0,63	0,32 – 0,70	0,32 – 0,70
	4	90	**155**	220	mm/r	0,25 – 0,50	0,28 – 0,56	0,32 – 0,63	0,32 – 0,70	0,32 – 0,70
	5	160	**200**	240	mm/r	0,25 – 0,50	0,28 – 0,56	0,32 – 0,63	0,32 – 0,70	0,32 – 0,70
	6	160	**200**	240	mm/r	0,25 – 0,50	0,28 – 0,56	0,32 – 0,63	0,32 – 0,70	0,32 – 0,70
S	1	20	**40**	60	mm/r	0,07 – 0,12	0,09 – 0,14	0,11 – 0,17	0,13 – 0,20	0,16 – 0,25
	2	15	**30**	45	mm/r	0,07 – 0,12	0,09 – 0,14	0,11 – 0,17	0,13 – 0,20	0,16 – 0,25
	3	15	**30**	45	mm/r	0,07 – 0,12	0,09 – 0,14	0,11 – 0,17	0,13 – 0,20	0,16 – 0,25
	4	10	**25**	40	mm/r	0,07 – 0,12	0,13 – 0,20	0,16 – 0,25	0,18 – 0,28	0,21 – 0,31

NOTE: Through coolant recommended for greater than 3 x D applications.

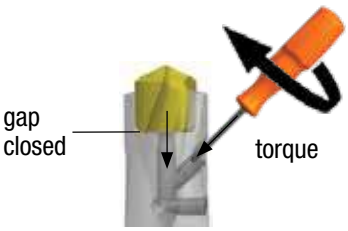
Assembling and Disassembling Instructions

Assembly

1 Insert positioning



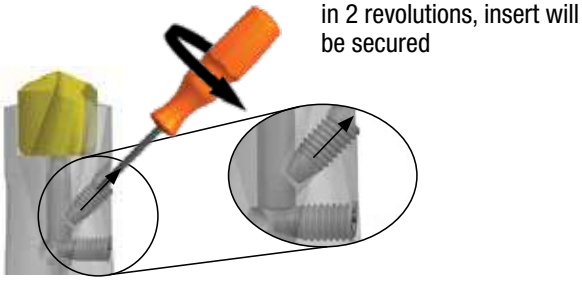
2 Insert clamping



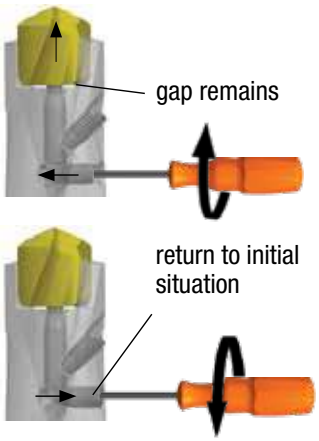
Drill diameter	Torque
ø .6300–.7874"	1.1 ft. lbs.
ø .7875–.9448"	1.5 ft. lbs.
ø .9449–1.1023"	2.2 ft. lbs.
ø 1.1024–1.5748"	3.3 ft. lbs.

Disassembly

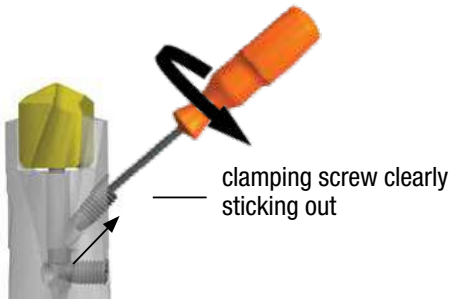
1 Clamping screw loosening



2 Insert pushing out



3 Further clamping screw loosening



4 Insert removal

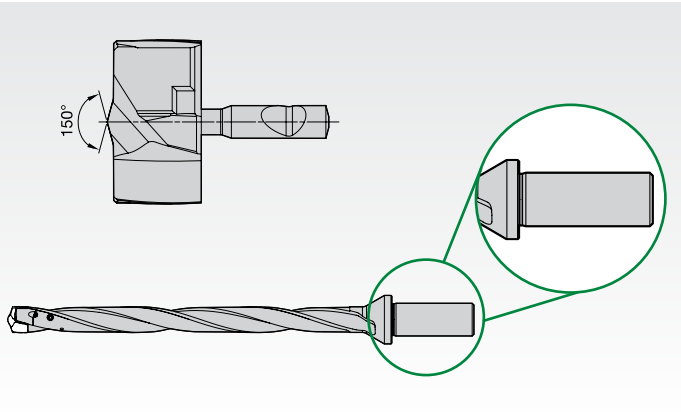


Application Guidelines

Deep-Hole Drilling from 12 x D

- Use the FPE(M) geometry in combination with the 1.5 x D body for pilot hole.
- The point angle of spot drill should be greater than point angle of the insert (>140º).
- The 150° point on the FPE(M) insert is perfect as spot for the regular 140° insert.

- The 12 x D body has a cylindrical straight shank with flange.
- Shank tolerance h6.
- Best used in combination with a hydraulic chuck to minimize the runout.



FPE



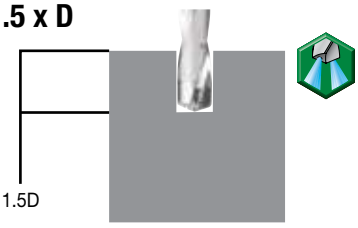
PK



MS



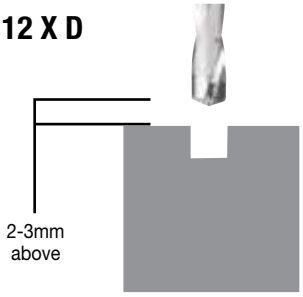
1 **1.5 x D**



Step 1

Use 1.5 x D FPE geometry drill to create a guide hole with thru coolant and ensure no chips are stuck in the hole.

2 **12 X D**

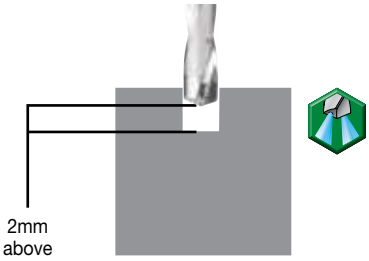


Step 2

Use 12 x D PK(M), MS(M) geometry drill for deep hole.

- Spindle RPM 500 max (If horizontal machine spindle direction CCW) and 2~3 above the work piece rapid traverse.
- Feed in recommended feed rate and position 2.0mm above the pilot hole depth.

3



Step 3

- Switch on the through coolant and ensure coolant flow and spindle rotation CW, recommended spindle RPM.

4

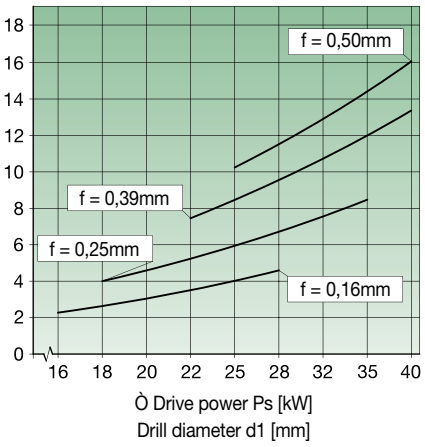


Step 4

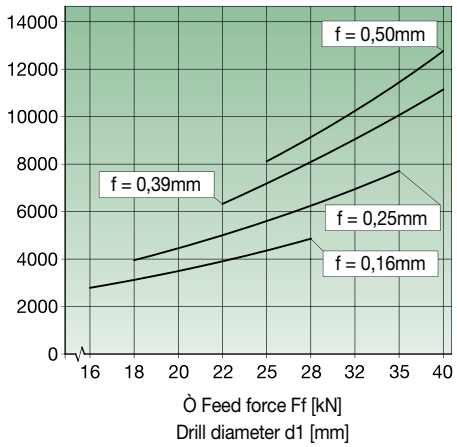
- Feed in for the entire depth with recommended cutting parameters (feed reduction 25% near exit).
- Ensure the carbide head does not come out of the hole if through.
- For best surface finish Vf, 2.0 to 3.0mm per min is recommended during retraction.

TDMX Application Notes • Power and Coolant Requirements

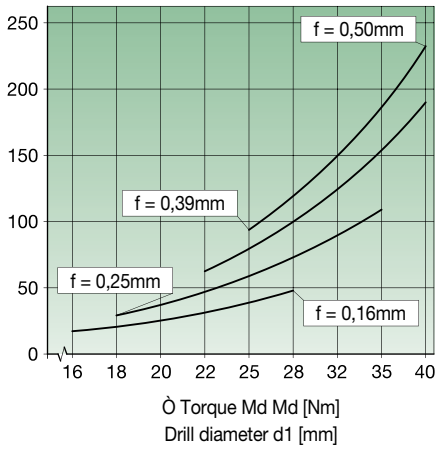
Drive Power (kW)



Feed Force (kN)



Torque (Nm)



NOTE: The diagrams above are used to determine the drive power, feed force, and torque. They are based on cutting force measurement in tempered steels in Cgr. 6. Tensile strength: Rm = 600 N/mm². The base cutting speed used is: vc = 80 m/min.

TDMX • Regrinding Length • FPE • Inch

SSC	diameter range D	L min.	L new
A	.6300–.6692	.3858	.4252
B	.6693–.7086	.3858	.4252
C	.7087–.7480	.4173	.4606
D	.7481–.7874	.4173	.4606
E	.7875–.8267	.4488	.4961
F	.8268–.8661	.4488	.4961
G	.8662–.9055	.4764	.5276
H	.9056–.9448	.4764	.5276
I	.9449–.9842	.5118	.5669
J	.9843–1.0236	.5118	.5669
K	1.0237–1.0629	.5433	.6024
L	1.063–1.1023	.5433	.6024
M	1.1024–1.1417	.5827	.6457
N	1.1418–1.1811	.5827	.6457
O	1.1812–1.2204	.6142	.6811
P	1.2205–1.2598	.6142	.6811
Q	1.2599–1.3385	.7008	.7756
R	1.3386–1.4173	.7008	.7756
S	1.4174–1.4960	.7638	.8465
T	1.4961–1.5748	.7638	.8465

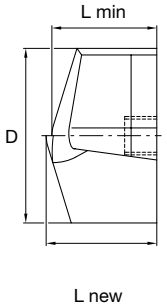
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TDMX • Regrinding Length • PK and MS • Inch

SSC	diameter range D	L min.	L new
A	.63–.6692	.4409	.4921
B	.6693–.7086	.4409	.4921
C	.7087–.748	.4803	.5354
D	.7481–.7874	.4803	.5354
E	.7875–.8267	.5197	.5787
F	.8268–.8661	.5197	.5787
G	.8662–.9055	.5591	.622
H	.9056–.9448	.5591	.622
I	.9449–.9842	.5984	.6654
J	.9843–1.0236	.5984	.6654
K	1.0237–1.0629	.6378	.7087
L	1.063–1.1023	.6378	.7087
M	1.1024–1.1417	.6772	.752
N	1.1418–1.1811	.6772	.752
O	1.1812–1.2204	.7165	.7953
P	1.2205–1.2598	.7165	.7953
Q	1.2599–1.3385	.7913	.878
R	1.3386–1.4173	.7913	.878
S	1.4174–1.496	.8701	.9646
T	1.4961–1.5748	.8701	.9646

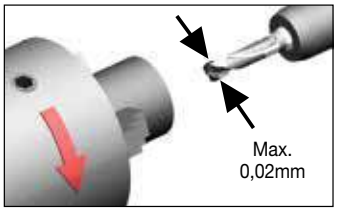
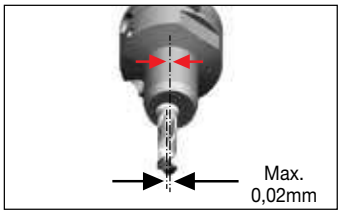
The following coolant pressure is recommended:

relative drilling depth	coolant pressure
1–3 x D	8 bars
5 x D	12 bars
7 x D	20 bars
10 x D	30 bars
12 x D	30 bars



TDMX Application Guidelines



<table>
<tr><th>Application
Recommendation</th><th>Work
Piece Shape</th><th>Remarks</th></tr>
<tr><td>Flat Face
Recommended</td><td></td><td>1.5 x D , 3 x D and 5 x D - No Feed Reduction
8 x D No Feed Reduction Optional 25% Reduction
12 x D 25% entry and exit Reduction</td></tr>
<tr><td>Stacked Plates
Recommended</td><td></td><td>Minimize as much as possible the space between the two plates.
The FPE geometry is a problem solver in this situation</td></tr>
<tr><td>Inclined Entry
Recommended</td><td></td><td>1.5 x D, 3 x D and 5 x D
<table><tr><th>INCLINATION</th><th>FEEDRATE</th></tr><tr><td>1°</td><td>90%</td></tr><tr><td>2°</td><td>75%</td></tr><tr><td>3°</td><td>50%</td></tr><tr><td>>3°</td><td>Pilot Drilling or Pre-Machining</td></tr></table>8 x D and 12 x D
Pilot Drilling or Pre-Machining on all surfaces recommended</td></tr>
<tr><td>Inclined Exit
Recommended</td><td></td><td>1.5 x D, 3 x D and 5 x D
<table><tr><th>INCLINATION</th><th>FEEDRATE</th></tr><tr><td>5°</td><td>100%</td></tr><tr><td>>5°</td><td>75% - 50%</td></tr><tr><td>>20°Cast Iron</td><td>50%</td></tr><tr><td>>20°Steel</td><td>Not Recommended</td></tr></table>8 x D and 12 x D
<table><tr><th>FEEDRATE</th></tr><tr><td>75%</td></tr><tr><td>75% - 50%</td></tr><tr><td>50%</td></tr><tr><td>Not Recommended</td></tr></table></td></tr>
<tr><td>Cross Holes
Recommended</td><td></td><td>Cross hole out of center and center edge in contact - Recommended
Cross hole on center and < drill diameter - Recommended
Cross hole on center and > drill diameter - Exercise Caution
Cross hole on center and = drill diameter - Exercise Caution
Cross hole out of center and center edge not in contact - Not Recommended</td></tr>
<tr><td>Convex / Concave
Surface</td><td></td><td>Always pre-machine the surface</td></tr>
<tr><td>Half Cylindrical
Not Recommended</td><td></td><td rowspan="4">Usage Precautions
Core deviation
1) For Turning Machines

Set deviation amount under 0,02mm between workpiece and drill.
2) For Machining Centers

Do not use any arbor with a damaged attachment surface. Center of arbor deviation must be within 0,02mm.</td></tr>
<tr><td>Hole Expansion
Not Recommended</td><td></td></tr>
<tr><td>Pipe Material
Not Recommended</td><td></td></tr>
<tr><td>Cored hole
Not Recommended</td><td></td></tr>
</table>

TOP DRILL M1™

Universal Modular Drilling • TDM1

The TDM1 modular drill is for customers seeking an easy-to-use system capable of operating on a variety of materials with one single point geometry, and a tool body featuring a quick-change, front-clamping mechanism.

140° cone point geometry
Low thrust with excellent centering capabilities

Front-locking system
Easy to change and apply

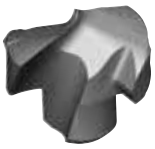
Differential flute design
Good stability and easy evacuation of chips

Sub-micron grain substrate
Longer life and superior resistance against drill breakage



The TDM1 modular drill is designed with a front-locking mechanism, point geometry UP, and wear-resistant PVD coating for consistent hole quality.

WU25PD



P M K

Sub-micron grain carbide

TiAlN multilayer for steel, stainless steel, and cast iron

MODULAR VERSATILITY

PRODUCT

TDM1 is a front clamping drill with universal point geometry and grade suited for PMK materials.

DIAMETER RANGE

.313–.984" (8–25,99mm)

INDUSTRY

ENERGY

GENERAL ENGINEERING

TRANSPORTATION

MATERIALS

FIRST CHOICE

P K

SECOND CHOICE

M

APPLICATIONS



DRILLING | THROUGH COOLANT | 2 FLUTE/2 MARGIN/ COOLANT

STEEL BODIES

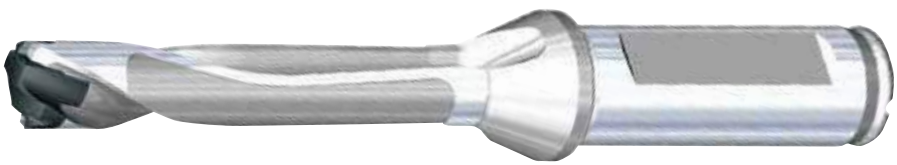
SERIES	COOLANT	LENGTH RATIO	DIAMETER RANGE
TDM1	Through Coolant	3 x D	.313–.984" (7,94–25,99mm)
TDM1	Through Coolant	5 x D	.313–.984" (7,94–25,99mm)
TDM1	Through Coolant	8 x D	.313–.984" (7,94–25,99mm)

Shank Style

SCF & SS Shank for inch tools

SCF Shank for metric tools





TDM1 Inserts • Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

TDM1	2599	UPM	WU25PD
Top Drill Modular	Insert Diameter	Insert Geometry	Grade
	mm = 25.99 **Inch** = 1.023"	**PK** = steel and cast iron	**W**IDIA™; **U**niversal, Application **25** = wear resistant carbide, **P**VD coated, Modular **D**rill Insert

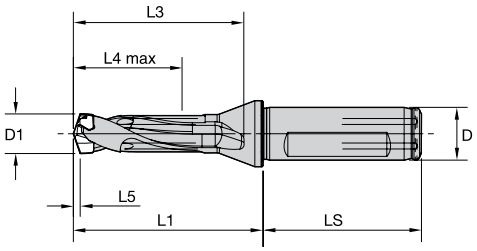
TDM1 Bodies • Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

TDM1	0984	R8	SCF	100
Top Drill Modular	Drill Body Diameter	L/D Ratio	Shank Style	Shank Diameter
	Inch = .984"	8 x D	Flanged shanks with flat SCF	1.00"

TOP DRILL M1™ • 3 x D • Flanged Shank • Inch





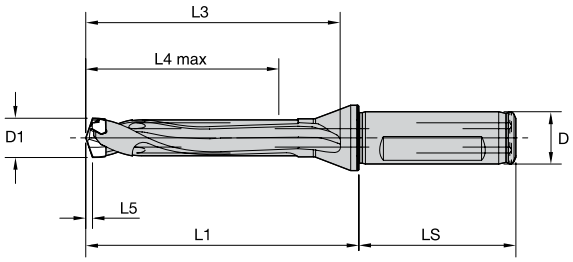
Flanged Shank with Flats (SCF)

order number	catalog number	D1	D1 max	D	L1	L3	L4 max	L5	LS	SSC
4098937	**TDM0313R3SCF050**	.313	.3343	.5000	1.63	1.41	1.00	.057	1.77	W10
4098938	**TDM0335R3SCF050**	.335	.3539	.5000	1.75	1.53	1.06	.062	1.77	W11
4098939	**TDM0354R3SCF050**	.354	.3736	.5000	1.88	1.66	1.12	.065	1.77	W12
4098940	**TDM0374R3SCF050**	.374	.3933	.5000	1.88	1.66	1.18	.068	1.77	W13
4098941	**TDM0394R3SCF063**	.394	.4130	.6250	2.00	1.78	1.24	.072	1.89	W14
4098942	**TDM0413R3SCF063**	.413	.4327	.6250	2.00	1.78	1.30	.076	1.89	W15
4099013	**TDM0433R3SCF063**	.433	.4524	.6250	2.13	1.91	1.36	.079	1.89	W16
4099014	**TDM0453R3SCF063**	.453	.4723	.6250	2.25	2.03	1.42	.082	1.89	W17
4099015	**TDM0472R3SCF063**	.472	.4917	.6250	2.38	2.16	1.48	.087	1.89	W18
4099016	**TDM0492R3SCF063**	.492	.5114	.6250	2.38	2.16	1.54	.090	1.89	W19
4099017	**TDM0512R3SCF063**	.512	.5311	.6250	2.50	2.28	1.59	.093	1.89	W20
4099018	**TDM0532R3SCF063**	.532	.5508	.6250	2.50	2.28	1.65	.098	1.89	W21
4099019	**TDM0551R3SCF063**	.551	.5705	.6250	2.63	2.41	1.71	.101	1.89	W22
4099020	**TDM0571R3SCF063**	.571	.5902	.6250	2.75	2.53	1.77	.104	1.89	W23
4099021	**TDM0591R3SCF075**	.591	.6295	.7500	2.88	2.66	1.89	.107	1.97	W24
4099022	**TDM0630R3SCF075**	.630	.6689	.7500	3.00	2.78	2.01	.113	1.97	W25
4099023	**TDM0669R3SCF075**	.669	.7083	.7500	3.25	3.03	2.13	.121	1.97	W26
4099024	**TDM0709R3SCF075**	.709	.7476	.7500	3.38	3.16	2.24	.129	1.97	W27
4099025	**TDM0748R3SCF075**	.748	.7870	.7500	3.50	3.28	2.36	.134	1.97	W28
4099026	**TDM0787R3SCF100**	.787	.8264	1.0000	3.75	3.53	2.48	.143	2.20	W29
4099027	**TDM0827R3SCF100**	.827	.8657	1.0000	3.88	3.66	2.60	.151	2.20	W30
4099028	**TDM0866R3SCF100**	.866	.9051	1.0000	4.00	3.78	2.72	.156	2.20	W31
4099029	**TDM0906R3SCF100**	.906	.9445	1.0000	4.25	4.03	2.84	.167	2.20	W32
4099030	**TDM0945R3SCF100**	.945	.9839	1.0000	4.38	4.16	2.95	.173	2.20	W33
4099031	**TDM0984R3SCF100**	.984	1.0232	1.0000	4.50	4.28	3.07	.178	2.20	W34

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TOP DRILL M1™ • 5 x D • Flanged Shank • Inch





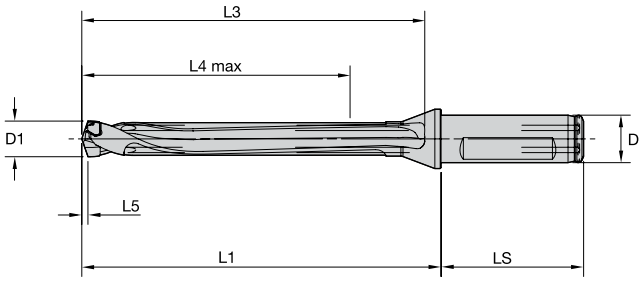
Flanged Shank with Flats (SCF)

order number	catalog number	D1	D1 max	D	L1	L3	L4 max	L5	LS	SSC
4099032	**TDM0313R5SCF050**	.313	.3346	.5000	2.38	2.16	1.67	.057	1.77	W10
4099033	**TDM0335R5SCF050**	.335	.3542	.5000	2.50	2.28	1.77	.054	1.77	W11
4099034	**TDM0354R5SCF050**	.354	.3736	.5000	2.63	2.41	1.87	.065	1.77	W12
4099035	**TDM0374R5SCF050**	.374	.3933	.5000	2.75	2.53	1.97	.068	1.77	W13
4099036	**TDM0394R5SCF063**	.394	.4133	.6250	2.88	2.66	2.07	.064	1.89	W14
4099037	**TDM0413R5SCF063**	.413	.4327	.6250	3.00	2.78	2.17	.076	1.89	W15
4099038	**TDM0433R5SCF063**	.433	.4524	.6250	3.13	2.91	2.26	.079	1.89	W16
4099039	**TDM0453R5SCF063**	.453	.4723	.6250	3.25	3.03	2.36	.082	1.89	W17
4099040	**TDM0472R5SCF063**	.472	.4920	.6250	3.37	3.16	2.46	.079	1.89	W18
4099041	**TDM0492R5SCF063**	.492	.5114	.6250	3.50	3.28	2.56	.090	1.89	W19
4099042	**TDM0512R5SCF063**	.512	.5311	.6250	3.63	3.41	2.66	.093	1.89	W20
4099043	**TDM0532R5SCF063**	.532	.5508	.6250	3.75	3.53	2.76	.098	1.89	W21
4099044	**TDM0551R5SCF063**	.551	.5705	.6250	3.88	3.66	2.85	.101	1.89	W22
4099045	**TDM0571R5SCF063**	.571	.5902	.6250	4.00	3.78	2.95	.104	1.89	W23
4099046	**TDM0591R5SCF075**	.591	.6295	.7500	4.25	4.03	3.15	.107	1.97	W24
4099047	**TDM0630R5SCF075**	.630	.6689	.7500	4.50	4.28	3.35	.113	1.97	W25
4099048	**TDM0669R5SCF075**	.669	.7083	.7500	4.75	4.53	3.54	.121	1.97	W26
4099049	**TDM0709R5SCF075**	.709	.7476	.7500	5.00	4.78	3.74	.129	1.97	W27
4099050	**TDM0748R5SCF075**	.748	.7870	.7500	5.25	5.03	3.94	.134	1.97	W28
4099051	**TDM0787R5SCF100**	.787	.8264	1.0000	5.38	5.16	4.13	.143	2.20	W29
4099052	**TDM0827R5SCF100**	.827	.8657	1.0000	5.75	5.53	4.33	.151	2.20	W30
4099053	**TDM0866R5SCF100**	.866	.9051	1.0000	6.00	5.78	4.53	.156	2.20	W31
4099054	**TDM0906R5SCF100**	.906	.9445	1.0000	6.13	5.91	4.72	.167	2.20	W32
4099055	**TDM0945R5SCF100**	.945	.9839	1.0000	6.38	6.16	4.92	.173	2.20	W33
4099056	**TDM0984R5SCF100**	.984	1.0232	1.0000	6.75	6.53	5.12	.178	2.20	W34

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TOP DRILL M1™ • 8 x D • Flanged Shank • Inch





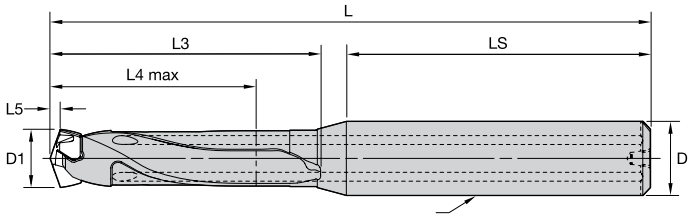
Flanged Shank with Flats (SCF)

order number	catalog number	D1	D1 max	D	L1	L3	L4 max	L5	LS	SSC
4099057	**TDM0313R8SCF050**	.313	.3343	.5000	3.38	3.16	2.68	.057	1.77	W10
4099058	**TDM0335R8SCF050**	.335	.3539	.5000	3.50	3.28	2.83	.062	1.77	W11
4099059	**TDM0354R8SCF050**	.354	.3736	.5000	3.75	3.53	2.99	.065	1.77	W12
4099060	**TDM0374R8SCF050**	.374	.3933	.5000	4.00	3.78	3.15	.068	1.77	W13
4099061	**TDM0394R8SCF063**	.394	.4130	.6250	4.13	3.91	3.31	.072	1.89	W14
4099062	**TDM0413R8SCF063**	.413	.4327	.6250	4.25	4.03	3.46	.076	1.89	W15
4099063	**TDM0433R8SCF063**	.433	.4524	.6250	4.50	4.28	3.62	.079	1.89	W16
4099064	**TDM0453R8SCF063**	.453	.4720	.6250	4.63	4.41	4.63	.073	1.89	W17
4099065	**TDM0472R8SCF063**	.472	.4917	.6250	4.88	4.66	3.94	.087	1.89	W18
4099066	**TDM0492R8SCF063**	.492	.5114	.6250	5.00	4.78	4.09	.090	1.89	W19
4099067	**TDM0512R8SCF063**	.512	.5311	.6250	5.13	4.91	4.25	.093	1.89	W20
4099068	**TDM0532R8SCF063**	.532	.5508	.6250	5.38	5.16	4.41	.098	1.89	W21
4099069	**TDM0551R8SCF063**	.551	.5705	.6250	5.63	5.41	4.57	.101	1.89	W22
4099070	**TDM0571R8SCF063**	.571	.5902	.6250	5.75	5.53	4.72	.104	1.89	W23
4099071	**TDM0591R8SCF075**	.591	.6298	.7500	6.13	5.91	6.13	.097	1.97	W24
4099072	**TDM0630R8SCF075**	.630	.6689	.7500	6.50	6.28	5.35	.113	1.97	W25
4099073	**TDM0669R8SCF075**	.669	.7083	.7500	6.88	6.66	5.67	.121	1.97	W26
4099074	**TDM0709R8SCF075**	.709	.7476	.7500	7.25	7.03	5.98	.129	1.97	W27
4099075	**TDM0748R8SCF075**	.748	.7870	.7500	7.50	7.28	6.30	.134	1.97	W28
4099077	**TDM0827R8SCF100**	.827	.8657	1.0000	8.25	8.03	6.93	.151	2.20	W30
4099078	**TDM0866R8SCF100**	.866	.9054	1.0000	8.63	8.41	7.24	.144	2.20	W31
4099079	**TDM0906R8SCF100**	.906	.9445	1.0000	9.00	8.78	7.56	.167	2.20	W32
4099080	**TDM0945R8SCF100**	.945	.9839	1.0000	9.38	9.16	7.87	.173	2.20	W33
4099081	**TDM0984R8SCF100**	.984	1.0232	1.0000	9.75	9.53	8.19	.178	2.20	W34

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TOP DRILL M1™ • 3 x D • Straight Round Shank • Inch





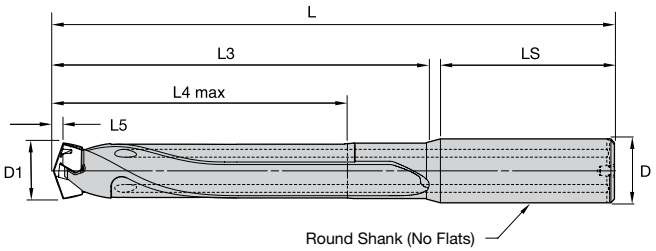
Round Shank (no flats)
For information on L, L3, L4 max, L5, LS, and D, see the Modular Drill foldout table.

order number	catalog number	D1	D1 max	D	L	L3	L4 max	L5	LS	SSC
3851478	**TDM0313R3SS038**	.313	.3343	.3750	3.13	1.42	1.00	.060	1.59	W10
3851480	**TDM0335R3SS038**	.335	.3539	.3750	3.25	1.54	1.06	.065	1.59	W11
3851482	**TDM0354R3SS038**	.354	.3736	.3750	3.38	1.67	1.12	.069	1.59	W12
3851545	**TDM0374R3SS044**	.374	.3933	.4375	3.38	1.59	1.18	.072	1.67	W13
3851544	**TDM0374R3SS038**	.375	.3936	.3750	3.38	1.67	1.18	.060	1.59	W13
3851548	**TDM0394R3SS044**	.394	.4130	.4375	3.63	1.84	1.24	.076	1.67	W14
3851550	**TDM0413R3SS044**	.413	.4327	.4375	3.75	1.96	1.30	.081	1.67	W15
3851552	**TDM0433R3SS044**	.433	.4524	.4375	3.88	2.09	1.36	.084	1.67	W16
3851554	**TDM0453R3SS050**	.453	.4720	.5000	3.88	1.97	1.42	.086	1.79	W17
3851556	**TDM0472R3SS050**	.472	.4917	.5000	4.00	2.09	1.48	.092	1.79	W18
3851558	**TDM0492R3SS050**	.492	.5114	.5000	4.13	2.22	1.54	.095	1.79	W19
3851559	**TDM0492R3SS056**	.492	.5114	.5625	4.13	2.22	1.54	.095	1.79	W19
3851562	**TDM0512R3SS056**	.512	.5311	.5625	4.25	2.34	1.60	.098	1.79	W20
3851564	**TDM0532R3SS056**	.532	.5508	.5625	4.25	2.34	1.65	.104	1.79	W21
3851566	**TDM0551R3SS056**	.551	.5705	.5625	4.50	2.59	1.71	.107	1.79	W22
3851568	**TDM0571R3SS063**	.571	.5902	.6250	4.50	2.47	1.77	.109	1.91	W23
3851570	**TDM0591R3SS063**	.591	.6295	.6250	4.75	2.72	1.89	.113	1.91	W24
3851572	**TDM0630R3SS069**	.630	.6689	.6875	4.88	2.85	2.01	.119	1.91	W25
3851574	**TDM0669R3SS069**	.669	.7083	.6875	5.00	2.97	2.12	.127	1.91	W26
3851576	**TDM0709R3SS075**	.709	.7476	.7500	5.25	3.13	2.24	.136	2.00	W27
3851578	**TDM0748R3SS075**	.748	.7870	.7500	5.50	3.38	2.36	.142	2.00	W28
3851580	**TDM0787R3SS081**	.787	.8264	.8125	5.75	3.63	2.48	.150	2.00	W29
3992477	**TDM0827R3SS088**	.827	.8657	.8750	5.87	3.69	2.60	.150	2.07	W30
3992478	**TDM0866R3SS088**	.866	.9051	.8750	6.00	3.81	2.72	.154	2.07	W31
3992479	**TDM0906R3SS094**	.906	.9445	.9375	6.25	3.98	2.83	.165	2.15	W32
3992481	**TDM0984R3SS100**	.984	1.0232	1.0000	7.37	4.26	3.07	.177	3.00	W34

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TOP DRILL M1™ • 5 x D • Straight Round Shank • Inch



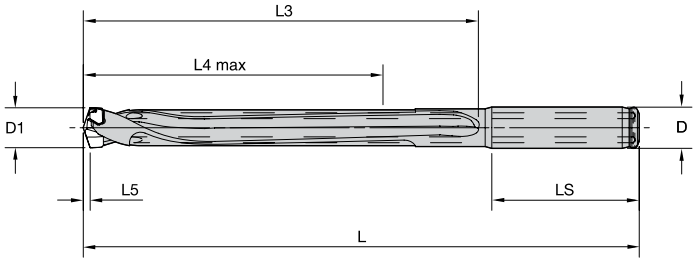


order number	catalog number	D1	D1 max	D	L	L3	L4 max	L5	LS	SSC
3851479	**TDM0313R5SS038**	.313	.3343	.3750	3.88	2.17	1.67	.060	1.59	W10
3851481	**TDM0335R5SS038**	.335	.3539	.3750	4.00	2.29	1.77	.065	1.59	W11
3851543	**TDM0354R5SS038**	.354	.3736	.3750	4.13	2.42	1.87	.069	1.59	W12
3851546	**TDM0374R5SS038**	.374	.3933	.3750	4.25	2.54	1.97	.072	1.59	W13
3851547	**TDM0374R5SS044**	.374	.3933	.4375	4.38	2.59	1.97	.072	1.67	W13
3851549	**TDM0394R5SS044**	.394	.4130	.4375	4.63	2.84	2.07	.076	1.67	W14
3851551	**TDM0413R5SS044**	.413	.4327	.4375	4.75	2.96	2.16	.081	1.67	W15
3851553	**TDM0433R5SS044**	.433	.4524	.4375	4.88	3.09	2.26	.084	1.67	W16
3851555	**TDM0453R5SS050**	.453	.4720	.5000	5.00	3.09	2.36	.086	1.79	W17
3851557	**TDM0472R5SS050**	.472	.4917	.5000	5.00	3.09	2.46	.092	1.79	W18
3851560	**TDM0492R5SS050**	.492	.5114	.5000	5.13	3.22	2.56	.095	1.79	W19
3851561	**TDM0492R5SS056**	.492	.5114	.5625	5.13	3.22	2.56	.095	1.79	W19
3851563	**TDM0512R5SS056**	.512	.5311	.5625	5.25	3.34	2.66	.098	1.79	W20
3851565	**TDM0532R5SS056**	.532	.5508	.5625	5.50	3.59	2.75	.104	1.79	W21
3851567	**TDM0551R5SS056**	.551	.5705	.5625	5.75	3.84	2.85	.107	1.79	W22
3851569	**TDM0571R5SS063**	.571	.5902	.6250	5.75	3.72	2.95	.109	1.91	W23
3851571	**TDM0591R5SS063**	.591	.6295	.6250	6.00	3.97	3.15	.113	1.91	W24
3851573	**TDM0630R5SS069**	.630	.6689	.6875	6.25	4.22	3.34	.119	1.91	W25
3851575	**TDM0669R5SS069**	.669	.7083	.6875	6.50	4.47	3.54	.127	1.91	W26
3851577	**TDM0709R5SS075**	.709	.7476	.7500	6.88	4.76	3.74	.136	2.00	W27
3851579	**TDM0748R5SS075**	.748	.7870	.7500	7.13	5.01	3.94	.142	2.00	W28
3851581	**TDM0787R5SS081**	.787	.8264	.8125	7.50	5.38	4.13	.150	2.00	W29
3992503	**TDM0827R5SS088**	.827	.8657	.8750	7.63	5.44	4.33	.150	2.07	W30
3992504	**TDM0866R5SS088**	.866	.9051	.8750	7.87	5.69	4.53	.154	2.07	W31
3992506	**TDM0945R5SS100**	.945	.9839	1.0000	9.37	6.26	4.92	.169	3.00	W33
3992507	**TDM0984R5SS100**	.984	1.0232	1.0000	9.63	6.51	5.12	.177	3.00	W34

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TOP DRILL M1™ • 8 x D • Straight Round Shank • Inch





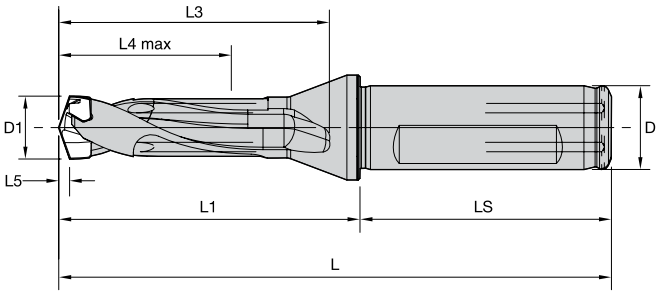
Round Shank (No Flats)

order number	catalog number	D1	D1 max	D	L	L3	L4 max	L5	LS	SSC
3992536	**TDM0313R8SS038**	.313	.3343	.3750	4.87	3.17	2.68	.055	1.59	W10
3992537	**TDM0335R8SS038**	.335	.3539	.3750	5.13	3.42	2.83	.063	1.59	W11
3992539	**TDM0374R8SS038**	.374	.3933	.3750	5.37	3.67	3.15	.067	1.59	W13
3992540	**TDM0374R8SS044**	.374	.3933	.4375	5.37	3.59	3.15	.067	1.67	W13
3992541	**TDM0394R8SS044**	.394	.4130	.4375	5.75	3.96	3.31	.071	1.67	W14
3992542	**TDM0413R8SS044**	.433	.4327	.4375	6.00	4.21	4.33	.068	1.67	K
3992543	**TDM0433R8SS044**	.433	.4524	.4375	6.25	4.46	3.62	.079	1.67	W16
3992544	**TDM0453R8SS050**	.453	.4720	.5000	6.50	4.56	3.78	.083	1.79	W17
3992545	**TDM0472R8SS050**	.472	.4917	.5000	6.75	4.84	3.94	.087	1.79	W18
3992546	**TDM0492R8SS050**	.492	.5114	.5000	7.00	5.08	4.09	.091	1.79	W19
3992548	**TDM0512R8SS056**	.512	.5311	.5625	7.13	5.22	4.25	.091	1.79	W20
3992549	**TDM0532R8SS056**	.532	.5508	.5625	7.25	5.34	4.41	.098	1.79	W21
3992550	**TDM0551R8SS056**	.551	.5705	.5625	7.37	5.47	4.57	.098	1.79	W22
3992551	**TDM0571R8SS063**	.571	.5902	.6250	7.50	5.47	4.72	.102	1.91	W23
3992552	**TDM0591R8SS063**	.591	.6295	.6250	7.75	5.72	5.04	.106	1.91	W24
3992553	**TDM0630R8SS069**	.630	.6689	.6875	8.00	5.97	5.35	.114	1.91	W25
3992554	**TDM0669R8SS069**	.669	.7083	.6875	8.75	6.72	5.67	.118	1.91	W26
3992556	**TDM0748R8SS075**	.748	.7870	.7500	9.63	7.51	6.30	.134	2.00	W28
3992557	**TDM0787R8SS081**	.787	.8264	.8125	10.00	7.88	6.61	.142	2.00	W29
3992558	**TDM0827R8SS088**	.827	.8657	.8750	10.25	8.06	6.93	.150	2.07	W30
3992560	**TDM0906R8SS094**	.906	.9445	.9375	11.13	8.86	7.56	.165	2.15	W32
3992561	**TDM0945R8SS100**	.945	.9839	1.0000	12.25	9.13	7.87	.169	3.00	W33
3992562	**TDM0984R8SS100**	.984	1.0232	1.0000	12.63	9.51	8.19	.177	3.00	W34

SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TOP DRILL M1™ • 3 x D • Flanged Shank • Metric





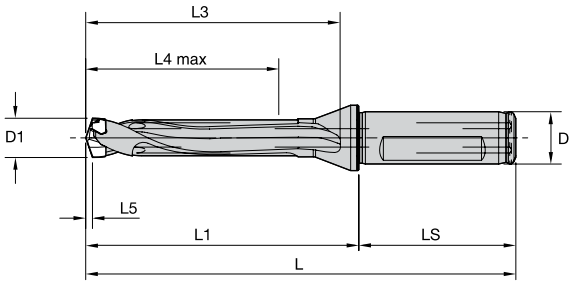
Round Shank (No Flats)

order number	catalog number	D1	D1 max	D	L	L1	L3	L4 max	L5	LS	SSC
3850904	**TDM080R3SCF12M**	7,94	8,49	12	86	41	35	26	1,5	45	W10
3850906	**TDM085R3SCF12M**	8,50	8,99	12	88	43	37	27	1,6	45	W11
3850908	**TDM090R3SCF12M**	9,00	9,49	12	90	45	39	29	1,7	45	W12
3850910	**TDM095R3SCF12M**	9,50	9,99	12	92	47	41	30	1,8	45	W13
3850912	**TDM100R3SCF16M**	10,00	10,49	16	97	49	43	32	1,9	48	W14
3850924	**TDM105R3SCF16M**	10,50	10,99	16	99	51	45	33	2,0	48	W15
3850926	**TDM110R3SCF16M**	11,00	11,49	16	101	53	47	35	2,1	48	W16
3850928	**TDM115R3SCF16M**	11,50	11,99	16	103	55	49	36	2,2	48	W17
3850930	**TDM120R3SCF16M**	12,00	12,49	16	106	58	52	38	2,3	48	W18
3850932	**TDM125R3SCF16M**	12,50	12,99	16	108	60	54	39	2,4	48	W19
3850934	**TDM130R3SCF16M**	13,00	13,49	16	110	62	56	41	2,5	48	W20
3850936	**TDM135R3SCF16M**	13,50	13,99	16	112	64	58	42	2,6	48	W21
3850938	**TDM140R3SCF16M**	14,00	14,49	16	114	66	60	44	2,7	48	W22
3850940	**TDM145R3SCF16M**	14,50	14,99	16	116	68	62	45	2,8	48	W23
3850942	**TDM150R3SCF20M**	15,00	15,99	20	122	72	66	48	2,8	50	W24
3850944	**TDM160R3SCF20M**	16,00	16,99	20	126	76	70	51	3,0	50	W25
3850946	**TDM170R3SCF20M**	17,00	17,99	20	131	81	75	54	3,2	50	W26
3850948	**TDM180R3SCF25M**	18,00	18,99	25	141	85	79	57	3,4	56	W27
3850950	**TDM190R3SCF25M**	19,00	19,99	25	144	89	83	60	3,6	56	W28
3850952	**TDM200R3SCF25M**	20,00	20,99	25	149	93	87	63	3,8	56	W29
3992070	**TDM210R3SCF25M**	21,00	21,99	25	153	97	91	66	3,7	56	W30
3992071	**TDM220R3SCF25M**	22,00	22,99	25	158	102	96	69	3,9	56	W31
3992072	**TDM230R3SCF25M**	23,00	23,99	25	162	106	100	72	4,1	56	W32
3992483	**TDM240R3SCF25M**	24,00	24,99	25	166	110	104	75	4,2	56	W33
3992484	**TDM250R3SCF25M**	25,00	25,99	25	170	114	108	78	4,4	56	W34

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TOP DRILL M1™ • 5 x D • Flanged Shank • Metric



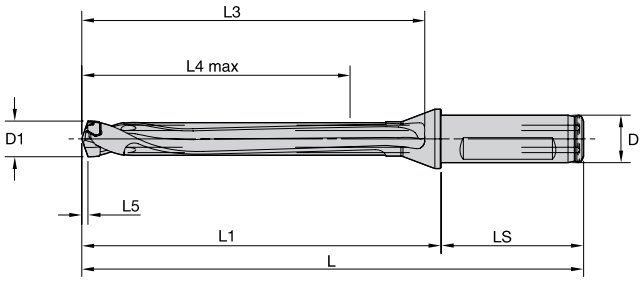


order number	catalog number	D1	D1 max	D	L	L1	L3	L4 max	L5	LS	SSC
3850905	**TDM080R5SCF12M**	7,94	8,49	12	104	59	53	43	1,5	45	W10
3850907	**TDM085R5SCF12M**	8,50	8,99	12	107	62	56	45	1,6	45	W11
3850909	**TDM090R5SCF12M**	9,00	9,49	12	110	65	59	48	1,7	45	W12
3850911	**TDM095R5SCF12M**	9,50	9,99	12	114	69	63	50	1,8	45	W13
3850923	**TDM100R5SCF16M**	10,00	10,49	16	120	72	66	53	1,9	48	W14
3850925	**TDM105R5SCF16M**	10,50	10,99	16	123	75	69	55	2,0	48	W15
3850927	**TDM110R5SCF16M**	11,00	11,49	16	126	78	72	58	2,1	48	W16
3850929	**TDM115R5SCF16M**	11,50	11,99	16	129	81	75	60	2,2	48	W17
3850931	**TDM120R5SCF16M**	12,00	12,49	16	132	84	78	63	2,3	48	W18
3850933	**TDM125R5SCF16M**	12,50	12,99	16	135	87	81	65	2,4	48	W19
3850935	**TDM130R5SCF16M**	13,00	13,49	16	138	90	84	68	2,5	48	W20
3850937	**TDM135R5SCF16M**	13,50	13,99	16	142	94	88	70	2,6	48	W21
3850939	**TDM140R5SCF16M**	14,00	14,49	16	145	97	91	73	2,7	48	W22
3850941	**TDM145R5SCF16M**	14,50	14,99	16	148	100	94	75	2,8	48	W23
3850943	**TDM150R5SCF20M**	15,00	15,99	20	156	106	100	80	2,8	50	W24
3850945	**TDM160R5SCF20M**	16,00	16,99	20	162	112	106	85	3,0	50	W25
3850947	**TDM170R5SCF20M**	17,00	17,99	20	169	119	113	90	3,2	50	W26
3850949	**TDM180R5SCF25M**	18,00	18,99	25	181	125	119	95	3,4	56	W27
3850951	**TDM190R5SCF25M**	19,00	19,99	25	187	131	125	100	3,6	56	W28
3850953	**TDM200R5SCF25M**	20,00	20,99	25	193	137	131	105	3,8	56	W29
3992485	**TDM210R5SCF25M**	21,00	21,99	25	200	144	138	110	3,7	56	W30
3992486	**TDM220R5SCF25M**	22,00	22,99	25	206	150	144	115	3,9	56	W31
3992487	**TDM230R5SCF25M**	23,00	23,99	25	212	156	150	120	4,1	56	W32
3992488	**TDM240R5SCF25M**	24,00	24,99	25	218	162	156	125	4,2	56	W33
3992489	**TDM250R5SCF25M**	25,00	25,99	25	225	169	163	130	4,4	56	W34

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TOP DRILL M1™ • 8 x D • Flanged Shank • Metric



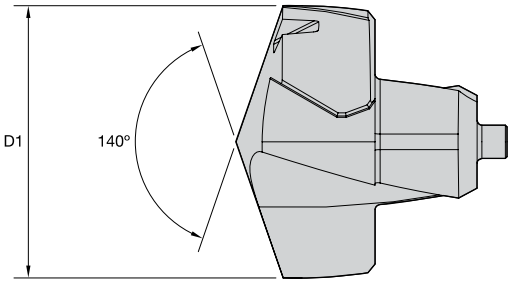


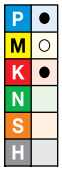
order number	catalog number	D1	D1 max	D	L	L1	L3	L4 max	L5	LS	SSC
3992141	TDM080R8SCF12M	7,94	8,49	12	129	84	79	68	1,4	45	W10
3992142	TDM085R8SCF12M	8,50	8,99	12	134	89	83	72	1,5	45	W11
3992213	TDM090R8SCF12M	9,00	9,49	12	138	93	88	76	1,6	45	W12
3992214	TDM095R8SCF12M	9,50	9,99	12	144	99	93	80	1,7	45	W13
3992215	TDM100R8SCF16M	10,00	10,49	16	151	103	98	84	1,8	48	W14
3992216	TDM105R8SCF16M	10,50	10,99	16	156	108	102	88	1,9	48	W15
3992217	TDM110R8SCF16M	11,00	11,49	16	160	112	107	92	2,0	48	W16
3992218	TDM115R8SCF16M	11,50	11,99	16	165	117	111	96	2,1	48	W17
3992219	TDM120R8SCF16M	12,00	12,49	16	169	121	116	100	2,1	48	W18
3992220	TDM125R8SCF16M	12,50	12,99	16	174	126	120	104	2,2	48	W19
3992221	TDM130R8SCF16M	13,00	13,49	16	178	130	125	108	2,3	48	W20
3992222	TDM135R8SCF16M	13,50	13,99	16	184	136	130	112	2,4	48	W21
3992223	TDM140R8SCF16M	14,00	14,49	16	188	140	135	116	2,5	48	W22
3992224	TDM145R8SCF16M	14,50	14,99	16	193	145	139	120	2,6	48	W23
3992225	TDM150R8SCF20M	15,00	15,99	20	204	154	148	128	2,7	50	W24
3992226	TDM160R8SCF20M	16,00	16,99	20	213	163	157	136	2,8	50	W25
3992227	TDM170R8SCF20M	17,00	17,99	20	223	173	167	144	3,0	50	W26
3992228	TDM180R8SCF25M	18,00	18,99	25	238	182	176	152	2,9	56	W27
3992229	TDM190R8SCF25M	19,00	19,99	25	247	191	185	160	3,4	56	W28
3992230	TDM200R8SCF25M	20,00	20,99	25	256	200	194	168	3,6	56	W29
3992231	TDM210R8SCF25M	21,00	21,99	25	266	210	204	176	3,7	56	W30
3992232	TDM220R8SCF25M	22,00	22,99	25	275	219	213	184	3,9	56	W31
3992233	TDM230R8SCF25M	23,00	23,99	25	284	228	222	192	4,1	56	W32
3992234	TDM240R8SCF25M	24,00	24,99	25	293	237	231	200	4,2	56	W33
3992235	TDM250R8SCF25M	25,00	25,99	25	303	247	241	208	4,4	56	W34

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TOP DRILL M1™ • Inserts • UP







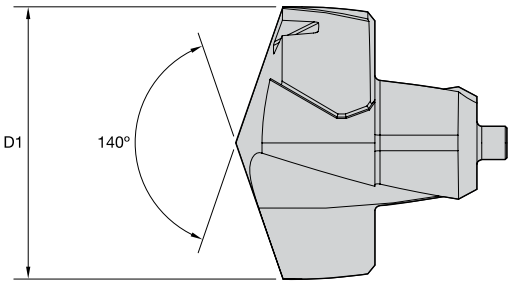
● first choice
○ alternate choice

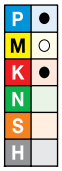
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order #	catalog #	mm	in	SSC
3850959	TDM0794UPM	7,94	.313	W10
3848984	TDM0800UPM	8,00	.315	W10
3848985	TDM0810UPM	8,10	.319	W10
3850960	TDM0816UPM	8,16	.321	W10
3850961	TDM0820UPM	8,20	.323	W10
3848986	TDM0830UPM	8,30	.327	W10
3850962	TDM0833UPM	8,33	.328	W10
3848987	TDM0840UPM	8,40	.331	W10
3850963	TDM0843UPM	8,43	.332	W10
3848988	TDM0850UPM	8,50	.335	W11
3848989	TDM0860UPM	8,60	.339	W11
3850964	TDM0861UPM	8,61	.339	W11
3848990	TDM0870UPM	8,70	.343	W11
3850965	TDM0873UPM	8,73	.344	W11
3848991	TDM0880UPM	8,80	.347	W11
3850966	TDM0884UPM	8,84	.348	W11
3848992	TDM0890UPM	8,90	.350	W11
3849043	TDM0900UPM	9,00	.354	W12
3850967	TDM0909UPM	9,09	.358	W12
3849044	TDM0910UPM	9,10	.358	W12
3850968	TDM0913UPM	9,13	.359	W12
3849045	TDM0920UPM	9,20	.362	W12
3849046	TDM0930UPM	9,30	.366	W12
3850969	TDM0935UPM	9,35	.368	W12
3849047	TDM0940UPM	9,40	.370	W12
3849048	TDM0950UPM	9,50	.374	W13
3850970	TDM0953UPM	9,53	.375	W13
3850971	TDM0956UPM	9,56	.376	W13
3850972	TDM0958UPM	9,58	.377	W13
3849049	TDM0960UPM	9,60	.378	W13
3850973	TDM0970UPM	9,70	.382	W13
3850974	TDM0980UPM	9,80	.386	W13
3849050	TDM0990UPM	9,90	.390	W13
3850975	TDM0992UPM	9,92	.391	W13
3849051	TDM1000UPM	10,00	.394	W14
3850976	TDM1002UPM	10,02	.395	W14
3850977	TDM1008UPM	10,08	.397	W14
3849052	TDM1010UPM	10,10	.398	W14
3849053	TDM1020UPM	10,20	.402	W14
3850978	TDM1026UPM	10,26	.404	W14
3849054	TDM1030UPM	10,30	.406	W14
3850979	TDM1032UPM	10,32	.406	W14
3849055	TDM1040UPM	10,40	.409	W14
3850980	TDM1049UPM	10,49	.413	W14
3849056	TDM1050UPM	10,50	.413	W15
3849057	TDM1060UPM	10,60	.417	W15
3849058	TDM1070UPM	10,70	.421	W15
3850981	TDM1072UPM	10,72	.422	W15

TOP DRILL M1™ • Inserts • UP

(continued)







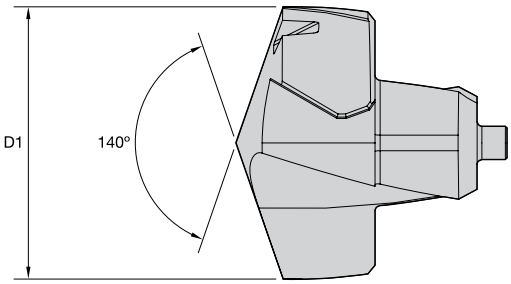
● first choice
○ alternate choice

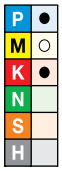
grade WU25PD TiAlN		D1		
order #	catalog #	mm	in	SSC
3849059	TDM1080UPM	10,80	.425	W15
3849060	TDM1090UPM	10,90	.429	W15
3849061	TDM1100UPM	11,00	.433	W16
3849062	TDM1110UPM	11,10	.437	W16
3850982	TDM1111UPM	11,11	.438	W16
3849063	TDM1120UPM	11,20	.441	W16
3849064	TDM1130UPM	11,30	.445	W16
3849065	TDM1140UPM	11,40	.449	W16
3849066	TDM1150UPM	11,50	.453	W17
3850983	TDM1151UPM	11,51	.453	W17
3849067	TDM1160UPM	11,60	.457	W17
3850984	TDM1161UPM	11,61	.457	W17
3849068	TDM1170UPM	11,70	.461	W17
3849069	TDM1180UPM	11,80	.465	W17
3849070	TDM1190UPM	11,90	.469	W17
3850985	TDM1191UPM	11,91	.469	W17
3849071	TDM1200UPM	12,00	.473	W18
3849072	TDM1210UPM	12,10	.476	W18
3849073	TDM1220UPM	12,20	.480	W18
3850986	TDM1230UPM	12,30	.484	W18
3849074	TDM1240UPM	12,40	.488	W18
3850987	TDM1247UPM	12,47	.491	W18
3849075	TDM1250UPM	12,50	.492	W19
3849076	TDM1260UPM	12,60	.496	W19
3850988	TDM1270UPM	12,70	.500	W19
3849077	TDM1280UPM	12,80	.504	W19
3850989	TDM1290UPM	12,90	.508	W19
3849078	TDM1300UPM	13,00	.512	W20
3850990	TDM1310UPM	13,10	.516	W20
3849079	TDM1320UPM	13,20	.520	W20
3849080	TDM1330UPM	13,30	.524	W20
3849081	TDM1340UPM	13,40	.528	W20
3850991	TDM1349UPM	13,49	.531	W20
3849082	TDM1350UPM	13,50	.532	W21
3849083	TDM1360UPM	13,60	.535	W21
3849084	TDM1370UPM	13,70	.539	W21
3849085	TDM1380UPM	13,80	.543	W21
3850992	TDM1389UPM	13,89	.547	W21
3850993	TDM1390UPM	13,90	.547	W21
3849086	TDM1400UPM	14,00	.551	W22
3849087	TDM1410UPM	14,10	.555	W22
3849088	TDM1420UPM	14,20	.559	W22
3850994	TDM1429UPM	14,29	.563	W22
3849089	TDM1430UPM	14,30	.563	W22
3849090	TDM1440UPM	14,40	.567	W22
3849091	TDM1450UPM	14,50	.571	W23
3849092	TDM1460UPM	14,60	.575	W23
3850995	TDM1467UPM	14,67	.577	W23

TOP DRILL M1™ • Inserts • UP

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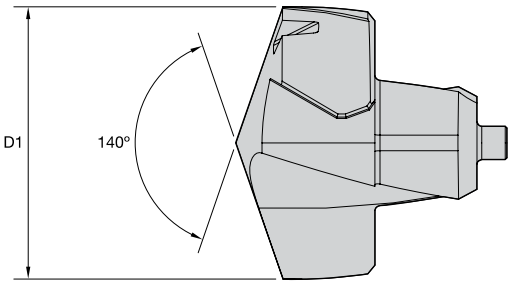
● first choice
○ alternate choice

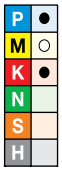
grade WU25PD TiAlN		D1		
order #	catalog #	mm	in	SSC
3850996	TDM1468UPM	14,68	.578	W23
3849093	TDM1470UPM	14,70	.579	W23
3849094	TDM1480UPM	14,80	.583	W23
3849095	TDM1490UPM	14,90	.587	W23
3849096	TDM1500UPM	15,00	.591	W24
3850997	TDM1508UPM	15,08	.594	W24
3849097	TDM1510UPM	15,10	.595	W24
3849098	TDM1520UPM	15,20	.598	W24
3849099	TDM1530UPM	15,30	.602	W24
3849100	TDM1540UPM	15,40	.606	W24
3850998	TDM1548UPM	15,48	.609	W24
3849101	TDM1550UPM	15,50	.610	W24
3849102	TDM1560UPM	15,60	.614	W24
3849103	TDM1570UPM	15,70	.618	W24
3849104	TDM1580UPM	15,80	.622	W24
3850999	TDM1588UPM	15,88	.625	W24
3849105	TDM1600UPM	16,00	.630	W25
3851000	TDM1603UPM	16,03	.631	W25
3851001	TDM1608UPM	16,08	.633	W25
3849106	TDM1610UPM	16,10	.634	W25
4010625	TDM1618UPM	16,18	.637	W25
3849107	TDM1620UPM	16,20	.638	W25
3851002	TDM1627UPM	16,27	.641	W25
3849108	TDM1630UPM	16,30	.642	W25
3849109	TDM1640UPM	16,40	.646	W25
3849110	TDM1650UPM	16,50	.650	W25
3849111	TDM1660UPM	16,60	.654	W25
3851003	TDM1667UPM	16,67	.656	W25
3849112	TDM1670UPM	16,70	.658	W25
3849113	TDM1680UPM	16,80	.661	W25
3851004	TDM1687UPM	16,87	.664	W25
3849114	TDM1690UPM	16,90	.665	W25
3849119	TDM1700UPM	17,00	.669	W26
3851005	TDM1707UPM	17,07	.672	W26
3849120	TDM1710UPM	17,10	.673	W26
3849121	TDM1720UPM	17,20	.677	W26
3849122	TDM1730UPM	17,30	.681	W26
3849193	TDM1740UPM	17,40	.685	W26
3851006	TDM1746UPM	17,46	.688	W26
3849194	TDM1750UPM	17,50	.689	W26
3849195	TDM1760UPM	17,60	.693	W26
3849196	TDM1770UPM	17,70	.697	W26
3849197	TDM1780UPM	17,80	.701	W26
3851007	TDM1786UPM	17,86	.703	W26
3849198	TDM1790UPM	17,90	.705	W26
3849199	TDM1800UPM	18,00	.709	W27
3849200	TDM1810UPM	18,10	.713	W27
3849201	TDM1820UPM	18,20	.717	W27

TOP DRILL M1™ • Inserts • UP

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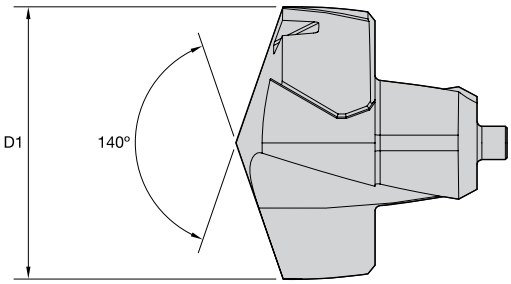
● first choice
○ alternate choice

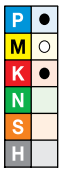
grade WU25PD TiAlN		D1		
order #	catalog #	mm	in	SSC
3851008	TDM1826UPM	18,26	.719	W27
3849202	TDM1830UPM	18,30	.721	W27
3849203	TDM1840UPM	18,40	.724	W27
3849204	TDM1850UPM	18,50	.728	W27
3849205	TDM1860UPM	18,60	.732	W27
3851009	TDM1865UPM	18,65	.734	W27
3849206	TDM1870UPM	18,70	.736	W27
3849207	TDM1880UPM	18,80	.740	W27
3849208	TDM1890UPM	18,90	.744	W27
3849209	TDM1900UPM	19,00	.748	W28
3851010	TDM1905UPM	19,05	.750	W28
3849210	TDM1910UPM	19,10	.752	W28
3849211	TDM1920UPM	19,20	.756	W28
3851011	TDM1923UPM	19,23	.757	W28
3851012	TDM1925UPM	19,25	.758	W28
3851013	TDM1928UPM	19,28	.759	W28
3849212	TDM1930UPM	19,30	.760	W28
3851014	TDM1935UPM	19,35	.762	W28
3849213	TDM1940UPM	19,40	.764	W28
3851015	TDM1945UPM	19,45	.766	W28
3849214	TDM1950UPM	19,50	.768	W28
3849215	TDM1960UPM	19,60	.772	W28
3849216	TDM1970UPM	19,70	.776	W28
3849217	TDM1980UPM	19,80	.780	W28
3851016	TDM1984UPM	19,84	.781	W28
3849218	TDM1990UPM	19,90	.784	W28
3849219	TDM2000UPM	20,00	.788	W29
3849220	TDM2010UPM	20,10	.791	W29
3849221	TDM2020UPM	20,20	.795	W29
3851017	TDM2024UPM	20,24	.797	W29
3849222	TDM2030UPM	20,30	.799	W29
3849223	TDM2040UPM	20,40	.803	W29
3849224	TDM2050UPM	20,50	.807	W29
3849225	TDM2060UPM	20,60	.811	W29
3851018	TDM2064UPM	20,64	.813	W29
3849226	TDM2070UPM	20,70	.815	W29
3849227	TDM2080UPM	20,80	.819	W29
3849228	TDM2090UPM	20,90	.823	W29
3849229	TDM2099UPM	20,99	.826	W29
4003225	TDM2100UPM	21,00	.827	W30
4003203	TDM2144UPM	21,44	.844	W30
3969291	TDM2150UPM	21,50	.846	W30
4003226	TDM2200UPM	22,00	.866	W31
4003204	TDM2223UPM	22,23	.875	W31
4003205	TDM2245UPM	22,45	.884	W31
4003227	TDM2250UPM	22,50	.887	W31
4003228	TDM2300UPM	23,00	.906	W32
4003229	TDM2350UPM	23,50	.925	W32

TOP DRILL M1™ • Inserts • UP

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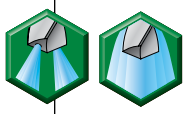


● first choice
○ alternate choice

grade WU25PD TiAlN		D1		
order #	catalog #	mm	in	SSC
4003206	TDM2381UPM	23,81	.938	W32
4003230	TDM2400UPM	24,00	.945	W33
4003231	TDM2450UPM	24,50	.965	W33
4003207	TDM2461UPM	24,61	.969	W33
4003232	TDM2500UPM	25,00	.984	W34
4003208	TDM2540UPM	25,40	1.000	W34
4002444	TDM2550UPM	25,50	1.004	W34
4003209	TDM2568UPM	25,68	1.011	W34
4003210	TDM2581UPM	25,81	1.016	W34
3992013	TDM2599UPM	25,99	1.023	W34

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Application Data • UP • WU25PD • Inch





Material Group		Cutting Speed — vc Range — SFM			Recommended Feed Rate							
		min	Starting Value	max	Tool Diameter (inch)	.315	.394	.472	.551	.630	.787	1.000
P	1	262	**410**	558	IPR	.004–.008	.005–.010	.006–.012	.007–.015	.007–.018	.010–.019	.012–.020
	2	345	**459**	591	IPR	.004–.011	.005–.014	.006–.015	.008–.018	.009–.018	.011–.020	.012–.020
	3	164	**246**	328	IPR	.004–.011	.005–.014	.006–.015	.008–.018	.009–.018	.011–.020	.012–.020
	4	164	**246**	328	IPR	.004–.011	.005–.014	.006–.015	.007–.018	.007–.018	.009–.019	.010–.020
	5	160	**210**	260	IPR	.004–.008	.004–.009	.004–.010	.006–0.11	.006–.013	.007–.014	.009–.017
	6	160	**210**	260	IPR	.004–.008	.004–.009	.004–.010	.006–0.11	.006–.013	.007–.014	.009–.017
M	1	130	**260**	360	IPR	.002–.009	.003–.009	.004–.010	.004–.010	.004–.010	.005–.012	.006–.013
	2	110	**180**	250	IPR	.002–.009	.003–.009	.004–.010	.004–.010	.004–.010	.005–.012	.006–.013
	3	70	**110**	160	IPR	.002–.009	.003–.009	.004–.010	.004–.010	.004–.010	.005–.012	.006–.013
K	1	197	**312**	558	IPR	.006–.011	.006–.013	.007–.014	.008–.017	.010–.019	.011–.020	.013–.022
	2	197	**246**	295	IPR	.006–.011	.006–.012	.007–.013	.008–.016	.010–.019	.011–.020	.013–.022
	3	131	**213**	295	IPR	.006–.012	.007–.013	.007–.014	.008–.016	.008–.017	.009–.019	.010–.020

NOTE: Through coolant recommended for greater than 3 x D applications.

Application Data • UP • WU25PD™ • Metric





Material Group		Cutting Speed — vc Range — m/min			Recommended Feed Rate							
		min	Starting Value	max	Tool Diameter (mm)	8,0	10,0	12,0	14,0	16,0	20,0	25,0
P	1	90	**125**	170	mm/r	0,11–0,20	0,13–0,25	0,14–0,31	0,17–0,39	0,19–0,45	0,25–0,48	0,30–0,52
	2	105	**140**	180	mm/r	0,11–0,28	0,12–0,35	0,16–0,37	0,21–0,46	0,23–0,46	0,28–0,50	0,30–0,52
	3	50	**75**	100	mm/r	0,11–0,28	0,12–0,35	0,16–0,37	0,21–0,46	0,23–0,46	0,28–0,50	0,30–0,52
	4	50	**75**	100	mm/r	0,11–0,28	0,12–0,35	0,16–0,37	0,17–0,36	0,19–0,45	0,22–0,48	0,25–0,50
	5	50	**65**	80	mm/r	0,10–0,20	0,10–0,23	0,10–0,25	0,14–0,29	0,16–0,32	0,18–0,36	0,22–0,42
	6	50	**65**	80	mm/r	0,10–0,20	0,10–0,23	0,10–0,25	0,14–0,29	0,16–0,32	0,18–0,36	0,22–0,42
M	1	40	**80**	110	mm/r	0,06–0,22	0,08–0,23	0,09–0,24	0,10–0,25	0,11–0,26	0,13–0,28	0,13–0,32
	2	35	**55**	75	mm/r	0,06–0,22	0,08–0,23	0,09–0,24	0,10–0,25	0,11–0,26	0,13–0,28	0,13–0,32
	3	20	**35**	50	mm/r	0,06–0,22	0,08–0,23	0,09–0,24	0,10–0,25	0,11–0,26	0,13–0,28	0,13–0,32
K	1	60	**95**	170	mm/r	0,15–0,29	0,16–0,32	0,17–0,35	0,21–0,42	0,25–0,48	0,28–0,52	0,32–0,56
	2	60	**75**	90	mm/r	0,15–0,29	0,16–0,30	0,17–0,33	0,21–0,41	0,25–0,48	0,28–0,52	0,32–0,56
	3	40	**65**	90	mm/r	0,16–0,30	0,17–0,33	0,18–0,36	0,20–0,41	0,21–0,44	0,23–0,48	0,25–0,50

NOTE: Through coolant recommended for greater than 3 x D applications.

Application Data • Victory™ TOP DRILL M1™

How to attach inserts



1) Fix drill holder on arbor. For insert exchange, fix arbor on the machine or set on tool presetter.



2) Remove dust using air blast.



3) Put insert into drill holder. (Use gloves to protect your hands.)



4) Turn lightly in a clockwise direction. (Use gloves to protect your hands.)



5) Set the wrench properly.*



6) Make sure the wrench fits with the insert slot for the wrench. (Is the wrench unfixed from the slot?)





7) Slowly turn the wrench in a clockwise direction.



8) Complete.

How to detach inserts



1) Remove dust from insert using air blast.



2) Set the wrench properly.*



3) Fit the wrench to insert slot.



4) Turn the wrench in a counterclockwise direction.



5) Once lock is released, insert can be turned with fingers. (Use gloves to protect your hands.)



6) Remove insert. (Use gloves to protect your hands.)

**To order the TDM1 Wrench, please use order number 3861623 and catalog number 170.315.*

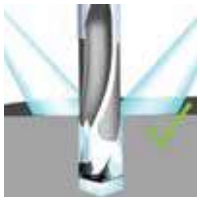
Application Data • Victory™ TOP DRILL M1™

Cautions

Coolant



1) Internal coolant is recommended.



2) In case of external coolant, cutting depth must be 3 x D or less.

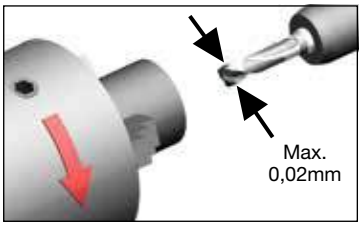


3) Dry cutting is not recommended.
Limited applicability in cast iron materials, MQL strongly recommended.

Usage Precautions

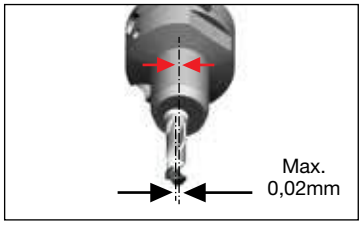
Core deviation

1) For Turning Machines



Set deviation amount under 0,02mm between workpiece and drill.

2) For Machining Centers



Do not use any arbor with a damaged attachment surface. Center of arbor deviation must be within 0,02mm.

Application Recommendation	Workpiece Shape
Flat Face **Recommended**	
Stacked Plates **Recommended**	
Inclined Surface >3° **Not Recommended**	
Half Cylindrical **Not Recommended**	
Hole Expansion **Not Recommended**	
Concave Surface **Not Recommended**	
Pipe Material **Not Recommended**	
Cored Hole **Not Recommended**	

Top Cut 4™

Efficient Indexable Drill • TC4

Top Cut 4 indexable drills are equipped with centering capabilities and inboard and outboard inserts delivering outstanding flexibility and versatility in multiple materials.

Large Coolant Holes
Improves coolant in the cutting zone and facilitates easy chip evacuation.

Large Optimized Chip Flutes to enable chip flow and reduce vibrations.

Rigid Cross Section – Sturdy Body
Higher tool life even in tough conditions.



Top Cut 4 indexable drill portfolio encompasses dual four-edged front inserts, instead of traditional drill point geometry, enabling it to perform in a variety of applications on multiple materials.

FOUR CHIP BREAKERS IN FOUR GRADES

-V34



P K

First choice for machining steel, cast iron and short chipping materials. Suitable for severe cutting conditions.

-V36



P M K N

This insert is suitable for situations with low power consumption.

-V38



P M S

First choice for long chipping materials in titanium and stainless steel.

-DU



P M K

First choice for low-powered applications, machining of steel, cast iron and stainless steel.

FLEXIBLE AND VERSATILE

PRODUCT

Top Cut 4™ is an efficient drill which performs on PMKN materials with true four cutting edges.

DIAMETER RANGE

.472–2.677" (12–68mm)

INDUSTRY

ENERGY

GENERAL ENGINEERING

TRANSPORTATION

MATERIALS

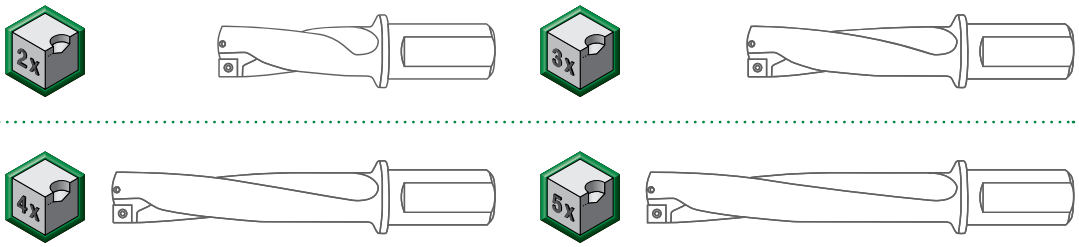
P M K N

APPLICATIONS



DRILLING | IINCLINED ENTRY | INCLINED EXIT | CROSS HOLES | BLIND | HALF-CYLINDRICAL DRILLING | CORNER DRILLING 45° | X-OFFSET | CONVEX | CHAIN DRILLING

STEEL BODIES



INSERTS

GRADES

WN10PH, WPK10CH, WU25CH, WU20PH, WU40PH

FLANGED SR SHANK



Top Cut 4™ Catalog Numbering System

The guide below provides an example of how to select the
Top Cut 4 tool body and accompanying inserts for a stable steel drilling application.

Metric Body

TCF	250	R	3	SL	32	M	D
Tool Family Top Cut 4	Diameter Metric = 3 digits (e.g. 250 = 25mm) Inch = 4 digits (e.g. 2500 = 2.5")	Right-Hand Cutting	Length Diameter Ratio L/D = 3 x D	Shank Style SL = Side Lock Adapter	Shank Size	Metric	Insert Size

Inch Body

TCF	1000	R	3	SSF	100	D
Tool Family Top Cut 4	Diameter Metric = 3 digits (e.g. 250 = 25mm) Inch = 4 digits (e.g. 2500 = 2.5")	Right-Hand Cutting	Length Diameter Ratio L/D = 3 x D	Shank Style SSF = Straight Shank Flange	Shank Size	Insert Size

Periphery Insert

TCF	08	03	08	D	P	V34	WU25CH
Tool Family Top Cut 4	Size In-Circle D1	Insert Thickness	Insert Corner Radius	Insert Size	Insert Positioning C = Central P = Periphery	Insert Geometry	Grade

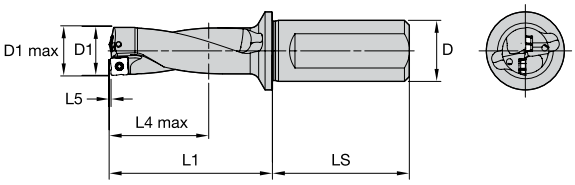
Insert Geometry – V34 for steel or cast iron or V36 for stainless steel and long chipping steel.

Insert Guide for Grades

W	U	25	C	H
W	U	40	P	H
W	PK	10	C	H
WIDIA™	Material Range U = Universal P = Steel K = Cast Iron	Toughness Range Choose high numbers for toughness in stable conditions, low numbers for high wear resistance at continuous cuts.	Coating P = PVD C = CVD	Application H = Holemaking

Top Cut 4 • 2 x D • SLR Shank • Inch





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537879	TCF0473R2SLR075A	.473	.493	.75	1.688	.963	.017	1.969	A	TCF040204AP	TCF040203AC
5537880	TCF0500R2SLR075A	.500	.520	.75	1.776	1.018	.018	1.969	A	TCF040204AP	TCF040203AC
5537881	TCF0531R2SLR075A	.531	.551	.75	1.876	1.081	.019	1.969	A	TCF040204AP	TCF040203AC
5578226	TCF0563R2SLR075B	.563	.583	.75	1.923	1.146	.020	1.969	B	TCF050204BP	TCF060203BC
5578227	TCF0594R2SLR075B	.594	.614	.75	2.021	1.210	.022	1.969	B	TCF050204BP	TCF060203BC
5578228	TCF0625R2SLR075B	.625	.645	.75	2.118	1.273	.023	1.969	B	TCF050204BP	TCF060203BC
5578229	TCF0656R2SLR075B	.656	.676	.75	2.215	1.336	.024	1.969	B	TCF050204BP	TCF060203BC
5578300	TCF0688R2SLR075B	.688	.708	.75	2.315	1.401	.025	1.969	B	TCF050204BP	TCF060203BC
5578301	TCF0703R2SLR075B	.703	.723	.75	2.362	1.431	.025	1.969	B	TCF050204BP	TCF060203BC
5578302	TCF0719R2SLR075B	.719	.739	.75	2.412	1.463	.026	1.969	B	TCF050204BP	TCF060203BC
5578303	TCF0734R2SLR075B	.734	.754	.75	2.459	1.494	.026	1.969	B	TCF050204BP	TCF060203BC
5578379	TCF0750R2SLR100C	.750	.770	1.00	2.510	1.527	.027	2.205	C	TCF070306CP	TCF070304CC
5578400	TCF0781R2SLR100C	.781	.801	1.00	2.607	1.590	.028	2.205	C	TCF070306CP	TCF070304CC
5578401	TCF0813R2SLR100C	.813	.833	1.00	2.707	1.655	.029	2.205	C	TCF070306CP	TCF070304CC
5578402	TCF0844R2SLR100C	.844	.864	1.00	2.804	1.718	.030	2.205	C	TCF070306CP	TCF070304CC
5578403	TCF0875R2SLR100C	.875	.895	1.00	2.901	1.781	.031	2.205	C	TCF070306CP	TCF070304CC
5578404	TCF0906R2SLR100C	.906	.926	1.00	2.998	1.844	.032	2.205	C	TCF070306CP	TCF070304CC
5578405	TCF0938R2SLR100C	.938	.958	1.00	3.097	1.908	.032	2.205	C	TCF070306CP	TCF070304CC
5537845	TCF0969R2SLR100D	.969	1.008	1.00	3.100	1.973	.035	2.205	D	TCF080308DP	TCF090305DC
5537846	TCF0984R2SLR100D	.984	1.023	1.00	3.146	2.004	.036	2.205	D	TCF080308DP	TCF090305DC
5537847	TCF1000R2SLR100D	1.000	1.039	1.00	3.194	2.036	.036	2.205	D	TCF080308DP	TCF090305DC
5537848	TCF1031R2SLR125D	1.031	1.070	1.25	3.327	2.099	.037	2.362	D	TCF080308DP	TCF090305DC
5537849	TCF1063R2SLR125D	1.063	1.102	1.25	3.424	2.164	.038	2.362	D	TCF080308DP	TCF090305DC
5537910	TCF1094R2SLR125D	1.094	1.133	1.25	3.518	2.227	.039	2.362	D	TCF080308DP	TCF090305DC
5537911	TCF1125R2SLR125D	1.125	1.164	1.25	3.612	2.290	.040	2.362	D	TCF080308DP	TCF090305DC
5537912	TCF1156R2SLR125D	1.156	1.195	1.25	3.706	2.353	.041	2.362	D	TCF080308DP	TCF090305DC
5537965	TCF1188R2SLR125E	1.188	1.227	1.25	3.685	2.419	.043	2.362	E	TCF100408EP	TCF120405EC
5537966	TCF1210R2SLR125E	1.210	1.249	1.25	3.750	2.464	.044	2.362	E	TCF100408EP	TCF120405EC
5537967	TCF1219R2SLR125E	1.219	1.258	1.25	3.776	2.482	.044	2.362	E	TCF100408EP	TCF120405EC
5537968	TCF1250R2SLR125E	1.250	1.289	1.25	3.867	2.545	.045	2.362	E	TCF100408EP	TCF120405EC
5537969	TCF1280R2SLR125E	1.281	1.320	1.25	3.958	2.608	.046	2.362	E	TCF100408EP	TCF120405EC
5538060	TCF1313R2SLR125E	1.313	1.352	1.25	4.052	2.673	.047	2.362	E	TCF100408EP	TCF120405EC
5538061	TCF1375R2SLR125E	1.375	1.414	1.25	4.233	2.799	.049	2.362	E	TCF100408EP	TCF120405EC
5538062	TCF1406R2SLR150E	1.406	1.445	1.50	4.364	2.862	.050	2.756	E	TCF100408EP	TCF120405EC
5538063	TCF1438R2SLR150E	1.438	1.438	1.50	4.457	2.926	.050	2.756	E	TCF100408EP	TCF120405EC
5578651	TCF1469R2SLR150F	1.469	1.508	1.50	4.550	2.991	.054	2.756	F	TCF120412FP	TCF150406FC
5578652	TCF1500R2SLR150F	1.500	1.539	1.50	4.641	3.055	.055	2.756	F	TCF120412FP	TCF150406FC
5578653	TCF1531R2SLR150F	1.531	1.570	1.50	4.732	3.118	.056	2.756	F	TCF120412FP	TCF150406FC
5578654	TCF1563R2SLR150F	1.563	1.602	1.50	4.826	3.183	.057	2.756	F	TCF120412FP	TCF150406FC
5578655	TCF1625R2SLR150F	1.625	1.664	1.50	5.007	3.308	.058	2.756	F	TCF120412FP	TCF150406FC
5578656	TCF1656R2SLR150F	1.656	1.695	1.50	5.098	3.371	.059	2.756	F	TCF120412FP	TCF150406FC
5578657	TCF1688R2SLR150F	1.688	1.727	1.50	5.192	3.436	.060	2.756	F	TCF120412FP	TCF150406FC
5578658	TCF1750R2SLR150F	1.750	1.789	1.50	5.373	3.562	.062	2.756	F	TCF120412FP	TCF150406FC
5578765	TCF1813R2SLR150G	1.813	1.852	1.50	5.379	3.692	.066	2.756	G	TCF150512GP	TCF180508GC
5578766	TCF1875R2SLR150G	1.875	1.914	1.50	5.554	3.818	.068	2.756	G	TCF150512GP	TCF180508GC
5578767	TCF1938R2SLR150G	1.938	1.977	1.50	5.732	3.945	.069	2.756	G	TCF150512GP	TCF180508GC
5578768	TCF2000R2SLR150G	2.000	2.039	1.50	5.907	4.071	.071	2.756	G	TCF150512GP	TCF180508GC
5578769	TCF2125R2SLR150G	2.125	2.164	1.50	6.261	4.324	.075	2.756	G	TCF150512GP	TCF180508GC
5578790	TCF2219R2SLR150G	2.219	2.258	1.50	6.527	4.515	.077	2.756	G	TCF150512GP	TCF180508GC
5538500	TCF2250R2SLR150H	2.250	2.289	1.50	6.392	4.581	.081	2.756	H	TCF180614HP	TCF210608HC
5538501	TCF2375R2SLR150H	2.375	2.414	1.50	6.734	4.835	.085	2.756	H	TCF180614HP	TCF210608HC
5538502	TCF2500R2SLR150H	2.500	2.539	1.50	7.074	5.088	.088	2.756	H	TCF180614HP	TCF210608HC

D	LS mm	LS in
.75	50	1.9685
1.00	56	2.2047
1.25	60	2.3622
1.50	70	2.7559

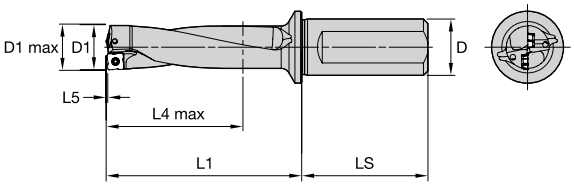
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.
Drill shipped with insert screws and Torx wrench.
See pages C103–C112 for inserts.
SSC = Pocket Seat Reference.
SLR = Side Lock.
D1 max is an achievable diameter using x-offset.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece.
When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force.
Provide adequate shielding to protect bystanders.

Top Cut 4 • 3 x D • SLR Shank • Inch





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537882	TCF0473R3SLR075A	.473	.493	.75	2.161	1.436	.017	1.969	A	TCF040204AP	TCF040203AC
5537883	TCF0500R3SLR075A	.500	.520	.75	2.276	1.518	.018	1.969	A	TCF040204AP	TCF040203AC
5537884	TCF0531R3SLR075A	.531	.551	.75	2.407	1.612	.019	1.969	A	TCF040204AP	TCF040203AC
5578304	TCF0563R3SLR075B	.563	.583	.75	2.486	1.709	.020	1.969	B	TCF050204BP	TCF060203BC
5578305	TCF0594R3SLR075B	.594	.614	.75	2.615	1.804	.022	1.969	B	TCF050204BP	TCF060203BC
5578306	TCF0625R3SLR075B	.625	.645	.75	2.743	1.898	.023	1.969	B	TCF050204BP	TCF060203BC
5578307	TCF0656R3SLR075B	.656	.676	.75	2.871	1.992	.024	1.969	B	TCF050204BP	TCF060203BC
5578308	TCF0688R3SLR075B	.688	.708	.75	3.003	2.089	.025	1.969	B	TCF050204BP	TCF060203BC
5578309	TCF0703R3SLR075B	.703	.723	.75	3.065	2.134	.025	1.969	B	TCF050204BP	TCF060203BC
5578310	TCF0719R3SLR075B	.719	.739	.75	3.131	2.182	.026	1.969	B	TCF050204BP	TCF060203BC
5578311	TCF0734R3SLR075B	.734	.754	.75	3.193	2.228	.026	1.969	B	TCF050204BP	TCF060203BC
5578406	TCF0750R3SLR100C	.750	.770	1.00	3.260	2.277	.027	2.205	C	TCF070306CP	TCF070304CC
5578407	TCF0781R3SLR100C	.781	.801	1.00	3.388	2.371	.028	2.205	C	TCF070306CP	TCF070304CC
5578408	TCF0813R3SLR100C	.813	.833	1.00	3.520	2.468	.029	2.205	C	TCF070306CP	TCF070304CC
5578409	TCF0844R3SLR100C	.844	.864	1.00	3.648	2.562	.030	2.205	C	TCF070306CP	TCF070304CC
5578410	TCF0875R3SLR100C	.875	.895	1.00	3.776	2.656	.031	2.205	C	TCF070306CP	TCF070304CC
5578411	TCF0906R3SLR100C	.906	.926	1.00	3.904	2.750	.032	2.205	C	TCF070306CP	TCF070304CC
5578412	TCF0938R3SLR100C	.938	.958	1.00	4.035	2.846	.032	2.205	C	TCF070306CP	TCF070304CC
5537913	TCF0969R3SLR100D	.969	1.008	1.00	4.069	2.942	.035	2.205	D	TCF080308DP	TCF090305DC
5537914	TCF0984R3SLR100D	.984	1.023	1.00	4.130	2.988	.036	2.205	D	TCF080308DP	TCF090305DC
5537915	TCF1000R3SLR100D	1.000	1.039	1.00	4.194	3.036	.036	2.205	D	TCF080308DP	TCF090305DC
5537916	TCF1031R3SLR125D	1.031	1.070	1.25	4.358	3.130	.037	2.362	D	TCF080308DP	TCF090305DC
5537917	TCF1063R3SLR125D	1.063	1.102	1.25	4.487	3.227	.038	2.362	D	TCF080308DP	TCF090305DC
5537918	TCF1094R3SLR125D	1.094	1.133	1.25	4.612	3.321	.039	2.362	D	TCF080308DP	TCF090305DC
5537919	TCF1125R3SLR125D	1.125	1.164	1.25	4.737	3.415	.040	2.362	D	TCF080308DP	TCF090305DC
5537920	TCF1156R3SLR125D	1.156	1.195	1.25	4.862	3.509	.041	2.362	D	TCF080308DP	TCF090305DC
5538064	TCF1188R3SLR125E	1.188	1.227	1.25	4.873	3.607	.043	2.362	E	TCF100408EP	TCF120405EC
5538065	TCF1210R3SLR125E	1.210	1.249	1.25	4.960	3.674	.044	2.362	E	TCF100408EP	TCF120405EC
5538066	TCF1219R3SLR125E	1.219	1.258	1.25	4.995	3.701	.044	2.362	E	TCF100408EP	TCF120405EC
5538067	TCF1250R3SLR125E	1.250	1.289	1.25	5.117	3.795	.045	2.362	E	TCF100408EP	TCF120405EC
5538068	TCF1280R3SLR125E	1.281	1.320	1.25	5.239	3.889	.046	2.362	E	TCF100408EP	TCF120405EC
5538069	TCF1313R3SLR125E	1.313	1.352	1.25	5.365	3.986	.047	2.362	E	TCF100408EP	TCF120405EC
5538080	TCF1375R3SLR125E	1.375	1.414	1.25	5.608	4.174	.049	2.362	E	TCF100408EP	TCF120405EC
5538081	TCF1406R3SLR150E	1.406	1.445	1.50	5.770	4.268	.050	2.756	E	TCF100408EP	TCF120405EC
5538082	TCF1438R3SLR150E	1.438	1.477	1.50	5.895	4.364	.050	2.756	E	TCF100408EP	TCF120405EC
5578659	TCF1469R3SLR150F	1.469	1.508	1.50	6.019	4.460	.054	2.756	F	TCF120412FP	TCF150406FC
5578670	TCF1500R3SLR150F	1.500	1.539	1.50	6.141	4.555	.055	2.756	F	TCF120412FP	TCF150406FC
5578671	TCF1531R3SLR150F	1.531	1.570	1.50	6.263	4.649	.056	2.756	F	TCF120412FP	TCF150406FC
5578672	TCF1563R3SLR150F	1.563	1.602	1.50	6.389	4.746	.057	2.756	F	TCF120412FP	TCF150406FC
5578673	TCF1625R3SLR150F	1.625	1.664	1.50	6.632	4.933	.058	2.756	F	TCF120412FP	TCF150406FC
5578674	TCF1656R3SLR150F	1.656	1.695	1.50	6.754	5.027	.059	2.756	F	TCF120412FP	TCF150406FC
5578675	TCF1688R3SLR150F	1.688	1.727	1.50	6.880	5.124	.060	2.756	F	TCF120412FP	TCF150406FC
5578676	TCF1750R3SLR150F	1.750	1.789	1.50	7.123	5.312	.062	2.756	F	TCF120412FP	TCF150406FC
5578791	TCF1813R3SLR150G	1.813	1.852	1.50	7.192	5.505	.066	2.756	G	TCF150512GP	TCF180508GC
5578792	TCF1875R3SLR150G	1.875	1.914	1.50	7.429	5.693	.068	2.756	G	TCF150512GP	TCF180508GC
5578793	TCF1938R3SLR150G	1.938	1.977	1.50	7.670	5.883	.069	2.756	G	TCF150512GP	TCF180508GC
5578794	TCF2000R3SLR150G	2.000	2.039	1.50	7.832	6.071	.071	2.756	G	TCF150512GP	TCF180508GC
5578795	TCF2125R3SLR150G	2.125	2.164	1.50	8.307	6.450	.075	2.756	G	TCF150512GP	TCF180508GC
5578796	TCF2219R3SLR150G	2.219	2.258	1.50	8.665	6.734	.077	2.756	G	TCF150512GP	TCF180508GC
5538503	TCF2250R3SLR150H	2.250	2.289	1.50	8.642	6.831	.081	2.756	H	TCF180614HP	TCF210608HC
5538504	TCF2375R3SLR150H	2.375	2.414	1.50	9.109	7.210	.085	2.756	H	TCF180614HP	TCF210608HC
5538505	TCF2500R3SLR150H	2.500	2.539	1.50	9.574	7.588	.088	2.756	H	TCF180614HP	TCF210608HC

D	LS mm	LS in
.75	50	1.9685
1.00	56	2.2047
1.25	60	2.3622
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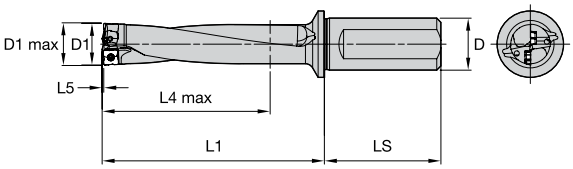
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Top Cut 4 • 4 x D • SLR Shank • Inch





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537885	TCF0473R4SLR075A	.473	.493	.75	2.634	1.909	.017	1.969	A	TCF040204AP	TCF040203AC
5537886	TCF0500R4SLR075A	.500	.520	.75	2.776	2.018	.018	1.969	A	TCF040204AP	TCF040203AC
5537887	TCF0531R4SLR075A	.531	.551	.75	2.938	2.143	.019	1.969	A	TCF040204AP	TCF040203AC
5578312	TCF0563R4SLR075B	.563	.583	.75	3.049	2.272	.020	1.969	B	TCF050204BP	TCF060203BC
5578313	TCF0594R4SLR075B	.594	.614	.75	3.209	2.398	.022	1.969	B	TCF050204BP	TCF060203BC
5578314	TCF0625R4SLR075B	.625	.645	.75	3.368	2.523	.023	1.969	B	TCF050204BP	TCF060203BC
5578315	TCF0656R4SLR075B	.656	.676	.75	3.527	2.648	.024	1.969	B	TCF050204BP	TCF060203BC
5578316	TCF0688R4SLR075B	.688	.708	.75	3.691	2.777	.025	1.969	B	TCF050204BP	TCF060203BC
5578317	TCF0703R4SLR075B	.703	.723	.75	3.768	2.837	.025	1.969	B	TCF050204BP	TCF060203BC
5578318	TCF0719R4SLR075B	.719	.739	.75	3.850	2.901	.026	1.969	B	TCF050204BP	TCF060203BC
5578319	TCF0734R4SLR075B	.734	.754	.75	3.927	2.962	.026	1.969	B	TCF050204BP	TCF060203BC
5578413	TCF0750R4SLR100C	.750	.770	1.00	4.010	3.027	.027	2.205	C	TCF070306CP	TCF070304CC
5578414	TCF0781R4SLR100C	.781	.801	1.00	4.169	3.152	.028	2.205	C	TCF070306CP	TCF070304CC
5578415	TCF0813R4SLR100C	.813	.833	1.00	4.333	3.281	.029	2.205	C	TCF070306CP	TCF070304CC
5578416	TCF0844R4SLR100C	.844	.864	1.00	4.492	3.406	.030	2.205	C	TCF070306CP	TCF070304CC
5578417	TCF0875R4SLR100C	.875	.895	1.00	4.651	3.531	.031	2.205	C	TCF070306CP	TCF070304CC
5578418	TCF0906R4SLR100C	.906	.926	1.00	4.810	3.656	.032	2.205	C	TCF070306CP	TCF070304CC
5578419	TCF0938R4SLR100C	.938	.958	1.00	4.973	3.784	.032	2.205	C	TCF070306CP	TCF070304CC
5537921	TCF0969R4SLR100D	.969	1.008	1.00	5.038	3.911	.035	2.205	D	TCF080308DP	TCF090305DC
5537922	TCF0984R4SLR100D	.984	1.023	1.00	5.114	3.972	.036	2.205	D	TCF080308DP	TCF090305DC
5537923	TCF1000R4SLR100D	1.000	1.039	1.00	5.194	4.036	.036	2.205	D	TCF080308DP	TCF090305DC
5537924	TCF1031R4SLR125D	1.031	1.070	1.25	5.389	4.161	.037	2.362	D	TCF080308DP	TCF090305DC
5537925	TCF1063R4SLR125D	1.063	1.102	1.25	5.550	4.290	.038	2.362	D	TCF080308DP	TCF090305DC
5537926	TCF1094R4SLR125D	1.094	1.133	1.25	5.706	4.415	.039	2.362	D	TCF080308DP	TCF090305DC
5537927	TCF1125R4SLR125D	1.125	1.164	1.25	5.862	4.540	.040	2.362	D	TCF080308DP	TCF090305DC
5537928	TCF1156R4SLR125D	1.156	1.195	1.25	6.018	4.665	.041	2.362	D	TCF080308DP	TCF090305DC
5538083	TCF1188R4SLR125E	1.188	1.227	1.25	6.061	4.795	.043	2.362	E	TCF100408EP	TCF120405EC
5538084	TCF1210R4SLR125E	1.210	1.249	1.25	6.170	4.884	.044	2.362	E	TCF100408EP	TCF120405EC
5538085	TCF1219R4SLR125E	1.219	1.258	1.25	6.214	4.920	.044	2.362	E	TCF100408EP	TCF120405EC
5538086	TCF1250R4SLR125E	1.250	1.289	1.25	6.367	5.045	.045	2.362	E	TCF100408EP	TCF120405EC
5538087	TCF1280R4SLR125E	1.281	1.320	1.25	6.520	5.170	.046	2.362	E	TCF100408EP	TCF120405EC
5538088	TCF1313R4SLR125E	1.313	1.352	1.25	6.678	5.299	.047	2.362	E	TCF100408EP	TCF120405EC
5538089	TCF1375R4SLR125E	1.375	1.414	1.25	6.983	5.549	.049	2.362	E	TCF100408EP	TCF120405EC
5538090	TCF1406R4SLR150E	1.406	1.445	1.50	7.176	5.674	.050	2.756	E	TCF100408EP	TCF120405EC
5538091	TCF1438R4SLR150E	1.438	1.477	1.50	7.333	5.802	.050	2.756	E	TCF100408EP	TCF120405EC
5578677	TCF1469R4SLR150F	1.469	1.508	1.50	7.488	5.929	.054	2.756	F	TCF120412FP	TCF150406FC
5578678	TCF1500R4SLR150F	1.500	1.539	1.50	7.641	6.054	.055	2.756	F	TCF120412FP	TCF150406FC
5578679	TCF1531R4SLR150F	1.531	1.570	1.50	7.794	6.180	.056	2.756	F	TCF120412FP	TCF150406FC
5578680	TCF1563R4SLR150F	1.563	1.602	1.50	7.952	6.309	.057	2.756	F	TCF120412FP	TCF150406FC
5578681	TCF1625R4SLR150F	1.625	1.664	1.50	8.257	6.558	.058	2.756	F	TCF120412FP	TCF150406FC
5578682	TCF1656R4SLR150F	1.656	1.695	1.50	8.410	6.683	.059	2.756	F	TCF120412FP	TCF150406FC
5578683	TCF1688R4SLR150F	1.688	1.727	1.50	8.568	6.812	.060	2.756	F	TCF120412FP	TCF150406FC
5578684	TCF1750R4SLR150F	1.750	1.789	1.50	8.873	7.062	.062	2.756	F	TCF120412FP	TCF150406FC
5578797	TCF1813R4SLR150G	1.813	1.852	1.50	9.005	7.318	.066	2.756	G	TCF150512GP	TCF180508GC
5578798	TCF1875R4SLR150G	1.875	1.914	1.50	9.304	7.568	.068	2.756	G	TCF150512GP	TCF180508GC
5578799	TCF1938R4SLR150G	1.938	1.977	1.50	9.608	7.821	.069	2.756	G	TCF150512GP	TCF180508GC
5578800	TCF2000R4SLR150G	2.000	2.039	1.50	9.907	8.071	.071	2.756	G	TCF150512GP	TCF180508GC
5578801	TCF2125R4SLR150G	2.125	2.164	1.50	10.511	8.574	.075	2.756	G	TCF150512GP	TCF180508GC
5578802	TCF2219R4SLR150G	2.219	2.258	1.50	10.965	8.953	.077	2.756	G	TCF150512GP	TCF180508GC
5538506	TCF2250R4SLR150H	2.250	2.289	1.50	10.892	9.081	.081	2.756	H	TCF180614HP	TCF210608HC
5538507	TCF2375R4SLR150H	2.375	2.414	1.50	11.484	9.585	.085	2.756	H	TCF180614HP	TCF210608HC
5538508	TCF2500R4SLR150H	2.500	2.539	1.50	12.074	10.088	.088	2.756	H	TCF180614HP	TCF210608HC

D	LS mm	LS in
.75	50	1.9685
1.00	56	2.2047
1.25	60	2.3622
1.50	70	2.7559

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.

Drill shipped with insert screws and Torx wrench.

See pages C103–C112 for inserts.

SSC = Pocket Seat Reference.

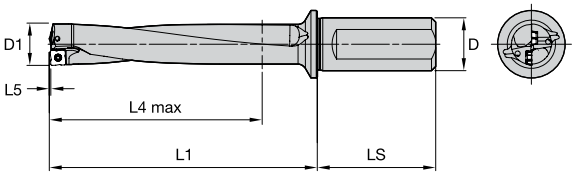
SLR = Side Lock.

D1 max is an achievable diameter using x-offset.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece.
When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force.
Provide adequate shielding to protect bystanders.

Top Cut 4 • 5 x D • SLR Shank • Inch





order number	catalog number	D1	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537888	TCF0473R5SLR075A	.473	.75	3.107	2.382	.017	1.969	A	TCF040204AP	TCF040203AC
5537889	TCF0500R5SLR075A	.500	.75	3.276	2.518	.018	1.969	A	TCF040204AP	TCF040203AC
5537890	TCF0531R5SLR075A	.531	.75	3.469	2.674	.019	1.969	A	TCF040204AP	TCF040203AC
5578320	TCF0563R5SLR075B	.563	.75	3.612	2.835	.020	1.969	B	TCF050204BP	TCF060203BC
5578321	TCF0594R5SLR075B	.594	.75	3.803	2.992	.022	1.969	B	TCF050204BP	TCF060203BC
5578322	TCF0625R5SLR075B	.625	.75	3.993	3.148	.023	1.969	B	TCF050204BP	TCF060203BC
5578323	TCF0656R5SLR075B	.656	.75	4.183	3.304	.024	1.969	B	TCF050204BP	TCF060203BC
5578324	TCF0688R5SLR075B	.688	.75	4.379	3.465	.025	1.969	B	TCF050204BP	TCF060203BC
5578325	TCF0703R5SLR075B	.703	.75	4.471	3.540	.025	1.969	B	TCF050204BP	TCF060203BC
5578326	TCF0719R5SLR075B	.719	.75	4.569	3.620	.026	1.969	B	TCF050204BP	TCF060203BC
5578327	TCF0734R5SLR075B	.734	.75	4.661	3.696	.026	1.969	B	TCF050204BP	TCF060203BC
5578420	TCF0750R5SLR100C	.750	1.00	4.760	3.777	.027	2.205	C	TCF070306CP	TCF070304CC
5578421	TCF0781R5SLR100C	.781	1.00	4.950	3.933	.028	2.205	C	TCF070306CP	TCF070304CC
5578422	TCF0813R5SLR100C	.813	1.00	5.146	4.094	.029	2.205	C	TCF070306CP	TCF070304CC
5578423	TCF0844R5SLR100C	.844	1.00	5.336	4.250	.030	2.205	C	TCF070306CP	TCF070304CC
5578424	TCF0875R5SLR100C	.875	1.00	5.526	4.406	.031	2.205	C	TCF070306CP	TCF070304CC
5578425	TCF0906R5SLR100C	.906	1.00	5.716	4.562	.032	2.205	C	TCF070306CP	TCF070304CC
5578426	TCF0938R5SLR100C	.938	1.00	5.911	4.722	.032	2.205	C	TCF070306CP	TCF070304CC
5537929	TCF0969R5SLR100D	.969	1.00	6.007	4.880	.035	2.205	D	TCF080308DP	TCF090305DC
5537930	TCF0984R5SLR100D	.984	1.00	6.098	4.956	.036	2.205	D	TCF080308DP	TCF090305DC
5537931	TCF1000R5SLR100D	1.000	1.00	6.194	5.036	.036	2.205	D	TCF080308DP	TCF090305DC
5537932	TCF1031R5SLR125D	1.031	1.25	6.420	5.192	.037	2.362	D	TCF080308DP	TCF090305DC
5537933	TCF1063R5SLR125D	1.063	1.25	6.613	5.353	.038	2.362	D	TCF080308DP	TCF090305DC
5537934	TCF1094R5SLR125D	1.094	1.25	6.800	5.509	.039	2.362	D	TCF080308DP	TCF090305DC
5537935	TCF1125R5SLR125D	1.125	1.25	6.987	5.665	.040	2.362	D	TCF080308DP	TCF090305DC
5537936	TCF1156R5SLR125D	1.156	1.25	7.174	5.821	.041	2.362	D	TCF080308DP	TCF090305DC
5538092	TCF1188R5SLR125E	1.188	1.25	7.249	5.983	.043	2.362	E	TCF100408EP	TCF120405EC
5538093	TCF1210R5SLR125E	1.210	1.25	7.380	6.094	.044	2.362	E	TCF100408EP	TCF120405EC
5538094	TCF1219R5SLR125E	1.219	1.25	7.433	6.139	.044	2.362	E	TCF100408EP	TCF120405EC
5538095	TCF1250R5SLR125E	1.250	1.25	7.617	6.295	.045	2.362	E	TCF100408EP	TCF120405EC
5538096	TCF1280R5SLR125E	1.281	1.25	7.801	6.451	.046	2.362	E	TCF100408EP	TCF120405EC
5538097	TCF1313R5SLR125E	1.313	1.25	7.991	6.612	.047	2.362	E	TCF100408EP	TCF120405EC
5538098	TCF1375R5SLR125E	1.375	1.25	8.358	6.924	.049	2.362	E	TCF100408EP	TCF120405EC
5538099	TCF1406R5SLR150E	1.406	1.50	8.582	7.080	.050	2.756	E	TCF100408EP	TCF120405EC
5538100	TCF1438R5SLR150E	1.438	1.50	8.771	7.240	.050	2.756	E	TCF100408EP	TCF120405EC
5578685	TCF1469R5SLR150F	1.469	1.50	8.957	7.398	.054	2.756	F	TCF120412FP	TCF150406FC
5578686	TCF1500R5SLR150F	1.500	1.50	9.141	7.554	.055	2.756	F	TCF120412FP	TCF150406FC
5578687	TCF1531R5SLR150F	1.531	1.50	9.325	7.711	.056	2.756	F	TCF120412FP	TCF150406FC
5578688	TCF1563R5SLR150F	1.563	1.50	9.515	7.872	.057	2.756	F	TCF120412FP	TCF150406FC
5578689	TCF1625R5SLR150F	1.625	1.50	9.882	8.183	.058	2.756	F	TCF120412FP	TCF150406FC
5578690	TCF1656R5SLR150F	1.656	1.50	10.066	8.339	.059	2.756	F	TCF120412FP	TCF150406FC
5578691	TCF1688R5SLR150F	1.688	1.50	10.256	8.500	.060	2.756	F	TCF120412FP	TCF150406FC
5578693	TCF1750R5SLR150F	1.750	1.50	10.623	8.812	.062	2.756	F	TCF120412FP	TCF150406FC
5578803	TCF1813R5SLR150G	1.813	1.50	10.818	9.131	.066	2.756	G	TCF150512GP	TCF180508GC
5578804	TCF1875R5SLR150G	1.875	1.50	11.179	9.443	.068	2.756	G	TCF150512GP	TCF180508GC
5578805	TCF1938R5SLR150G	1.938	1.50	11.546	9.759	.069	2.756	G	TCF150512GP	TCF180508GC
5578806	TCF2000R5SLR150G	2.000	1.50	11.907	10.071	.071	2.756	G	TCF150512GP	TCF180508GC
5578807	TCF2125R5SLR150G	2.125	1.50	12.636	10.699	.075	2.756	G	TCF150512GP	TCF180508GC
5578808	TCF2219R5SLR150G	2.219	1.50	13.184	11.172	.077	2.756	G	TCF150512GP	TCF180508GC
5538509	TCF2250R5SLR150H	2.250	1.50	13.142	11.331	.081	2.756	H	TCF180614HP	TCF210608HC
5538510	TCF2375R5SLR150H	2.375	1.50	13.859	11.960	.085	2.756	H	TCF180614HP	TCF210608HC
5538511	TCF2500R5SLR150H	2.500	1.50	14.574	12.588	.088	2.756	H	TCF180614HP	TCF210608HC

D	LS mm	LS in
.75	50	1.9685
1.00	56	2.2047
1.25	60	2.3622
1.50	70	2.7559

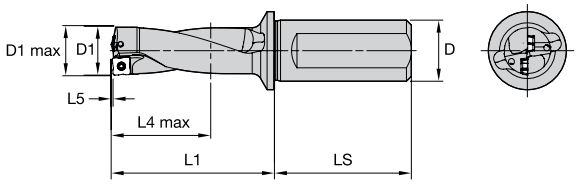
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.
Drill shipped with insert screws and Torx wrench.
See pages C103–C112 for inserts.
SSC = Pocket Seat Reference.
SLR = Side Lock.
D1 max is an achievable diameter using x-offset.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece.
When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force.
Provide adequate shielding to protect bystanders.

Top Cut 4 • 2 x D • SLR Shanks • Metric



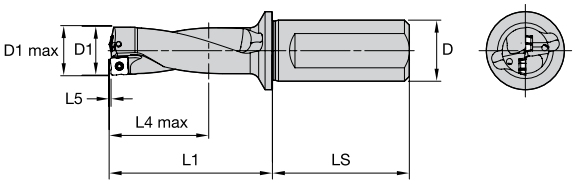


order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537778	TCF120R2SLR20MA	12,00	12,50	20	43,4	24,4	0,43	50,00	A	TCF040204AP	TCF040203AC
5537779	TCF125R2SLR20MA	12,50	13,00	20	44,5	25,5	0,45	50,00	A	TCF040204AP	TCF040203AC
5537860	TCF127R2SLR20MA	12,70	13,20	20	45,9	25,9	0,46	50,00	A	TCF040204AP	TCF040203AC
5537861	TCF130R2SLR20MA	13,00	13,50	20	46,5	26,5	0,47	50,00	A	TCF040204AP	TCF040203AC
5537862	TCF135R2SLR20MA	13,50	14,00	20	48,5	27,5	0,48	50,00	A	TCF040204AP	TCF040203AC
5577828	TCF140R2SLR25MB	14,00	14,50	25	48,5	28,5	0,49	56,00	B	TCF050204BP	TCF060203BC
5577829	TCF145R2SLR25MB	14,50	15,00	25	49,5	29,5	0,52	56,00	B	TCF050204BP	TCF060203BC
5577920	TCF150R2SLR25MB	15,00	15,50	25	51,5	30,5	0,55	56,00	B	TCF050204BP	TCF060203BC
5577921	TCF155R2SLR25MB	15,50	16,00	25	53,6	31,6	0,56	56,00	B	TCF050204BP	TCF060203BC
5577922	TCF160R2SLR25MB	16,00	16,50	25	54,6	32,6	0,58	56,00	B	TCF050204BP	TCF060203BC
5577923	TCF165R2SLR25MB	16,50	17,00	25	56,6	33,6	0,60	56,00	B	TCF050204BP	TCF060203BC
5577924	TCF170R2SLR25MB	17,00	17,50	25	57,6	34,6	0,61	56,00	B	TCF050204BP	TCF060203BC
5577925	TCF175R2SLR25MB	17,50	18,00	25	59,6	35,6	0,63	56,00	B	TCF050204BP	TCF060203BC
5577926	TCF180R2SLR25MB	18,00	18,50	25	60,6	36,6	0,64	56,00	B	TCF050204BP	TCF060203BC
5577927	TCF185R2SLR25MB	18,50	19,00	25	62,7	37,7	0,65	56,00	B	TCF050204BP	TCF060203BC
5578820	TCF190R2SLR25MC	19,00	19,50	25	63,7	38,7	0,68	56,00	C	TCF070306CP	TCF070304CC
5578821	TCF195R2SLR25MC	19,50	20,00	25	65,7	39,7	0,71	56,00	C	TCF070306CP	TCF070304CC
5578822	TCF200R2SLR25MC	20,00	20,50	25	66,7	40,7	0,72	56,00	C	TCF070306CP	TCF070304CC
5578823	TCF205R2SLR25MC	20,50	21,00	25	68,7	41,7	0,74	56,00	C	TCF070306CP	TCF070304CC
5578824	TCF210R2SLR25MC	21,00	21,50	25	70,8	42,8	0,75	56,00	C	TCF070306CP	TCF070304CC
5578825	TCF220R2SLR25MC	22,00	22,50	25	73,8	44,8	0,78	56,00	C	TCF070306CP	TCF070304CC
5578826	TCF225R2SLR25MC	22,50	23,00	25	74,8	45,8	0,79	56,00	C	TCF070306CP	TCF070304CC
5578827	TCF230R2SLR25MC	23,00	23,50	25	76,8	46,8	0,80	56,00	C	TCF070306CP	TCF070304CC
5537167	TCF240R2SLR25MD	24,00	25,00	25	76,9	48,9	0,87	56,00	D	TCF080308DP	TCF090305DC
5537168	TCF250R2SLR32MD	25,00	26,00	32	80,9	50,9	0,91	60,00	D	TCF080308DP	TCF090305DC
5537169	TCF260R2SLR32MD	26,00	27,00	32	83,9	52,9	0,94	60,00	D	TCF080308DP	TCF090305DC
5537820	TCF265R2SLR32MD	26,50	27,50	32	86,0	54,0	0,95	60,00	D	TCF080308DP	TCF090305DC
5537821	TCF270R2SLR32MD	27,00	28,00	32	87,0	55,0	0,97	60,00	D	TCF080308DP	TCF090305DC
5537822	TCF280R2SLR32MD	28,00	29,00	32	90,0	57,0	0,99	60,00	D	TCF080308DP	TCF090305DC
5537823	TCF290R2SLR32MD	29,00	30,00	32	93,0	59,0	1,02	60,00	D	TCF080308DP	TCF090305DC
5537937	TCF300R2SLR32ME	30,00	31,00	32	93,1	61,1	1,09	60,00	E	TCF100408EP	TCF120405EC
5537938	TCF310R2SLR32ME	31,00	32,00	32	96,1	63,1	1,12	60,00	E	TCF100408EP	TCF120405EC
5537939	TCF320R2SLR32ME	32,00	33,00	32	99,2	65,2	1,15	60,00	E	TCF100408EP	TCF120405EC
5537940	TCF330R2SLR40ME	33,00	34,00	40	103,2	67,2	1,18	70,00	E	TCF100408EP	TCF120405EC
5537941	TCF340R2SLR40ME	34,00	35,00	40	106,2	69,2	1,21	70,00	E	TCF100408EP	TCF120405EC
5537942	TCF350R2SLR40ME	35,00	36,00	40	109,2	71,2	1,24	70,00	E	TCF100408EP	TCF120405EC
5537943	TCF360R2SLR40ME	36,00	37,00	40	112,3	73,3	1,27	70,00	E	TCF100408EP	TCF120405EC
5578539	TCF370R2SLR40MF	37,00	38,00	40	115,3	75,3	1,35	70,00	F	TCF120412FP	TCF150406FC
5578600	TCF375R2SLR40MF	37,50	38,50	40	116,4	76,4	1,36	70,00	F	TCF120412FP	TCF150406FC
5578601	TCF380R2SLR40MF	38,00	39,00	40	118,4	77,4	1,38	70,00	F	TCF120412FP	TCF150406FC
5578602	TCF390R2SLR40MF	39,00	40,00	40	121,4	79,4	1,41	70,00	F	TCF120412FP	TCF150406FC
5578603	TCF400R2SLR40MF	40,00	41,00	40	123,4	81,4	1,45	70,00	F	TCF120412FP	TCF150406FC
5578604	TCF410R2SLR40MF	41,00	42,00	40	126,5	83,5	1,48	70,00	F	TCF120412FP	TCF150406FC
5578605	TCF420R2SLR40MF	42,00	43,00	40	129,5	85,5	1,51	70,00	F	TCF120412FP	TCF150406FC
5578606	TCF430R2SLR40MF	43,00	44,00	40	132,5	87,5	1,53	70,00	F	TCF120412FP	TCF150406FC
5578607	TCF440R2SLR40MF	44,00	45,00	40	135,6	89,6	1,56	70,00	F	TCF120412FP	TCF150406FC
5578608	TCF450R2SLR40MF	45,00	46,00	40	138,6	91,6	1,59	70,00	F	TCF120412FP	TCF150406FC
5578694	TCF460R2SLR40MG	46,00	47,00	40	136,7	93,7	1,67	70,00	G	TCF150512GP	TCF180508GC
5578695	TCF470R2SLR40MG	47,00	48,00	40	139,7	95,7	1,70	70,00	G	TCF150512GP	TCF180508GC
5578696	TCF480R2SLR40MG	48,00	49,00	40	142,7	97,7	1,73	70,00	G	TCF150512GP	TCF180508GC
5578697	TCF490R2SLR40MG	49,00	50,00	40	145,8	99,8	1,76	70,00	G	TCF150512GP	TCF180508GC
5578698	TCF500R2SLR40MG	50,00	51,00	40	147,8	101,8	1,79	70,00	G	TCF150512GP	TCF180508GC
5578699	TCF505R2SLR40MG	50,50	51,50	40	149,8	102,8	1,80	70,00	G	TCF150512GP	TCF180508GC
5578710	TCF510R2SLR40MG	51,00	52,00	40	150,8	103,8	1,81	70,00	G	TCF150512GP	TCF180508GC
5578711	TCF520R2SLR40MG	52,00	53,00	40	153,8	105,8	1,84	70,00	G	TCF150512GP	TCF180508GC
5578712	TCF530R2SLR40MG	53,00	54,00	40	156,9	107,9	1,87	70,00	G	TCF150512GP	TCF180508GC
5578713	TCF540R2SLR40MG	54,00	55,00	40	159,9	109,9	1,89	70,00	G	TCF150512GP	TCF180508GC
5578714	TCF550R2SLR40MG	55,00	56,00	40	161,9	111,9	1,92	70,00	G	TCF150512GP	TCF180508GC
5578715	TCF560R2SLR40MG	56,00	57,00	40	164,9	113,9	1,94	70,00	G	TCF150512GP	TCF180508GC
5538613	TCF570R2SLR40MH	57,00	58,00	40	162,1	116,1	2,06	70,00	H	TCF180614HP	TCF210608HC
5538614	TCF580R2SLR40MH	58,00	59,00	40	165,1	118,1	2,09	70,00	H	TCF180614HP	TCF210608HC
5538615	TCF590R2SLR40MH	59,00	60,00	40	168,1	120,1	2,12	70,00	H	TCF180614HP	TCF210608HC
5538616	TCF600R2SLR40MH	60,00	61,00	40	170,1	122,1	2,15	70,00	H	TCF180614HP	TCF210608HC
5538617	TCF610R2SLR40MH	61,00	62,00	40	173,2	124,2	2,18	70,00	H	TCF180614HP	TCF210608HC

Top Cut 4 • 2 x D • SLR Shanks • Metric

(continued)





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5538618	**TCF620R2SLR40MH**	62,00	63,00	40	176,2	126,2	2,20	70,00	H	**TCF180614HP**	**TCF210608HC**
5538619	**TCF630R2SLR40MH**	63,00	64,00	40	179,2	128,2	2,23	70,00	H	**TCF180614HP**	**TCF210608HC**
5538630	**TCF640R2SLR40MH**	64,00	65,00	40	181,3	130,3	2,26	70,00	H	**TCF180614HP**	**TCF210608HC**
5538631	**TCF650R2SLR40MH**	65,00	66,00	40	184,3	132,3	2,28	70,00	H	**TCF180614HP**	**TCF210608HC**
5538632	**TCF660R2SLR40MH**	66,00	67,00	40	187,3	134,3	2,31	70,00	H	**TCF180614HP**	**TCF210608HC**
5538633	**TCF670R2SLR40MH**	67,00	68,00	40	189,3	136,3	2,33	70,00	H	**TCF180614HP**	**TCF210608HC**
5538634	**TCF680R2SLR40MH**	68,00	69,00	40	192,4	138,4	2,36	70,00	H	**TCF180614HP**	**TCF210608HC**

D	LS mm	LS in
.75	50	1.9685
1.00	56	2.2047
1.25	60	2.3622
1.50	70	2.7559

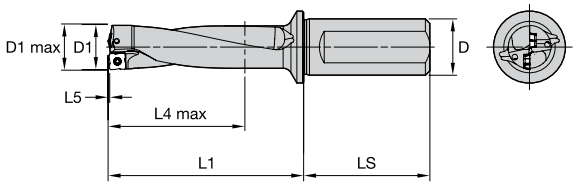
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.
Drill shipped with insert screws and Torx wrench.
See pages C103–C112 for inserts.
SSC = Pocket Seat Reference.
SLR = Side Lock.
D1 max is an achievable diameter using x-offset.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece.
When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force.
Provide adequate shielding to protect bystanders.

Top Cut 4 • 3 x D • SLR Shanks • Metric



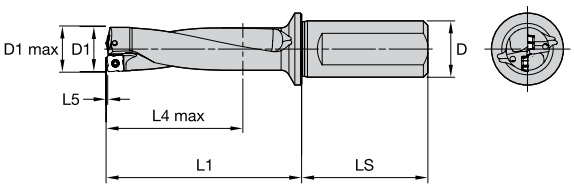


order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537863	TCF120R3SLR20MA	12,00	12,50	20	55,4	36,4	0,43	50,00	A	TCF040204AP	TCF040203AC
5537864	TCF125R3SLR20MA	12,50	13,00	20	57,0	38,0	0,45	50,00	A	TCF040204AP	TCF040203AC
5537866	TCF127R3SLR20MA	12,70	13,20	20	58,6	38,6	0,46	50,00	A	TCF040204AP	TCF040203AC
5537867	TCF130R3SLR20MA	13,00	13,50	20	59,5	39,5	0,47	50,00	A	TCF040204AP	TCF040203AC
5537868	TCF135R3SLR20MA	13,50	14,00	20	61,0	41,0	0,48	50,00	A	TCF040204AP	TCF040203AC
5577928	TCF140R3SLR25MB	14,00	14,50	25	62,5	42,5	0,49	56,00	B	TCF050204BP	TCF060203BC
5577929	TCF145R3SLR25MB	14,50	15,00	25	64,0	44,0	0,52	56,00	B	TCF050204BP	TCF060203BC
5577930	TCF150R3SLR25MB	15,00	15,50	25	66,5	45,5	0,55	56,00	B	TCF050204BP	TCF060203BC
5577931	TCF155R3SLR25MB	15,50	16,00	25	69,1	47,1	0,56	56,00	B	TCF050204BP	TCF060203BC
5577932	TCF160R3SLR25MB	16,00	16,50	25	70,6	48,6	0,58	56,00	B	TCF050204BP	TCF060203BC
5577933	TCF165R3SLR25MB	16,50	17,00	25	73,1	50,1	0,60	56,00	B	TCF050204BP	TCF060203BC
5577934	TCF170R3SLR25MB	17,00	17,50	25	74,6	51,6	0,61	56,00	B	TCF050204BP	TCF060203BC
5577935	TCF175R3SLR25MB	17,50	18,00	25	77,1	53,1	0,63	56,00	B	TCF050204BP	TCF060203BC
5577936	TCF180R3SLR25MB	18,00	18,50	25	78,6	54,6	0,64	56,00	B	TCF050204BP	TCF060203BC
5577937	TCF185R3SLR25MB	18,50	19,00	25	81,2	56,2	0,65	56,00	B	TCF050204BP	TCF060203BC
5578828	TCF190R3SLR25MC	19,00	19,50	25	82,7	57,7	0,68	56,00	C	TCF070306CP	TCF070304CC
5578829	TCF195R3SLR25MC	19,50	20,00	25	85,2	59,2	0,71	56,00	C	TCF070306CP	TCF070304CC
5578830	TCF200R3SLR25MC	20,00	20,50	25	86,7	60,7	0,72	56,00	C	TCF070306CP	TCF070304CC
5578831	TCF205R3SLR25MC	20,50	21,00	25	89,2	62,2	0,74	56,00	C	TCF070306CP	TCF070304CC
5578832	TCF210R3SLR25MC	21,00	21,50	25	91,8	63,8	0,75	56,00	C	TCF070306CP	TCF070304CC
5578833	TCF220R3SLR25MC	22,00	22,50	25	95,8	66,8	0,78	56,00	C	TCF070306CP	TCF070304CC
5578834	TCF225R3SLR25MC	22,50	23,00	25	97,3	68,3	0,79	56,00	C	TCF070306CP	TCF070304CC
5578835	TCF230R3SLR25MC	23,00	23,50	25	99,8	69,8	0,80	56,00	C	TCF070306CP	TCF070304CC
5537824	TCF240R3SLR25MD	24,00	25,00	25	100,9	72,9	0,87	56,00	D	TCF080308DP	TCF090305DC
5537825	TCF250R3SLR32MD	25,00	26,00	32	105,9	75,9	0,91	60,00	D	TCF080308DP	TCF090305DC
5537826	TCF260R3SLR32MD	26,00	27,00	32	109,9	78,9	0,94	60,00	D	TCF080308DP	TCF090305DC
5537827	TCF265R3SLR32MD	26,50	27,50	32	112,5	80,5	0,95	60,00	D	TCF080308DP	TCF090305DC
5537828	TCF270R3SLR32MD	27,00	28,00	32	114,0	82,0	0,97	60,00	D	TCF080308DP	TCF090305DC
5537829	TCF280R3SLR32MD	28,00	29,00	32	118,0	85,0	0,99	60,00	D	TCF080308DP	TCF090305DC
5537830	TCF290R3SLR32MD	29,00	30,00	32	122,0	88,0	1,02	60,00	D	TCF080308DP	TCF090305DC
5537944	TCF300R3SLR32ME	30,00	31,00	32	123,1	91,1	1,09	60,00	E	TCF100408EP	TCF120405EC
5537945	TCF310R3SLR32ME	31,00	32,00	32	127,1	94,1	1,12	60,00	E	TCF100408EP	TCF120405EC
5537946	TCF320R3SLR32ME	32,00	33,00	32	131,2	97,2	1,15	60,00	E	TCF100408EP	TCF120405EC
5537947	TCF330R3SLR40ME	33,00	34,00	40	136,2	100,2	1,18	70,00	E	TCF100408EP	TCF120405EC
5537948	TCF340R3SLR40ME	34,00	35,00	40	140,2	103,2	1,21	70,00	E	TCF100408EP	TCF120405EC
5537949	TCF350R3SLR40ME	35,00	36,00	40	144,2	106,2	1,24	70,00	E	TCF100408EP	TCF120405EC
5537950	TCF360R3SLR40ME	36,00	37,00	40	148,3	109,3	1,27	70,00	E	TCF100408EP	TCF120405EC
5578609	TCF370R3SLR40MF	37,00	38,00	40	152,3	112,3	1,35	70,00	F	TCF120412FP	TCF150406FC
5578610	TCF375R3SLR40MF	37,50	38,50	40	153,9	113,9	1,36	70,00	F	TCF120412FP	TCF150406FC
5578611	TCF380R3SLR40MF	38,00	39,00	40	156,4	115,4	1,38	70,00	F	TCF120412FP	TCF150406FC
5578612	TCF390R3SLR40MF	39,00	40,00	40	160,4	118,4	1,41	70,00	F	TCF120412FP	TCF150406FC
5578613	TCF400R3SLR40MF	40,00	41,00	40	163,4	121,4	1,45	70,00	F	TCF120412FP	TCF150406FC
5578614	TCF410R3SLR40MF	41,00	42,00	40	167,5	124,5	1,48	70,00	F	TCF120412FP	TCF150406FC
5578615	TCF420R3SLR40MF	42,00	43,00	40	171,5	127,5	1,51	70,00	F	TCF120412FP	TCF150406FC
5578616	TCF430R3SLR40MF	43,00	44,00	40	175,5	130,5	1,53	70,00	F	TCF120412FP	TCF150406FC
5578617	TCF440R3SLR40MF	44,00	45,00	40	179,6	133,6	1,56	70,00	F	TCF120412FP	TCF150406FC
5578618	TCF450R3SLR40MF	45,00	46,00	40	183,6	136,6	1,59	70,00	F	TCF120412FP	TCF150406FC
5578716	TCF460R3SLR40MG	46,00	47,00	40	182,7	139,7	1,67	70,00	G	TCF150512GP	TCF180508GC
5578717	TCF470R3SLR40MG	47,00	48,00	40	186,7	142,7	1,70	70,00	G	TCF150512GP	TCF180508GC
5578718	TCF480R3SLR40MG	48,00	49,00	40	190,7	145,7	1,73	70,00	G	TCF150512GP	TCF180508GC
5578719	TCF490R3SLR40MG	49,00	50,00	40	194,8	148,8	1,76	70,00	G	TCF150512GP	TCF180508GC
5578720	TCF500R3SLR40MG	50,00	51,00	40	197,8	151,8	1,79	70,00	G	TCF150512GP	TCF180508GC
5578721	TCF505R3SLR40MG	50,50	51,50	40	200,3	153,3	1,80	70,00	G	TCF150512GP	TCF180508GC
5578722	TCF510R3SLR40MG	51,00	52,00	40	201,8	154,8	1,81	70,00	G	TCF150512GP	TCF180508GC
5578723	TCF520R3SLR40MG	52,00	53,00	40	205,8	157,8	1,84	70,00	G	TCF150512GP	TCF180508GC
5578724	TCF530R3SLR40MG	53,00	54,00	40	209,9	160,9	1,87	70,00	G	TCF150512GP	TCF180508GC
5578726	TCF540R3SLR40MG	54,00	55,00	40	213,9	163,9	1,89	70,00	G	TCF150512GP	TCF180508GC
5578727	TCF550R3SLR40MG	55,00	56,00	40	216,9	166,9	1,92	70,00	G	TCF150512GP	TCF180508GC
5578728	TCF560R3SLR40MG	56,00	57,00	40	220,9	169,9	1,94	70,00	G	TCF150512GP	TCF180508GC
5538635	TCF570R3SLR40MH	57,00	58,00	40	219,1	173,1	2,06	70,00	H	TCF180614HP	TCF210608HC
5538636	TCF580R3SLR40MH	58,00	59,00	40	223,1	176,1	2,09	70,00	H	TCF180614HP	TCF210608HC
5538637	TCF590R3SLR40MH	59,00	60,00	40	227,1	179,1	2,12	70,00	H	TCF180614HP	TCF210608HC
5538638	TCF600R3SLR40MH	60,00	61,00	40	230,1	182,1	2,15	70,00	H	TCF180614HP	TCF210608HC
5538639	TCF610R3SLR40MH	61,00	62,00	40	234,2	185,2	2,18	70,00	H	TCF180614HP	TCF210608HC

Top Cut 4 • 3 x D • SLR Shanks • Metric

(continued)





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5538640	**TCF620R3SLR40MH**	62,00	63,00	40	238,2	188,2	2,20	70,00	H	**TCF180614HP**	**TCF210608HC**
5538641	**TCF630R3SLR40MH**	63,00	64,00	40	242,2	191,2	2,23	70,00	H	**TCF180614HP**	**TCF210608HC**
5538642	**TCF640R3SLR40MH**	64,00	65,00	40	245,3	194,3	2,26	70,00	H	**TCF180614HP**	**TCF210608HC**
5538643	**TCF650R3SLR40MH**	65,00	66,00	40	249,3	197,3	2,28	70,00	H	**TCF180614HP**	**TCF210608HC**
5538644	**TCF660R3SLR40MH**	66,00	67,00	40	253,3	200,3	2,31	70,00	H	**TCF180614HP**	**TCF210608HC**
5538645	**TCF670R3SLR40MH**	67,00	68,00	40	256,3	203,3	2,33	70,00	H	**TCF180614HP**	**TCF210608HC**
5538646	**TCF680R3SLR40MH**	68,00	69,00	40	260,4	206,4	2,36	70,00	H	**TCF180614HP**	**TCF210608HC**

D	LS mm	LS in
.75	50	1.9685
1.00	56	2.2047
1.25	60	2.3622
1.50	70	2.7559

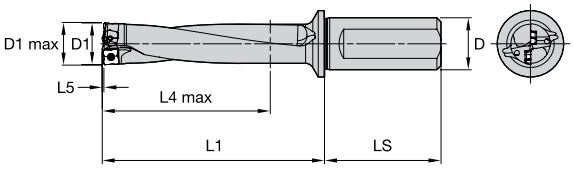
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.
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See pages C103–C112 for inserts.
SSC = Pocket Seat Reference.
SLR = Side Lock.
D1 max is an achievable diameter using x-offset.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece.
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Top Cut 4 • 4 x D • SLR Shanks • Metric



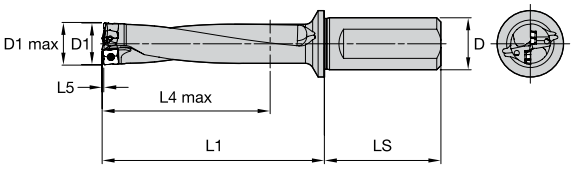


order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537869	TCF120R4SLR20MA	12,00	12,50	20	67,4	48,4	0,43	50,00	A	TCF040204AP	TCF040203AC
5537870	TCF125R4SLR20MA	12,50	13,00	20	69,5	50,5	0,45	50,00	A	TCF040204AP	TCF040203AC
5537871	TCF127R4SLR20MA	12,70	13,20	20	71,3	51,3	0,46	50,00	A	TCF040204AP	TCF040203AC
5537872	TCF130R4SLR20MA	13,00	13,50	20	72,5	52,5	0,47	50,00	A	TCF040204AP	TCF040203AC
5537873	TCF135R4SLR20MA	13,50	14,00	20	75,5	54,5	0,48	50,00	A	TCF040204AP	TCF040203AC
5577938	TCF140R4SLR25MB	14,00	14,50	25	76,5	56,5	0,49	56,00	B	TCF050204BP	TCF060203BC
5577939	TCF145R4SLR25MB	14,50	15,00	25	78,5	58,5	0,52	56,00	B	TCF050204BP	TCF060203BC
5577940	TCF150R4SLR25MB	15,00	15,50	25	81,5	60,5	0,55	56,00	B	TCF050204BP	TCF060203BC
5577941	TCF155R4SLR25MB	15,50	16,00	25	84,6	62,6	0,56	56,00	B	TCF050204BP	TCF060203BC
5577942	TCF160R4SLR25MB	16,00	16,50	25	86,6	64,6	0,58	56,00	B	TCF050204BP	TCF060203BC
5577943	TCF165R4SLR25MB	16,50	17,00	25	89,6	66,6	0,60	56,00	B	TCF050204BP	TCF060203BC
5577944	TCF170R4SLR25MB	17,00	17,50	25	91,6	68,6	0,61	56,00	B	TCF050204BP	TCF060203BC
5577945	TCF175R4SLR25MB	17,50	18,00	25	94,6	70,6	0,63	56,00	B	TCF050204BP	TCF060203BC
5577946	TCF180R4SLR25MB	18,00	18,50	25	96,6	72,6	0,64	56,00	B	TCF050204BP	TCF060203BC
5577947	TCF185R4SLR25MB	18,50	19,00	25	99,7	74,7	0,65	56,00	B	TCF050204BP	TCF060203BC
5578836	TCF190R4SLR25MC	19,00	19,50	25	101,7	76,7	0,68	56,00	C	TCF070306CP	TCF070304CC
5578837	TCF195R4SLR25MC	19,50	20,00	25	104,7	78,7	0,71	56,00	C	TCF070306CP	TCF070304CC
5578838	TCF200R4SLR25MC	20,00	20,50	25	106,7	80,7	0,72	56,00	C	TCF070306CP	TCF070304CC
5578839	TCF205R4SLR25MC	20,50	21,00	25	109,7	82,7	0,74	56,00	C	TCF070306CP	TCF070304CC
5578840	TCF210R4SLR25MC	21,00	21,50	25	112,8	84,8	0,75	56,00	C	TCF070306CP	TCF070304CC
5578841	TCF220R4SLR25MC	22,00	22,50	25	117,8	88,8	0,78	56,00	C	TCF070306CP	TCF070304CC
5578842	TCF225R4SLR25MC	22,50	23,00	25	119,8	90,8	0,79	56,00	C	TCF070306CP	TCF070304CC
5578843	TCF230R4SLR25MC	23,00	23,50	25	122,8	92,8	0,80	56,00	C	TCF070306CP	TCF070304CC
5537831	TCF240R4SLR25MD	24,00	25,00	25	124,9	96,9	0,87	56,00	D	TCF080308DP	TCF090305DC
5537832	TCF250R4SLR32MD	25,00	26,00	32	130,9	100,9	0,91	60,00	D	TCF080308DP	TCF090305DC
5537833	TCF260R4SLR32MD	26,00	27,00	32	135,9	104,9	0,94	60,00	D	TCF080308DP	TCF090305DC
5537834	TCF265R4SLR32MD	26,50	27,50	32	139,0	107,0	0,95	60,00	D	TCF080308DP	TCF090305DC
5537835	TCF270R4SLR32MD	27,00	28,00	32	141,0	109,0	0,97	60,00	D	TCF080308DP	TCF090305DC
5537836	TCF280R4SLR32MD	28,00	29,00	32	146,0	113,0	0,99	60,00	D	TCF080308DP	TCF090305DC
5537837	TCF290R4SLR32MD	29,00	30,00	32	151,0	117,0	1,02	60,00	D	TCF080308DP	TCF090305DC
5537951	TCF300R4SLR32ME	30,00	31,00	32	153,1	121,1	1,09	60,00	E	TCF100408EP	TCF120405EC
5537952	TCF310R4SLR32ME	31,00	32,00	32	158,1	125,1	1,12	60,00	E	TCF100408EP	TCF120405EC
5537953	TCF320R4SLR32ME	32,00	33,00	32	163,2	129,2	1,15	60,00	E	TCF100408EP	TCF120405EC
5537954	TCF330R4SLR40ME	33,00	34,00	40	165,2	133,2	1,18	70,00	E	TCF100408EP	TCF120405EC
5537955	TCF340R4SLR40ME	34,00	35,00	40	174,2	137,2	1,21	70,00	E	TCF100408EP	TCF120405EC
5537956	TCF350R4SLR40ME	35,00	36,00	40	179,2	141,2	1,24	70,00	E	TCF100408EP	TCF120405EC
5537957	TCF360R4SLR40ME	36,00	37,00	40	184,3	145,3	1,27	70,00	E	TCF100408EP	TCF120405EC
5578619	TCF370R4SLR40MF	37,00	38,00	40	189,3	149,3	1,35	70,00	F	TCF120412FP	TCF150406FC
5578620	TCF375R4SLR40MF	37,50	38,50	40	191,4	151,4	1,36	70,00	F	TCF120412FP	TCF150406FC
5578621	TCF380R4SLR40MF	38,00	39,00	40	194,4	153,4	1,38	70,00	F	TCF120412FP	TCF150406FC
5578622	TCF390R4SLR40MF	39,00	40,00	40	199,4	157,4	1,41	70,00	F	TCF120412FP	TCF150406FC
5578623	TCF400R4SLR40MF	40,00	41,00	40	203,4	161,4	1,45	70,00	F	TCF120412FP	TCF150406FC
5578624	TCF410R4SLR40MF	41,00	42,00	40	208,5	165,5	1,48	70,00	F	TCF120412FP	TCF150406FC
5578625	TCF420R4SLR40MF	42,00	43,00	40	213,5	169,5	1,51	70,00	F	TCF120412FP	TCF150406FC
5578626	TCF430R4SLR40MF	43,00	44,00	40	218,5	173,5	1,53	70,00	F	TCF120412FP	TCF150406FC
5578627	TCF440R4SLR40MF	44,00	45,00	40	223,6	177,6	1,56	70,00	F	TCF120412FP	TCF150406FC
5578628	TCF450R4SLR40MF	45,00	46,00	40	228,6	181,6	1,59	70,00	F	TCF120412FP	TCF150406FC
5578729	TCF460R4SLR40MG	46,00	47,00	40	228,7	185,7	1,67	70,00	G	TCF150512GP	TCF180508GC
5578730	TCF470R4SLR40MG	47,00	48,00	40	233,7	189,7	1,70	70,00	G	TCF150512GP	TCF180508GC
5578731	TCF480R4SLR40MG	48,00	49,00	40	238,7	193,7	1,73	70,00	G	TCF150512GP	TCF180508GC
5578732	TCF490R4SLR40MG	49,00	50,00	40	243,8	197,8	1,76	70,00	G	TCF150512GP	TCF180508GC
5578733	TCF500R4SLR40MG	50,00	51,00	40	247,8	201,8	1,79	70,00	G	TCF150512GP	TCF180508GC
5578734	TCF505R4SLR40MG	50,50	51,50	40	250,8	203,8	1,80	70,00	G	TCF150512GP	TCF180508GC
5578735	TCF510R4SLR40MG	51,00	52,00	40	252,8	205,8	1,81	70,00	G	TCF150512GP	TCF180508GC
5578736	TCF520R4SLR40MG	52,00	53,00	40	257,8	209,8	1,84	70,00	G	TCF150512GP	TCF180508GC
5578737	TCF530R4SLR40MG	53,00	54,00	40	262,9	213,9	1,87	70,00	G	TCF150512GP	TCF180508GC
5578738	TCF540R4SLR40MG	54,00	55,00	40	267,9	217,9	1,89	70,00	G	TCF150512GP	TCF180508GC
5578739	TCF550R4SLR40MG	55,00	56,00	40	271,9	221,9	1,92	70,00	G	TCF150512GP	TCF180508GC
5578750	TCF560R4SLR40MG	56,00	57,00	40	276,9	225,9	1,94	70,00	G	TCF150512GP	TCF180508GC
5538647	TCF570R4SLR40MH	57,00	58,00	40	276,1	230,1	2,06	70,00	H	TCF180614HP	TCF210608HC
5538648	TCF580R4SLR40MH	58,00	59,00	40	281,1	234,1	2,09	70,00	H	TCF180614HP	TCF210608HC
5538649	TCF590R4SLR40MH	59,00	60,00	40	286,1	238,1	2,12	70,00	H	TCF180614HP	TCF210608HC
5538650	TCF600R4SLR40MH	60,00	61,00	40	290,1	242,1	2,15	70,00	H	TCF180614HP	TCF210608HC
5538651	TCF610R4SLR40MH	61,00	62,00	40	295,2	246,2	2,18	70,00	H	TCF180614HP	TCF210608HC

Top Cut 4 • 4 x D • SLR Shanks • Metric

(continued)





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5538652	**TCF620R4SLR40MH**	62,00	63,00	40	300,2	250,2	2,20	70,00	H	**TCF180614HP**	**TCF210608HC**
5538653	**TCF630R4SLR40MH**	63,00	64,00	40	305,2	254,2	2,23	70,00	H	**TCF180614HP**	**TCF210608HC**
5538654	**TCF640R4SLR40MH**	64,00	65,00	40	309,3	258,3	2,26	70,00	H	**TCF180614HP**	**TCF210608HC**
5538655	**TCF650R4SLR40MH**	65,00	66,00	40	314,3	262,3	2,28	70,00	H	**TCF180614HP**	**TCF210608HC**
5538656	**TCF660R4SLR40MH**	66,00	67,00	40	319,3	266,3	2,31	70,00	H	**TCF180614HP**	**TCF210608HC**
5538657	**TCF670R4SLR40MH**	67,00	68,00	40	323,3	270,3	2,33	70,00	H	**TCF180614HP**	**TCF210608HC**
5538658	**TCF680R4SLR40MH**	68,00	69,00	40	328,4	274,4	2,36	70,00	H	**TCF180614HP**	**TCF210608HC**

D	LS mm	LS in
.75	50	1.9685
1.00	56	2.2047
1.25	60	2.3622
1.50	70	2.7559

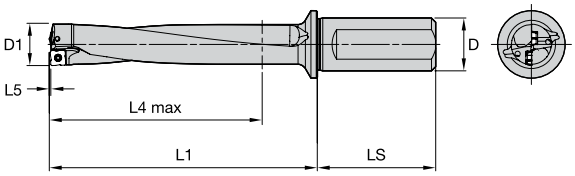
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.
Drill shipped with insert screws and Torx wrench.
See pages C103–C112 for inserts.
SSC = Pocket Seat Reference.
SLR = Side Lock.
D1 max is an achievable diameter using x-offset.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece.
When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force.
Provide adequate shielding to protect bystanders.

Top Cut 4 • 5 x D • SLR Shank • Metric



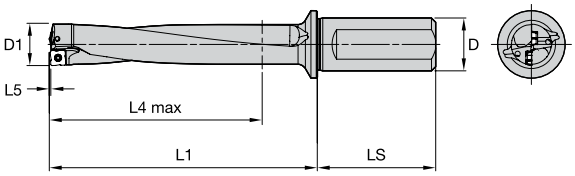


order number	catalog number	D1	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537874	TCF120R5SLR20MA	12,00	20	79,4	60,4	0,43	50,00	A	TCF040204AP	TCF040203AC
5537875	TCF125R5SLR20MA	12,50	20	82,0	63,0	0,45	50,00	A	TCF040204AP	TCF040203AC
5537876	TCF127R5SLR20MA	12,70	20	84,0	64,0	0,46	50,00	A	TCF040204AP	TCF040203AC
5537877	TCF130R5SLR20MA	13,00	20	85,5	65,5	0,47	50,00	A	TCF040204AP	TCF040203AC
5537878	TCF135R5SLR20MA	13,50	20	89,0	68,0	0,48	50,00	A	TCF040204AP	TCF040203AC
5577948	TCF140R5SLR25MB	14,00	25	90,5	70,5	0,49	56,00	B	TCF050204BP	TCF060203BC
5577949	TCF145R5SLR25MB	14,50	25	93,0	73,0	0,52	56,00	B	TCF050204BP	TCF060203BC
5577950	TCF150R5SLR25MB	15,00	25	96,5	75,5	0,55	56,00	B	TCF050204BP	TCF060203BC
5577951	TCF155R5SLR25MB	15,50	25	100,1	78,1	0,56	56,00	B	TCF050204BP	TCF060203BC
5577952	TCF160R5SLR25MB	16,00	25	102,6	80,6	0,58	56,00	B	TCF050204BP	TCF060203BC
5577953	TCF165R5SLR25MB	16,50	25	106,1	83,1	0,60	56,00	B	TCF050204BP	TCF060203BC
5577954	TCF170R5SLR25MB	17,00	25	108,6	85,6	0,61	56,00	B	TCF050204BP	TCF060203BC
5577955	TCF175R5SLR25MB	17,50	25	112,1	88,1	0,63	56,00	B	TCF050204BP	TCF060203BC
5577956	TCF180R5SLR25MB	18,00	25	114,6	90,6	0,64	56,00	B	TCF050204BP	TCF060203BC
5577957	TCF185R5SLR25MB	18,50	25	118,2	93,2	0,65	56,00	B	TCF050204BP	TCF060203BC
5578844	TCF190R5SLR25MC	19,00	25	120,7	95,7	0,68	56,00	C	TCF070306CP	TCF070304CC
5578845	TCF195R5SLR25MC	19,50	25	124,2	98,2	0,71	56,00	C	TCF070306CP	TCF070304CC
5578846	TCF200R5SLR25MC	20,00	25	126,7	100,7	0,72	56,00	C	TCF070306CP	TCF070304CC
5578847	TCF205R5SLR25MC	20,50	25	130,2	103,2	0,74	56,00	C	TCF070306CP	TCF070304CC
5578848	TCF210R5SLR25MC	21,00	25	133,8	105,8	0,75	56,00	C	TCF070306CP	TCF070304CC
5578849	TCF220R5SLR25MC	22,00	25	139,8	110,8	0,78	56,00	C	TCF070306CP	TCF070304CC
5578850	TCF225R5SLR25MC	22,50	25	142,3	113,3	0,79	56,00	C	TCF070306CP	TCF070304CC
5578851	TCF230R5SLR25MC	23,00	25	145,8	115,8	0,80	56,00	C	TCF070306CP	TCF070304CC
5537838	TCF240R5SLR25MD	24,00	25	148,9	120,9	0,87	56,00	D	TCF080308DP	TCF090305DC
5537839	TCF250R5SLR32MD	25,00	32	155,9	125,9	0,91	60,00	D	TCF080308DP	TCF090305DC
5537840	TCF260R5SLR32MD	26,00	32	161,9	130,9	0,94	60,00	D	TCF080308DP	TCF090305DC
5537841	TCF265R5SLR32MD	26,50	32	165,5	133,5	0,95	60,00	D	TCF080308DP	TCF090305DC
5537842	TCF270R5SLR32MD	27,00	32	168,0	136,0	0,97	60,00	D	TCF080308DP	TCF090305DC
5537843	TCF280R5SLR32MD	28,00	32	174,0	141,0	0,99	60,00	D	TCF080308DP	TCF090305DC
5537844	TCF290R5SLR32MD	29,00	32	180,0	146,0	1,02	60,00	D	TCF080308DP	TCF090305DC
5537958	TCF300R5SLR32ME	30,00	32	183,1	151,1	1,09	60,00	E	TCF100408EP	TCF120405EC
5537959	TCF310R5SLR32ME	31,00	32	189,1	156,1	1,12	60,00	E	TCF100408EP	TCF120405EC
5537960	TCF320R5SLR32ME	32,00	32	195,2	161,2	1,15	60,00	E	TCF100408EP	TCF120405EC
5537961	TCF330R5SLR40ME	33,00	40	202,2	166,2	1,18	70,00	E	TCF100408EP	TCF120405EC
5537962	TCF340R5SLR40ME	34,00	40	208,2	171,2	1,21	70,00	E	TCF100408EP	TCF120405EC
5537963	TCF350R5SLR40ME	35,00	40	214,2	176,2	1,24	70,00	E	TCF100408EP	TCF120405EC
5537964	TCF360R5SLR40ME	36,00	40	220,3	181,3	1,27	70,00	E	TCF100408EP	TCF120405EC
5578629	TCF370R5SLR40MF	37,00	40	226,3	186,3	1,35	70,00	F	TCF120412FP	TCF150406FC
5578640	TCF375R5SLR40MF	37,50	40	228,9	188,9	1,36	70,00	F	TCF120412FP	TCF150406FC
5578641	TCF380R5SLR40MF	38,00	40	232,4	191,4	1,38	70,00	F	TCF120412FP	TCF150406FC
5578642	TCF390R5SLR40MF	39,00	40	238,4	196,4	1,41	70,00	F	TCF120412FP	TCF150406FC
5578643	TCF400R5SLR40MF	40,00	40	243,4	201,4	1,45	70,00	F	TCF120412FP	TCF150406FC
5578644	TCF410R5SLR40MF	41,00	40	249,5	206,5	1,48	70,00	F	TCF120412FP	TCF150406FC
5578645	TCF420R5SLR40MF	42,00	40	255,5	211,5	1,51	70,00	F	TCF120412FP	TCF150406FC
5578646	TCF430R5SLR40MF	43,00	40	261,5	216,5	1,53	70,00	F	TCF120412FP	TCF150406FC
5578647	TCF440R5SLR40MF	44,00	40	267,6	221,6	1,56	70,00	F	TCF120412FP	TCF150406FC
5578648	TCF450R5SLR40MF	45,00	40	273,6	226,6	1,59	70,00	F	TCF120412FP	TCF150406FC
5578751	TCF460R5SLR40MG	46,00	40	274,7	231,7	1,67	70,00	G	TCF150512GP	TCF180508GC
5578752	TCF470R5SLR40MG	47,00	40	280,7	236,7	1,70	70,00	G	TCF150512GP	TCF180508GC
5578753	TCF480R5SLR40MG	48,00	40	286,7	241,7	1,73	70,00	G	TCF150512GP	TCF180508GC
5578754	TCF490R5SLR40MG	49,00	40	292,8	246,8	1,76	70,00	G	TCF150512GP	TCF180508GC
5578755	TCF500R5SLR40MG	50,00	40	297,8	251,8	1,79	70,00	G	TCF150512GP	TCF180508GC
5578756	TCF505R5SLR40MG	50,50	40	301,3	254,3	1,80	70,00	G	TCF150512GP	TCF180508GC
5578757	TCF510R5SLR40MG	51,00	40	303,8	256,8	1,81	70,00	G	TCF150512GP	TCF180508GC
5578758	TCF520R5SLR40MG	52,00	40	309,8	261,8	1,84	70,00	G	TCF150512GP	TCF180508GC
5578759	TCF530R5SLR40MG	53,00	40	315,9	266,9	1,87	70,00	G	TCF150512GP	TCF180508GC
5578760	TCF540R5SLR40MG	54,00	40	321,9	271,9	1,89	70,00	G	TCF150512GP	TCF180508GC
5578761	TCF550R5SLR40MG	55,00	40	326,9	276,9	1,92	70,00	G	TCF150512GP	TCF180508GC
5578762	TCF560R5SLR40MG	56,00	40	332,9	281,9	1,94	70,00	G	TCF150512GP	TCF180508GC
5538659	TCF570R5SLR40MH	57,00	40	333,1	287,1	2,06	70,00	H	TCF180614HP	TCF210608HC
5538680	TCF580R5SLR40MH	58,00	40	339,1	292,1	2,09	70,00	H	TCF180614HP	TCF210608HC
5538681	TCF590R5SLR40MH	59,00	40	345,1	297,1	2,12	70,00	H	TCF180614HP	TCF210608HC
5538682	TCF600R5SLR40MH	60,00	40	350,1	302,1	2,15	70,00	H	TCF180614HP	TCF210608HC
5538683	TCF610R5SLR40MH	61,00	40	356,2	307,2	2,18	70,00	H	TCF180614HP	TCF210608HC

Top Cut 4 • 5 x D • SLR Shank • Metric

(continued)





order number	catalog number	D1	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5538684	**TCF620R5SLR40MH**	62,00	40	362,2	312,2	2,20	70,00	H	**TCF180614HP**	**TCF210608HC**
5538685	**TCF630R5SLR40MH**	63,00	40	368,2	317,2	2,23	70,00	H	**TCF180614HP**	**TCF210608HC**
5538686	**TCF640R5SLR40MH**	64,00	40	373,3	322,3	2,26	70,00	H	**TCF180614HP**	**TCF210608HC**
5538687	**TCF650R5SLR40MH**	65,00	40	379,3	327,3	2,28	70,00	H	**TCF180614HP**	**TCF210608HC**
5538688	**TCF660R5SLR40MH**	66,00	40	385,3	332,3	2,31	70,00	H	**TCF180614HP**	**TCF210608HC**
5538689	**TCF670R5SLR40MH**	67,00	40	390,3	337,3	2,33	70,00	H	**TCF180614HP**	**TCF210608HC**
5538700	**TCF680R5SLR40MH**	68,00	40	396,4	342,4	2,36	70,00	H	**TCF180614HP**	**TCF210608HC**

D	LS mm	LS in
.75	50	1.9685
1.00	56	2.2047
1.25	60	2.3622
1.50	70	2.7559

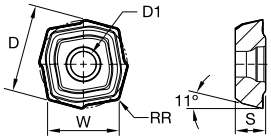
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.
Drill shipped with insert screws and Torx wrench.
See pages C103–C112 for inserts.
SSC = Pocket Seat Reference.
SLR = Side Lock.
D1 max is an achievable diameter using x-offset.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece.
When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force.
Provide adequate shielding to protect bystanders.

Top Cut 4 • Center Inserts • Roughing V34





● first choice
○ alternate choice

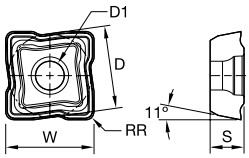
	P	M	K	N	S	H
WU25CH	○	○	○			
WU40PH	●	○	●			

catalog number	D mm	D in	D1 mm	D1 in	W mm	W in	S mm	S in	RR mm	RR in	SSC	WU25CH	WU40PH
TCF040203ACV34	4,47	.176	2,10	.083	3,65	.144	2,00	.079	0,300	.011	A	5541817	5541818
TCF060203BCV34	6,00	.236	2,40	.094	4,90	.193	2,40	.095	0,300	.011	B	5542602	5542604
TCF070304CCV34	7,59	.299	2,60	.102	6,20	.244	2,80	.110	0,400	.015	C	5542642	5542643
TCF090305DCV34	9,55	.376	2,80	.110	7,80	.307	3,00	.118	0,500	.019	D	5538554	5538555
TCF120405ECV34	12,00	.473	3,40	.134	9,80	.386	3,60	.142	0,500	.019	E	5538603	5538604
TCF150406FCV34	14,94	.588	4,80	.189	12,20	.480	4,20	.165	0,600	.023	F	5542623	5542624
TCF180508GCV34	17,88	.704	6,00	.236	14,60	.575	5,40	.213	0,800	.031	G	5542475	5542476
TCF210608HCV34	21,68	.853	7,50	.295	17,70	.697	6,50	.256	0,800	.031	H	5542002	5542003

NOTE: For application-specific insert selection, please refer to the application data on page C113.
SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Periphery Inserts • Roughing V34





● first choice
○ alternate choice

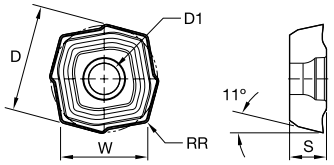
P	○	●	○	
M			○	○
K	○	●	○	
N				
S				
H				

	D		D1		W		S		RR					
catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	SSC	WPK10CH	WU25CH	WU40PH
TCF040204APV34	4,14	.163	2,10	.083	4,40	.173	2,00	.079	0,400	.015	A	5541843	5541841	5541842
TCF050204BPV34	5,07	.200	2,40	.094	5,40	.213	2,40	.094	0,400	.015	B	5542620	5542608	5542609
TCF070306CPV34	6,67	.263	2,60	.102	7,10	.280	2,80	.110	0,600	.023	C	5542648	5542646	5542647
TCF080308DPV34	8,08	.318	2,80	.110	8,60	.339	3,00	.118	0,800	.031	D	5538600	5538558	5538559
TCF100408EPV34	9,96	.392	3,40	.134	10,60	.417	3,60	.142	0,800	.031	E	5538610	5538608	5538609
TCF120412FPV34	12,59	.496	4,80	.189	13,40	.528	4,20	.165	1,200	.046	F	5542629	5542627	5542628
TCF150512GPV34	15,13	.596	6,00	.236	16,10	.634	5,40	.213	1,200	.046	G	5542601	5542479	5542600
TCF180614HPV34	18,04	.710	7,50	.295	19,20	.756	6,50	.256	1,400	.054	H	5542008	5542006	5542007

NOTE: For application-specific insert selection, please refer to the application data on page C113.
SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Center Inserts • Aluminum V36





● first choice
○ alternate choice

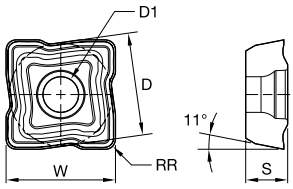
	P	M	K	N	S	H
WN10PH				●		

catalog number	D mm	D in	D1 mm	D1 in	W mm	W in	S mm	S in	RR mm	RR in	SSC	WN10PH
TCF040203ACV36	4,47	.176	2,10	.083	3,65	.144	2,00	.079	0,300	.011	A	6407887
TCF060203BCV36	6,00	.236	2,40	.094	4,90	.193	2,40	.095	0,300	.011	B	6372041
TCF070304CCV36	7,59	.299	2,60	.102	6,20	.244	2,80	.110	0,400	.015	C	6372042
TCF090305DCV36	9,55	.376	2,80	.110	7,80	.307	3,00	.118	0,500	.019	D	6372045
TCF120405ECV36	12,00	.473	3,40	.134	9,80	.386	3,60	.142	0,500	.019	E	6372047
TCF150406FCV36	14,94	.588	4,80	.189	12,20	.480	4,20	.165	0,600	.023	F	6346757
TCF180508GCV36	17,88	.704	6,00	.236	14,60	.575	5,40	.213	0,800	.031	G	6407890
TCF210608HCV36	21,68	.853	7,50	.295	17,70	.697	6,50	.256	0,800	.031	H	6372049

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Periphery Inserts • Aluminum V36





● first choice
○ alternate choice

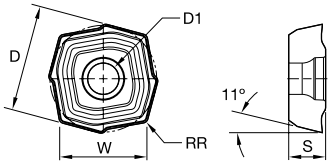
	P	M	K	N	S	H
WN10PH				●		

catalog number	D mm	D in	D1 mm	D1 in	W mm	W in	S mm	S in	RR mm	RR in	SSC	WN10PH
TCF040204APV36	4,14	.163	2,10	.083	4,40	.173	2,00	.079	0,400	.015	A	6407888
TCF050204BPV36	5,07	.200	2,40	.094	5,40	.213	2,40	.094	0,400	.015	B	6371850
TCF070306CPV36	6,67	.263	2,60	.102	7,10	.280	2,80	.110	0,600	.023	C	6372043
TCF080308DPV36	8,08	.318	2,80	.110	8,60	.339	3,00	.118	0,800	.031	D	6372044
TCF100408EPV36	9,96	.392	3,40	.134	10,60	.417	3,60	.142	0,800	.031	E	6372046
TCF120412FPV36	12,59	.496	4,80	.189	13,40	.528	4,20	.165	1,200	.046	F	6348893
TCF150512GPV36	15,13	.596	6,00	.236	16,10	.634	5,40	.213	1,200	.046	G	6407889
TCF180614HPV36	18,04	.710	7,50	.295	19,20	.756	6,50	.256	1,400	.054	H	6372048

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Center Inserts • Roughing V36





● first choice
○ alternate choice

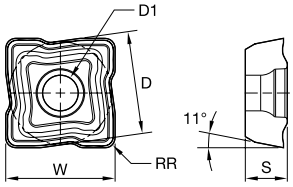
P												○	●
M												○	●
K												○	●
N													
S													
H													

	D		D1		W		S		RR				
catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	SSC	WU25CH	WU40PH
TCF040203ACV36	4,47	.176	2,10	.083	3,65	.144	2,00	.079	0,300	.011	A	5541819	5541840
TCF060203BCV36	6,00	.236	2,40	.094	4,90	.193	2,40	.095	0,300	.011	B	5542606	5542607
TCF070304CCV36	7,59	.299	2,60	.102	6,20	.244	2,80	.110	0,400	.015	C	5542644	5542645
TCF090305DCV36	9,55	.376	2,80	.110	7,80	.307	3,00	.118	0,500	.019	D	5538556	5538557
TCF120405ECV36	12,00	.473	3,40	.134	9,80	.386	3,60	.142	0,500	.019	E	5538606	5538607
TCF150406FCV36	14,94	.588	4,80	.189	12,20	.480	4,20	.165	0,600	.023	F	5542625	5542626
TCF180508GCV36	17,88	.704	6,00	.236	14,60	.575	5,40	.213	0,800	.031	G	5542477	5542478
TCF210608HCV36	21,68	.853	7,50	.295	17,70	.697	6,50	.256	0,800	.031	H	5542004	5542005

NOTE: For application-specific insert selection, please refer to the application data on page C113.
SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Periphery Inserts • Roughing V36





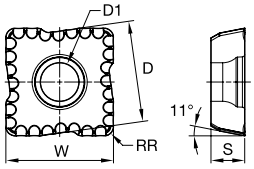
● first choice
○ alternate choice

	D		D1		W		S		RR					
catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	SSC	WU25CH	WU40PH	
TCF040204APV36	4,14	.163	2,10	.083	4,40	.173	2,00	.079	0,400	.015	A	5541844	5541845	
TCF050204BPV36	5,07	.200	2,40	.094	5,40	.213	2,40	.094	0,400	.015	B	5542621	5542622	
TCF070306CPV36	6,67	.263	2,60	.102	7,10	.280	2,80	.110	0,600	.023	C	5542649	5542650	
TCF080308DPV36	8,08	.318	2,80	.110	8,60	.339	3,00	.118	0,800	.031	D	5538601	5538602	
TCF100408EPV36	9,96	.392	3,40	.134	10,60	.417	3,60	.142	0,800	.031	E	5538611	5538612	
TCF120412FPV36	12,59	.496	4,80	.189	13,40	.528	4,20	.165	1,200	.046	F	5542640	5542641	
TCF150512GPV36	15,13	.596	6,00	.236	16,10	.634	5,40	.213	1,200	.046	G	5542603	5542605	
TCF180614HPV36	18,04	.710	7,50	.295	19,20	.756	6,50	.256	1,400	.054	H	5542009	5542020	

NOTE: For application-specific insert selection, please refer to the application data on page C113.
SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Center Inserts • Long Chip Materials V38





● first choice
○ alternate choice

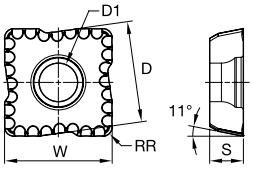
P	●
M	●
K	○
N	
S	
H	

catalog number	D mm	D in	D1 mm	D1 in	W mm	W in	S mm	S in	RR mm	RR in	SSC	WU40PH
TCF040203ACV38	4,47	.176	2,10	.083	3,65	.144	2,00	.079	0,300	.012	A	6429458
TCF060203BCV38	6,00	.236	2,40	.094	4,90	.193	2,40	.095	0,300	.012	B	6429459
TCF070304CCV38	7,59	.299	2,60	.102	6,20	.244	2,80	.110	0,400	.015	C	6429460
TCF090305DCV38	9,55	.376	2,80	.110	7,80	.307	3,00	.118	0,500	.019	D	6429461
TCF120405ECV38	12,00	.473	3,40	.134	9,80	.386	3,60	.142	0,500	.019	E	6429462
TCF150406FCV38	14,94	.588	4,80	.189	12,20	.480	4,20	.165	0,600	.023	F	6429463
TCF180508GCV38	17,88	.704	6,00	.236	14,60	.575	5,40	.213	0,800	.031	G	6324383
TCF210608HCV38	21,68	.853	7,50	.295	17,70	.697	6,50	.256	0,800	.031	H	6429464

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Periphery Inserts • Long Chip Materials V38





● first choice
○ alternate choice

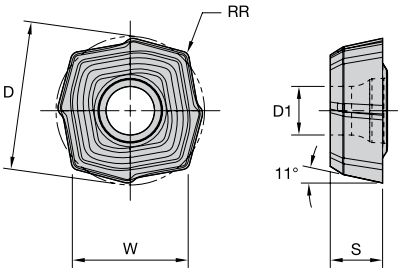
P												●	●
M												●	●
K												○	○
N													
S													
H													

	D		D1		W		S		RR				
catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	SSC	WU25CH	WU40PH
TCF040204APV38	4,14	.163	2,10	.083	4,40	.173	2,00	.079	0,400	.015	A	6429424	6429425
TCF050204BPV38	5,07	.200	2,40	.094	5,40	.213	2,40	.094	0,400	.015	B	6429426	6429427
TCF070306CPV38	6,67	.263	2,60	.102	7,10	.280	2,80	.110	0,600	.023	C	6429466	6429428
TCF080308DPV38	8,08	.318	2,80	.110	8,60	.339	3,00	.118	0,800	.031	D	6429429	6429430
TCF100408EPV38	9,96	.392	3,40	.134	10,60	.417	3,60	.142	0,800	.031	E	6429451	6429452
TCF120412FPV38	12,59	.496	4,80	.189	13,40	.528	4,20	.165	1,200	.046	F	6429453	6429454
TCF150512GPV38	15,13	.596	6,00	.236	16,10	.634	5,40	.213	1,200	.046	G	6429455	6324381
TCF180614HPV38	18,04	.710	7,50	.295	19,20	.756	6,50	.256	1,400	.054	H	6429456	6429457

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Center Inserts • Universal DU





● first choice
○ alternate choice

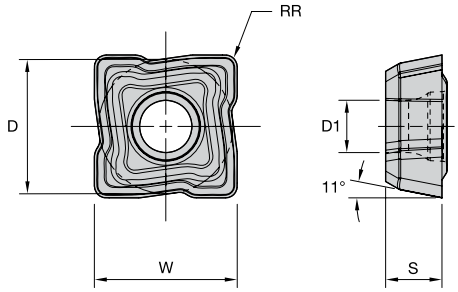
	P	M	K	N	S	H
	●	●	●			

	D		D1		W		S		RR			
catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	SSC	WU20PH
TCF070304CCDU	7,59	.299	2,60	.102	6,20	.244	2,80	.110	0,400	.015	C	6858590
TCF090305DCDU	9,55	.376	2,80	.110	7,80	.307	3,00	.118	0,500	.019	D	6858611
TCF120405ECDU	12,00	.473	3,40	.134	9,80	.386	3,60	.142	0,500	.019	E	6858612
TCF150406FCDU	14,94	.588	4,80	.189	12,20	.480	4,20	.165	0,600	.023	F	6858613

NOTE: For application-specific insert selection, please refer to the application data on page C113.
SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Periphery Inserts • Universal DU





● first choice
○ alternate choice

	P	M	K	N	S	H
WU20PH	●	●	●			

	D		D1		W		S		RR			
catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	SSC	WU20PH
TCF070306CPDU	6,67	.263	2,60	.102	7,10	.280	2,80	.110	0,600	.023	C	6858586
TCF080308DPDU	8,08	.318	2,80	.110	8,60	.339	3,00	.118	0,800	.031	D	6858587
TCF100408EPDU	9,96	.392	3,40	.134	10,60	.417	3,60	.142	0,800	.031	E	6858588
TCF120412FPDU	12,59	.496	4,80	.189	13,40	.528	4,20	.165	1,200	.046	F	6858589

NOTE: For application-specific insert selection, please refer to the application data on page C113.
SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Insert Selection Guide

Material Group	Geometry	Light Machining		General Purpose		Heavy Machining	
		periphery insert	center insert	periphery insert	center insert	periphery insert	center insert
P1	V38/DU	WU25CH	WU40PH/WU20PH	**WU40PH/WU20PH**	**WU40PH/WU20PH**	WU40PH/WU20PH	WU40PH/WU20PH
P2–P4	V34/DU	WPK10CH	WU40PH/WU20PH	**WU25CH/WU20PH**	**WU40PH/WU20PH**	WU40PH/WU20PH	WU40PH/WU20PH
P5–P6	V36/DU	WU25CH	WU40PH/WU20PH	**WU40PH/WU20PH**	**WU40PH/WU20PH**	WU40PH/WU20PH	WU40PH/WU20PH
M1–M3	V36/DU	WU25CH	WU40PH/WU20PH	**WU40PH/WU20PH**	**WU40PH/WU20PH**	WU40PH/WU20PH	WU40PH/WU20PH
K1–K3	V34/DU	WPK10CH	WU40PH/WU20PH	**WU40PH/WU20PH**	**WU40PH/WU20PH**	WU40PH/WU20PH	WU40PH/WU20PH
N1–N4	V36	WN10PH	WN10PH	**WN10PH**	**WN10PH**	WN10PH	WN10PH
S1–S4	V38/DU	WU40PH/WU20PH	WU40PH/WU20PH	**WU40PH/WU20PH**	**WU40PH/WU20PH**	WU40PH/WU20PH	WU40PH/WU20PH

NOTE: All speed conditions are for stable conditions. For unstable conditions, it is suggested to reduce starting speeds by 10%. For interrupted cuts, reduce speed by 20%.
For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above data.
For 5 x D, diameter range 12–23,99mm (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above data.
For 5 x D, diameter range 25–68mm (inserts sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above data.
For 4 x D and 5 x D, it is recommended to reduce feed rate during entry and exit by 30–50%.

Top Cut 4 • Cutting Data • Inch

Material Group	Geometry	Grade		Cutting Speed — SFM			Tool Diameter	Recommended Feed Rate per Revolution			
		center	periphery	min	Start	max		.473–.531" Insert Size A	.563–.734" Insert Size B	.750–.938" Insert Size C	.969–1.156" Insert Size D
P0	–V38	WU40PH	WU25CH	360	**540**	780	IPR	0.0024–0.0031	0.0031–0.0043	0.0039–0.0051	0.0043–0.0055
	– DU	WU20PH	WU20PH	290	**430**	625	IPR	–	–	0.0031–0.0041	0.0034–0.0044
P1	–V38	WU40PH	WU25CH	360	**540**	780	IPR	0.0024–0.0039	0.0031–0.0051	0.0039–0.0059	0.0043–0.0063
	– DU	WU20PH	WU20PH	290	**430**	625	IPR	–	–	0.0031–0.0047	0.0034–0.0050
P2	–V34	WU40PH	WU25CH	360	**570**	840	IPR	0.0024–0.0039	0.0031–0.0059	0.0039–0.0063	0.0043–0.0067
	– DU	WU20PH	WU20PH	290	**450**	675	IPR	–	–	0.0031–0.0050	0.0034–0.0054
P3	–V34	WU40PH	WPK10CH	360	**600**	930	IPR	0.0031–0.0059	0.0039–0.0063	0.0043–0.0071	0.0047–0.0079
	– DU	WU20PH	WU20PH	290	**480**	745	IPR	–	–	0.0034–0.0067	0.0037–0.0063
P4	–V34	WU40PH	WPK10CH	360	**570**	930	IPR	0.0031–0.0059	0.0039–0.0063	0.0043–0.0071	0.0047–0.0079
	– DU	WU20PH	WU20PH	290	**450**	745	IPR	–	–	0.0034–0.0067	0.0037–0.0063
P5	–V36	WU40PH	WU25CH	360	**540**	750	IPR	0.0024–0.0039	0.0031–0.0055	0.0039–0.0059	0.0043–0.0063
	– DU	WU20PH	WU20PH	290	**430**	600	IPR	–	–	0.0031–0.0047	0.0034–0.0050
P6	-V36	WU40PH	WU25CH	360	**480**	630	IPR	0.0024–0.0039	0.0031–0.0055	0.0039–0.0059	0.0043–0.0063
	-V36	WU40PH	WU25CH	290	**385**	500	IPR	-	-	0.0031–0.0047	0.0034–0.0050
M1	-V38	WU40PH	WU40PH	360	**480**	720	IPR	0.0024–0.0047	0.0028–0.0051	0.0031–0.0059	0.0039–0.0063
	- DU	WU20PH	WU20PH	290	**385**	575	IPR	-	-	0.0025–0.0047	0.0031–0.0050
M2	–V38	WU40PH	WU40PH	330	**420**	630	IPR	0.0024–0.0047	0.0028–0.0051	0.0031–0.0059	0.0039–0.0063
	– DU	WU20PH	WU20PH	265	**340**	500	IPR	–	–	0.0025–0.0047	0.0031–0.0050
M3	-V36	WU40PH	WU40PH	300	**360**	600	IPR	0.0024–0.0047	0.0028–0.0051	0.0031–0.0059	0.0039–0.0063
	- DU	WU20PH	WU20PH	240	**290**	480	IPR	-	-	0.0025–0.0047	0.0031–0.0050
K1	-V34	WU25CH	WPK10CH	360	**600**	840	IPR	0.0031–0.0055	0.0031–0.0063	0.0039–0.0071	0.0047–0.0094
	- DU	WU20PH	WU20PH	290	**480**	675	IPR	-	-	0.0031–0.0057	0.0038–0.0075
K2	–V34	WU40PH	WPK10CH	300	**540**	780	IPR	0.0031–0.0055	0.0031–0.0063	0.0039–0.0071	0.0047–0.0094
	– DU	WU20PH	WU20PH	240	**430**	625	IPR	–	–	0.0031–0.0057	0.0038–0.0075
K3	-V34	WU40PH	WPK10CH	300	**510**	720	IPR	0.0031–0.0055	0.0031–0.0063	0.0039–0.0071	0.0047–0.0094
	- DU	WU20PH	WU20PH	240	**400**	575	IPR	-	-	0.0031–0.0057	0.0038–0.0075
N1	-V36	WN10PH	WN10PH	750	**1050**	1500	IPR	0.0024–0.0039	0.0031–0.0055	0.0039–0.0059	0.0043–0.0063
N2	–V36	WN10PH	WN10PH	450	**900**	1350	IPR	0.0024–0.0039	0.0031–0.0055	0.0039–0.0059	0.0043–0.0063
N3	-V36	WN10PH	WN10PH	240	**360**	450	IPR	0.0024–0.0039	0.0028–0.0043	0.0031–0.0047	0.0039–0.0055
S3	-V38	WU40PH	WU40PH	60	**90**	135	IPR	0.0031–0.0047	0.0031–0.0051	0.0039–0.0059	0.0047–0.0075
	- DU	WU20PH	WU20PH	50	**70**	100	IPR	-	-	0.0031-0.0047	0.0038-0.006
S4	–V38	WU40PH	WU40PH	105	**120**	195	IPR	0.0031–0.0047	0.0031–0.0051	0.0039–0.0059	0.0047–0.0075
	– DU	WU20PH	WU20PH	85	**95**	150	IPR	–	–	0.0031–0.0047	0.0038–0.006

Material Group	Geometry	Grade		Cutting Speed — SFM			Tool Diameter	1.188–1.438" Insert Size E	1.469–1.750" Insert Size F	1.813–2.219" Insert Size G	2.250–2.500" Insert Size H
		center	periphery	min	Start	max					
P0	–V38	WU40PH	WU25CH	360	**540**	780	IPR	0.0051–0.0063	0.0059–0.0071	0.0063–0.0091	0.0067–0.0094
	– DU	WU20PH	WU20PH	290	**430**	624	IPR	0.0040–0.0050	0.0047–0.0057	–	–
P1	–V38	WU40PH	WU25CH	360	**540**	780	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0106	0.0067–0.0114
	– DU	WU20PH	WU20PH	290	**430**	625	IPR	0.0040–0.0057	0.0047–0.0063	–	–
P2	–V34	WU40PH	WU25CH	360	**570**	840	IPR	0.0051–0.0079	0.0059–0.0083	0.0063–0.0110	0.0067–0.0118
	– DU	WU20PH	WU20PH	290	**450**	675	IPR	0.0040–0.0063	0.0047–0.0063	–	–
P3	–V34	WU40PH	WPK10CH	360	**600**	930	IPR	0.0053–0.0094	0.0063–0.0094	0.0071–0.0118	0.0075–0.0126
	– DU	WU20PH	WU20PH	290	**480**	745	IPR	0.0042–0.0075	0.0050–0.0075	–	–
P4	–V34	WU40PH	WPK10CH	360	**570**	930	IPR	0.0055–0.0087	0.0063–0.0094	0.0071–0.0118	0.0075–0.0126
	– DU	WU20PH	WU20PH	290	**450**	745	IPR	0.0044–0.0069	0.0050–0.0075	–	–
P5	–V36	WU40PH	WU25CH	360	**540**	750	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0110	0.0067–0.0118
	– DU	WU20PH	WU20PH	290	**430**	600	IPR	0.0040–0.0057	0.0047–0.0063	–	–
P6	-V36	WU40PH	WU25CH	360	**480**	630	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0110	0.0067–0.0114
	- DU	WU20PH	WU20PH	290	**380**	500	IPR	0.0040–0.0057	0.0047–0.0063	-	-
M1	-V38	WU40PH	WU40PH	360	**480**	720	IPR	0.0047–0.0079	0.0055–0.0098	0.0063–0.0110	0.0063–0.0118
	- DU	WU20PH	WU20PH	290	**385**	575	IPR	0.0038-0.0063	0.0044-0.0078	-	-
M2	–V38	WU40PH	WU40PH	330	**420**	630	IPR	0.0047–0.0079	0.0055–0.0098	0.0063–0.0110	0.0063–0.0118
	– DU	WU20PH	WU20PH	265	**330**	500	IPR	0.0038–0.0063	0.0044–0.0078	–	–
M3	-V36	WU40PH	WU40PH	300	**360**	600	IPR	0.0047–0.0079	0.0055–0.0098	0.0063–0.0110	0.0063–0.0118
	- DU	WU20PH	WU20PH	240	**290**	480	IPR	0.0038-0.0063	0.0044-0.0098	-	-
K1	-V34	WU25CH	WPK10CH	360	**600**	840	IPR	0.0055–0.0102	0.0063–0.0118	0.0071–0.0126	0.0079–0.0142
	- DU	WU20PH	WU20PH	290	**480**	670	IPR	0.0044-0.0081	0.0050-0.0094	-	-
K2	–V34	WU40PH	WPK10CH	300	**540**	780	IPR	0.0055–0.0102	0.0063–0.0118	0.0071–0.0126	0.0079–0.0142
	– DU	WU20PH	WU20PH	240	**430**	625	IPR	0.0044–0.0081	0.0050–0.0094	–	–
K3	-V34	WU40PH	WPK10CH	300	**510**	720	IPR	0.0055–0.0102	0.0063–0.0118	0.0071–0.0126	0.0079–0.0142
	- DU	WU20PH	WU20PH	240	**400**	575	IPR	0.0044-0.0081	0.0050-0.0094	-	-
N1	-V36	WN10PH	WN10PH	750	**1050**	1500	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0110	0.0067–0.0118
N2	–V36	WN10PH	WN10PH	450	**900**	1350	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0110	0.0067–0.0118
N3	-V36	WN10PH	WN10PH	240	**360**	450	IPR	0.0047–0.0067	0.0055–0.0083	0.0063–0.0091	0.0063–0.0094
S3	-V38	WU40PH	WU40PH	60	**90**	135	IPR	0.0055–0.0083	0.0063–0.0094	0.0071–0.0102	0.0079–0.0118
	- DU	WU20PH	WU20PH	50	**70**	100	IPR	0.0044-0.083	0.0050-0.0075	-	-
S4	–V38	WU40PH	WU40PH	105	**120**	195	IPR	0.0055–0.0083	0.0063–0.0094	0.0071–0.0102	0.0079–0.0118
	– DU	WU20PH	WU20PH	85	**95**	150	IPR	0.0044–0.0664	0.0050–0.0075	–	–

NOTE: All speed conditions are for stable conditions. For unstable conditions, it is suggested to reduce starting speeds by 10%. For interrupted cuts, reduce speed by 20%.
For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above data.
For 5 x D, diameter range .473–.938" (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above data.
For 5 x D, diameter range .969–2.5" (inserts sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above data.
For 4 x D and 5 x D, it is recommended to reduce feed rate during entry and exit by 30–50%.

Top Cut 4 • Cutting Data • Metric

Material Group	Geometry	Grade		Cutting Speed – vc m/min			Tool Diameter	Recommended Feed Rate per Revolution			
		center	periphery	min	Start	max		12,00–13,99 Insert Size A	14,00–18,99 Insert Size B	19,00–23,99 Insert Size C	24,00–29,99 Insert Size D
P0	–V38	WU40PH	WU25CH	120	**180**	260	mm/rev	0,06–0,08	0,08–0,11	0,10–0,13	0,11–0,14
	–DU	WU20PH	WU20PH	90	**150**	200	mm/rev	–	–	0,07–0,10	0,08–0,10
P1	–V38	WU40PH	WU25CH	120	**180**	260	mm/rev	0,06–0,10	0,08–0,13	0,10–0,15	0,11–0,16
	–DU	WU20PH	WU20PH	90	**150**	200	mm/rev	–	–	0,07–0,11	0,08–0,11
P2	–V34	WU40PH	WU25CH	120	**190**	280	mm/rev	0,06–0,10	0,08–0,15	0,10–0,16	0,11–0,17
	–DU	WU20PH	WU20PH	90	**150**	220	mm/rev	–	–	0,07–0,12	0,08–0,13
P3	–V34	WU40PH	WPK10CH	120	**200**	310	mm/rev	0,08–0,15	0,10–0,16	0,11–0,18	0,12–0,20
	–DU	WU20PH	WU20PH	90	**160**	220	mm/rev	–	–	0,08–0,13	0,09–0,15
P4	–V34	WU40PH	WPK10CH	120	**190**	310	mm/rev	0,08–0,15	0,10–0,16	0,11–0,18	0,12–0,20
	–DU	WU20PH	WU20PH	90	**150**	220	mm/rev	–	–	0,08–0,13	0,09–0,15
P5	–V36	WU40PH	WU25CH	120	**180**	250	mm/rev	0,06–0,10	0,08–0,14	0,10–0,15	0,11–0,16
	–DU	WU20PH	WU20PH	90	**150**	220	mm/rev	–	–	0,07–0,11	0,08–0,12
P6	-V36	WU40PH	WU25CH	120	**160**	210	mm/rev	0,06–0,10	0,08–0,14	0,10–0,15	0,11–0,16
	–DU	WU20PH	WU20PH	90	**130**	165	mm/rev	–	–	0,07–0,11	0,08–0,12
M1	-V38	WU40PH	WU40PH	120	**160**	240	mm/rev	0,06–0,11	0,07–0,11	0,08–0,12	0,10–0,14
	–DU	WU20PH	WU20PH	90	**130**	190	mm/rev	–	–	0,06–0,09	0,07–0,10
M2	–V38	WU40PH	WU40PH	110	**140**	210	mm/rev	0,06–0,10	0,07–0,11	0,08–0,12	0,10–0,14
	–DU	WU20PH	WU20PH	110	**140**	190	mm/rev	–	–	0,06–0,09	0,07–0,10
M3	-V36	WU40PH	WU40PH	100	**120**	200	mm/rev	0,06–0,10	0,07–0,11	0,08–0,12	0,10–0,14
	–DU	WU20PH	WU20PH	80	**100**	160	mm/rev	–	–	0,06–0,09	0,07–0,10
K1	-V34	WU25CH	WPK10CH	120	**200**	280	mm/rev	0,08–0,14	0,08–0,16	0,10–0,18	0,12–0,24
	–DU	WU20PH	WU20PH	90	**160**	220	mm/rev	–	–	0,07–0,13	0,09–0,18
K2	–V34	WU40PH	WPK10CH	100	**180**	260	mm/rev	0,08–0,14	0,08–0,16	0,10–0,18	0,12–0,24
	–DU	WU20PH	WU20PH	80	**140**	200	mm/rev	–	–	0,07–0,13	0,09–0,18
K3	-V34	WU40PH	WPK10CH	100	**170**	240	mm/rev	0,08–0,14	0,08–0,16	0,10–0,18	0,12–0,24
	–DU	WU20PH	WU20PH	80	**140**	190	mm/rev	–	–	0,07–0,13	0,09–0,18
N1	-V36	WN10PH	WN10PH	250	**350**	500	mm/rev	0,06–0,10	0,08–0,14	0,10–0,15	0,11–0,16
N2	–V36	WN10PH	WN10PH	150	**300**	450	mm/rev	0,06–0,10	0,08–0,14	0,10–0,15	0,11–0,16
N3	-V36	WN10PH	WN10PH	80	**120**	150	mm/rev	0,06–0,10	0,07–0,11	0,08–0,12	0,10–0,14
S3	-V38	WU40PH	WU40PH	20	**30**	45	mm/rev	0,08–0,12	0,08–0,13	0,10–0,15	0,12–0,19
	–DU	WU20PH	WU20PH	20	**30**	40	mm/rev	–	–	0,07–0,11	0,09–0,14
S4	–V38	WU40PH	WU40PH	35	**40**	65	mm/rev	0,08–0,12	0,08–0,13	0,10 –0,15	0,12–0,19
	–DU	WU20PH	WU20PH	30	**40**	60	mm/rev	–	–	0,07–0,11	0,09–0,14

Material Group	Geometry	Grade		Cutting Speed – vc m/min			Tool Diameter	30,00–36,99 Insert Size E	37,00–45,99 Insert Size F	46,00–56,99 Insert Size G	57,00–68,00 Insert Size H
		center	periphery	min	Start	max					
P0	–V38	WU40PH	WU25CH	120	**180**	260	mm/rev	0,13–0,16	0,15–0,18	0,16–0,23	0,17–0,24
	–DU	WU20PH	WU20PH	90	**140**	200	mm/rev	0,09–0,12	0,11–0,13	–	–
P1	–V38	WU40PH	WU25CH	120	**180**	260	mm/rev	0,13–0,17	0,15–0,19	0,16–0,24	0,17–0,25
	–DU	WU20PH	WU20PH	90	**140**	200	mm/rev	0,09–0,13	0,11–0,14	–	–
P2	–V34	WU40PH	WU25CH	120	**190**	280	mm/rev	0,13–0,20	0,15–0,21	0,16–0,28	0,17–0,30
	–DU	WU20PH	WU20PH	90	**150**	220	mm/rev	0,09–0,15	0,11–0,15	–	–
P3	–V34	WU40PH	WPK10CH	120	**200**	310	mm/rev	0,16–0,24	0,16–0,24	0,18–0,30	0,19–0,32
	–DU	WU20PH	WU20PH	90	**160**	250	mm/rev	0,12–0,16	0,12–0,18	–	–
P4	–V34	WU40PH	WPK10CH	120	**190**	310	mm/rev	0,14–0,22	0,16–0,24	0,18–0,30	0,19–0,32
	–DU	WU20PH	WU20PH	90	**150**	250	mm/rev	0,12–0,16	0,12–0,18	–	–
P5	–V36	WU40PH	WU25CH	120	**180**	250	mm/rev	0,13–0,18	0,15–0,20	0,16–0,28	0,17–0,30
	–DU	WU20PH	WU20PH	90	**140**	200	mm/rev	0,09–0,13	0,11–0,15	–	–
P6	-V36	WU40PH	WU25CH	120	**160**	210	mm/rev	0,13–0,18	0,15–0,20	0,16–0,28	0,17–0,29
	–DU	WU20PH	WU20PH	90	**120**	160	mm/rev	0,09–0,13	0,11–0,15	–	–
M1	-V38	WU40PH	WU40PH	120	**160**	240	mm/rev	0,12–0,17	0,14–0,21	0,16–0,23	0,16–0,24
	–DU	WU20PH	WU20PH	90	**120**	190	mm/rev	0,09–0,13	0,10–0,15	–	–
M2	–V38	WU40PH	WU40PH	110	**140**	210	mm/rev	0,12–0,17	0,14–0,21	0,16–0,23	0,16–0,24
	–DU	WU20PH	WU20PH	90	**110**	160	mm/rev	0,09–0,13	0,10–0,15	–	–
M3	-V36	WU40PH	WU40PH	100	**120**	200	mm/rev	0,12–0,17	0,14–0,21	0,16–0,23	0,16–0,24
	–DU	WU20PH	WU20PH	80	**90**	160	mm/rev	0,09–0,13	0,10–0,15	–	–
K1	-V34	WU25CH	WPK10CH	120	**200**	280	mm/rev	0,14–0,26	0,16–0,30	0,18–0,32	0,20–0,36
	–DU	WU20PH	WU20PH	90	**160**	220	mm/rev	0,10–0,19	0,12–0,22	–	–
K2	–V34	WU40PH	WPK10CH	100	**180**	260	mm/rev	0,14–0,26	0,16–0,30	0,18–0,32	0,20–0,36
	–DU	WU20PH	WU20PH	80	**140**	200	mm/rev	0,10–0,19	0,12–0,22	–	–
K3	-V34	WU40PH	WPK10CH	100	**170**	240	mm/rev	0,14–0,26	0,16–0,30	0,18–0,32	0,20–0,36
	–DU	WU20PH	WU20PH	80	**130**	190	mm/rev	0,10–0,19	0,12–0,22	–	–
N1	-V36	WN10PH	WN10PH	250	**350**	500	mm/rev	0,13–0,18	0,15–0,20	0,16–0,28	0,17–0,30
N2	–V36	WN10PH	WN10PH	150	**300**	450	mm/rev	0,13–0,18	0,15–0,20	0,16–0,28	0,17–0,30
N3	-V36	WN10PH	WN10PH	80	**120**	150	mm/rev	0,12–0,17	0,14–0,21	0,16–0,23	0,16–0,24
S3	-V38	WU40PH	WU40PH	20	**30**	45	mm/rev	0,14–0,21	0,16–0,24	0,18–0,26	0,20–0,30
	–DU	WU20PH	WU20PH	20	**25**	40	mm/rev	0,10–0,15	0,12–0,18	–	–
S4	–V38	WU40PH	WU40PH	35	**40**	65	mm/rev	0,14–0,21	0,16–0,24	0,18–0,26	0,20–0,30
	–DU	WU20PH	WU20PH	30	**35**	50	mm/rev	0,10–0,15	0,12–0,18	–	–

NOTE: All speed conditions are for stable conditions. For unstable conditions, it is suggested to reduce starting speeds by 10%. For interrupted cuts, reduce speed by 20%.
For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above data.
For 5 x D, diameter range 12–23,99mm (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above data.
For 5 x D, diameter range 25–68mm (inserts sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above data.
For 4 x D and 5 x D, it is recommended to reduce feed rate during entry and exit by 30–50%.

Top Cut 4 • Drill Depth • X-Offset Capabilities • Hole Tolerance

Insert size	Diameter range mm (in)	2 x D/3 x D			4 x D			5 x D		
		X-offset value max. in mm (max. in inch)	D1 max value mm (in)	Hole tolerance mm (in)	X-offset value max. in mm (max. in inch)	D1 max value mm (in)	Hole tolerance mm (in)	X-offset value max. in mm (max. in inch)	D1 max value mm (in)	Hole tolerance mm (in)
A	12,00–13,99 (.473–.531)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,20 (+/- 0.008)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	—	—	+/- 0,35 (+/- 0.014)
B	14,00–18,99 (.563–.734)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,20 (+/- 0.008)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	—	—	+/- 0,35 (+/- 0.014)
C	19,00–23,99 (.750–.938)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,20 (+/- 0.008)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	—	—	+/- 0,35 (+/- 0.014)
D	24,00–29,99 (.969–1.156)	0,8 (0.031)	D1 + 1,6mm (D1 + 0.063")	+/- 0,20 (+/- 0.008)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	—	—	+/- 0,35 (+/- 0.014)
E	30,00–36,99 (1.188–1.438)	0,8 (0.031)	D1 + 1,6mm (D1 + 0.063")	+/- 0,20 (+/- 0.008)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	—	—	+/- 0,35 (+/- 0.014)
F	37,00–45,99 (1.469–1.750)	0,8 (0.031)	D1 + 1,6mm (D1 + 0.063")	+/- 0,25 (+/- 0.010)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,38 (+/- 0.015)	—	—	+/- 0,38 (+/- 0.015)
G	46,00–56,99 (1.813–2.219)	1 (0.039)	D1 + 2mm (D1 + 0.079")	+/- 0,25 (+/- 0.010)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,38 (+/- 0.015)	—	—	+/- 0,38 (+/- 0.015)
H	57,00–68,00 (2.250–2.500)	1 (0.039)	D1 + 2mm (D1 + 0.079")	+/- 0,28 (+/- 0.011)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,42 (+/- 0.017)	—	—	+/- 0,42 (+/- 0.017)

NOTE: All speed conditions are for stable conditions. For unstable conditions, it is suggested to reduce starting speeds by 10%. For interrupted cuts, reduce speed by 20%.
For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above data.
For 5 x D, diameter range .473–.938" (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above data.
For 5 x D, diameter range .969–2.5" (inserts sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above data.
For 4 x D and 5 x D, it is recommended to reduce feed rate during entry and exit by 30–50%.

Top Cut 4 • Screw Torque

SSC	periphery insert	center insert	Torx size	tightening torque Nm	tightening torque ft. lbs
A	TCF040204AP	TCF040203AC	T5	0,40	.295
B	TCF050204BP	TCF060203BC	T6	0,53	.390
C	TCF070306CP	TCF070304CC	T7	0,90	.663
D	TCF080308DP	TCF090305DC	T8	1,10	.811
E	TCF100408EP	TCF120405EC	T9	2,00	1.475
F	TCF120412FP	TCF150406FC	T15	4,00	2.950
F	TCF120412FP	TCF150406FC	T15	4,00	2.950
G	TCF150512GP	TCF180508GC	T20	6,30	4.646
H	TCF180614HP	TCF210608HC	T25	8,80	6.490
H	TCF180614HP	TCF210608HC	T25	8,80	6.490

Application Data • Top Cut 4™

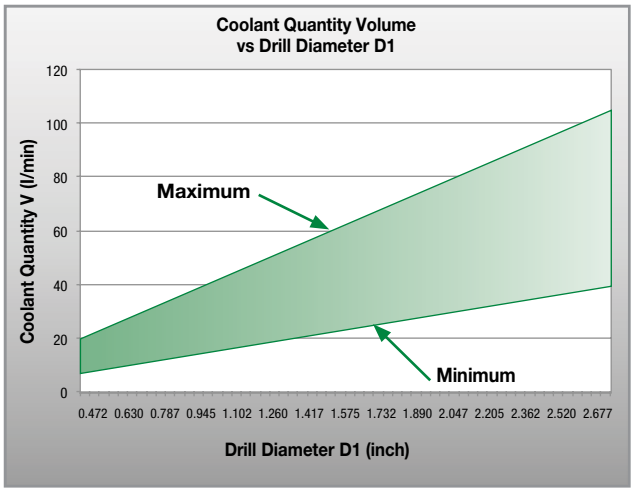
Top Cut 4 • Drill Depth • 2 x D/3 x D • Hole Tolerance Table

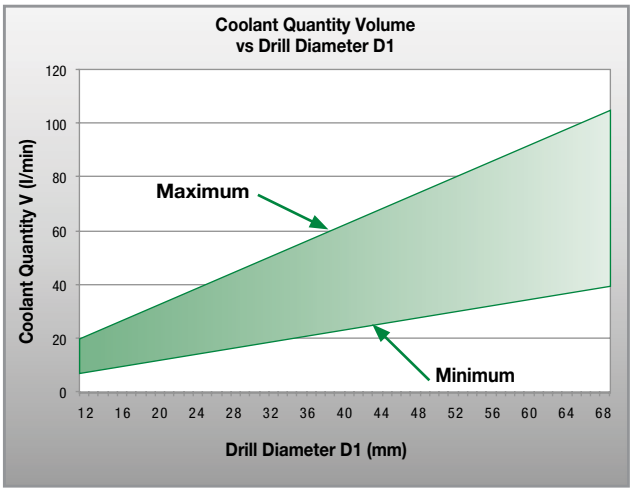
Insert size	Diameter Range (mm)	Hole Tolerance (mm)
A	12,00–13,99	+/- 0,20
B	14,00–18,99	+/- 0,20
C	19,00–23,99	+/- 0,20
D	24,00–29,99	+/- 0,20
E	30,00–36,99	+/- 0,20
F	37,00–45,99	+/- 0,25
G	46,00–56,99	+/- 0,25
H	57,00–68,00	+/- 0,28

Top Cut 4 • Drill Depth • 4 x D/5 x D • Hole Tolerance Table

Insert size	Diameter Range (mm)	Hole Tolerance (mm)
A	12,00–13,99	+/- 0,35
B	14,00–18,99	+/- 0,35
C	19,00–23,99	+/- 0,35
D	24,00–29,99	+/- 0,35
E	30,00–36,99	+/- 0,35
F	37,00–45,99	+/- 0,38
G	46,00–56,99	+/- 0,38
H	57,00–68,00	+/- 0,42

Coolant Requirement/Recommendation







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Tapping

High-Performance Taps Selection Guide D4–D19

General-Purpose Taps D20–D63

Multipurpose Taps • VariTap D64–D88

Aerospace Fastener Taps D90–D95

High-Performance Taps • GT Series D96–D126

Technical Information D127–D133

Selection Guide

★ Good
★★ Better
★★★ Best

series	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension
	through	blind	cutting	forming	flood	through	min–max		carbide	HSS-E-PM	HSS-E	HSS	type	form		
Spiral-Point and Left-Hand Spiral-Flute Taps																
GT20 	X		X		X		#2–3/4"	WU32MG, WS34MG		X			plug	D	L15°	ANSI 302A
GT20 	X		X		X		#6–1/2"	WU32MG		X			plug	D	L15°	DIN/ANSI
GT20 	X		X		X		M3–M12	WU32MG, WS34MG		X			plug	D	L15°	ANSI 302A
GT20 	X		X		X		M3–M42	WU32MG, WS34MG		X			plug	D	L15°	DIN 371, 374, 376
GT20 	X		X		X		M24–M42	WU32MG		X			plug	D	L15°	DIN 376, XL
GT21 	X		X			X	M5–M14	WU32MG, WS34MG		X			plug	D	L15°	DIN 371, 376
GT10 	X		X		X		M3–M20	WS32MG		X			plug	D	L8°	DIN 371, 376
GT90 	X		X		X		#2–3/4"	WU32MG, WS39MG		X			plug	D	L15°	ANSI 302A
GT90 	X		X		X		M2.5–M12	WU32MG, WS39MG		X			plug	D	L15°	ANSI 302A
GT14 	X		X		X		M3–M12	WN35MG		X			plug	B	0°	DIN 371, 376
GT60 	X		X		X		#2-1"	WS34MG		X			plug	D	L15°	ANSI 302A
GT60 	X		X		X		M2.5-M12	WS34MG		X			plug	D	L15°	ANSI 302A
GT70 	X		X	X			M3–M16	WN48EG			X		plug	B	0°	DIN 371, 376
GT72 	X		X		X		#2–1/2"	WN44EG			X		plug	D	L15°	DIN/ANSI
GT72 	X		X		X		M3–M12	WN44EG			X		plug	D	L15°	DIN/ANSI
GT00 	X		X		X		M3–M20	WP31MG		X			plug	B	0°	DIN 371, 374, 376
VTSPO50 	X		X		X		#2–2"	WP42EG, WP49EG, WU41EG			X		plug	B	0°	ANSI 302A
VTSPO90 	X		X		X		#4–3/4"	WP42EG, WP49EG			X		plug	B	0°	DIN/ANSI
VTSPO97 	X		X			X	1/4–1"	WP42EG			X		plug	B	0°	DIN/ANSI

Selection Guide

P				M	K		N			S				H			
1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2	page(s)	recommended cutting parameters
Steel <35 HRC	Steel >36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49–55 HRC	Hardened Steels 56–68 HRC		
Spiral-Point and Left-Hand Spiral-Flute Taps *(continued)*																	
★★★		★★★		★★★		★★	★	★		★★						D99	D126
★★★		★★★		★★★		★★	★	★		★★						–	–
★★★		★★★		★★★		★★	★	★		★★						D100	D126
★★★		★★★		★★★		★★	★	★		★★						–	–
★★★		★★★		★★★		★★	★	★		★★						–	–
★★★		★★★		★★★		★★	★	★		★★						–	–
											★★★	★★★				D97	–
											★★★	★★★				D115	D126
											★★★	★★★				D114	D126
													★★★			D97	–
													★★★			D105	D126
													★★★			D104	D126
							★★★	★	★							D97	–
							★★★	★★								D109	D126
							★★★	★★								D108	D126
	★★★		★★★	★	★	★					★					D97	D126
★★	★	★		★★	★	★★	★	★★	★★	★						D67–D69	–
★★	★	★		★★	★	★★	★	★★	★★	★						D70	–
★★	★	★		★★	★	★★	★	★★	★★	★						D73	–

Selection Guide

★ Good
★★ Better
★★★ Best

series	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through	min–max		carbide	HSS-E-PM	HSS-E	HSS	type	form			
Spiral-Point and Left-Hand Spiral-Flute Taps *(continued)*																	
VTSPO60 	X		X		X		#4–1"	WU41EG, WP49EG			X		plug	B	0°	DIN 371, 376	
VTSPO55 	X		X		X		M3–M30	WP42EG, WP49EG, WU41EG			X		plug	B	0°	ANSI 302A	
VTSPO95 	X		X		X		M3–M20	WP42EG, WP49EG			X		plug	B	0°	DIN/ANSI	
VTSPO99 	X		X			X	M6–M20	WP42EG			X		plug	B	0°	DIN/ANSI	
VTSPO65 	X		X		X		M2–M36	WP42EG, WP49EG, WU41EG			X		plug	B	0°	DIN 371, 374, 376	
VTSPO75 	X		X		X		M3–M20	WU41EG			X		plug	B	0°	JIS	
5301/2301 	X		X		X		#0–3/4"	TiCN, TiN, Oxide, Uncoated				X	plug	—	0°	ANSI 302	
5301F 	X		X		X		1/4–1"	Uncoated				X	plug	—	0°	ANSI 302	
5301 	X		X		X		#6–3/3/8"	Uncoated				X	plug	—	0°	Extend 6"	
5601 	X		X		X		#6–3/4"	Oxide/ Nitride				X	plug	—	0°	ANSI 302	
5302 		X	X		X		#0–5/16"	Uncoated				X	bottoming	—	0°	ANSI 302	
5351/2351 	X		X		X		M2–M18	TiCN, TiN, Uncoated				X	plug	—	0°	ANSI 302	
7301 	X		X		X		#4–3/4"	Uncoated				X	plug	—	0°	ANSI 302	

Selection Guide

	P				M	K		N			S				H			
	1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
	Steel <35 HRC	Steel >36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49–55 HRC	Hardened Steels 56–68 HRC	page(s)	recommended cutting parameters
Spiral-Point and Left-Hand Spiral-Flute Taps *(continued)*																		
	★★	★	★		★★	★	★★	★	★★	★★	★						–	–
	★★	★	★		★★	★	★★	★	★★	★★	★						D71	–
	★★	★	★		★★	★	★★	★	★★	★★	★						D72	–
	★★	★	★		★★	★	★★	★	★★	★★	★						–	–
	★★	★	★		★★	★	★★	★	★★	★★	★						–	–
	★★	★	★		★★	★	★★	★	★★	★★	★						–	–
	★		★		★		★	★	★	★							D22–D23	–
	★		★		★		★	★	★	★							D26	–
	★		★		★		★	★	★	★							D26	–
	★		★		★		★	★	★	★							D25	–
	★		★		★		★	★	★	★							D28	–
	★		★		★		★	★	★	★							D24	–
	★	★	★	★	★	★	★	★	★	★							D27	–

Selection Guide

★ Good
★★ Better
★★★ Best

series	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension
	through	blind	cutting	forming	flood	through	min–max		carbide	HSS-E-PM	HSS-E	HSS	type	form		
Spiral-Flute Taps																
GT30 		X	X		X		#2–1"	WU32MG, WS34MG		X			semi-bottom	C	45°	ANSI 302A
GT30 		X	X		X		#6–1/2"	WU32MG		X			semi-bottom	C	45°	DIN/ANSI
GT30 		X	X		X		M3–M42	WU32MG, WS34MG		X			semi-bottom	C	45°	DIN 371, 374, 376
GT30 		X	X		X		M24–M42	WU32MG		X			semi-bottom	C	45°	DIN 376, XL
GT30 		X	X		X		M3–M16	WU32MG, WS34MG		X			semi-bottom	C	45°	ANSI 302A
GT31 		X	X			X	1/4–1/2"	WU32MG		X			semi-bottom	C	45°	DIN/ANSI
GT31 		X	X			X	M5–M42	WU32MG, WS34MG		X			semi-bottom	C	45°	DIN 371, 376
GT31 		X	X			X	M24–M42	WU32MG		X			semi-bottom	C	45°	DIN 376, XL
GT32 		X	X		X		M5–M16	WU32MG		X			bottoming	E	45°	DIN 371, 374, 376
GT33 		X	X			X	M5–M16	WU32MG		X			bottoming	E	45°	DIN 371, 374, 376
GT50 		X	X		X		M24–M42	WU32MG		X			semi-bottom	C	15°	DIN 376, XL
GT51 		X	X			X	M24–M42	WU32MG		X			semi-bottom	C	15°	DIN 376, XL
GT12 		X	X		X		M3–M20	WS32MG		X			semi-bottom	C	10°	DIN 371, 376
GT92 		X	X		X		#2-3/4"	WU32MG, WS39MG		X			3-4 pitches	—	11°	ANSI 302A
GT92 		X	X		X		M2.5–M12	WU32MG, WS39MG		X			3-4 pitches	—	11°	ANSI 302A
GT94 		X	X		X		#4-5/8"	WU32MG, WS39MG		X			bottom	E	11°	ANSI 302A
GT16 		X	X		X		M3–M12	WN35MG		X			semi-bottom	C	30°	DIN 371
GT62 		X	X		X		#2-1"	WS34MG		X			semi-bottom	C	10°	ANSI 302A
GT62 		X	X		X		M2.5–M12	WS34MG		X			semi-bottom	C	10°	ANSI 302A

Selection Guide

	P				M	K		N			S				H			
	1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
	Steel <35 HRC	Steel >36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49–55 HRC	Hardened Steels 56–68 HRC	page(s)	recommended cutting parameters
Spiral-Flute Taps *(continued)*																		
	★★★		★★★		★★★		★★	★	★		★★						D101	D126
	★★★		★★★		★★★		★★	★	★		★★						–	–
	★★★		★★★		★★★		★★	★	★		★★						–	–
	★★★		★★★		★★★		★★	★	★		★★						–	–
	★★★		★★★		★★★		★★	★	★		★★						D012	D126
	★★★		★★★		★★★		★★	★	★		★★						–	D126
	★★★		★★★		★★★		★★	★	★		★★						–	D126
	★★★		★★★		★★★		★★	★	★		★★						–	D126
	★★★		★★★		★★★		★★	★	★		★★						–	D126
	★★★		★★★		★★★		★★	★	★		★★						–	D126
	★★★		★★★				★★										–	D126
	★★★		★★★				★★										–	D126
												★★★	★★★				D97	–
												★★★	★★★				D117	D126
												★★★	★★★				D116	D126
												★★★	★★★				D118	D126
														★★★			D97	–
														★★★			D107	D126
														★★★			D106	D126

Selection Guide

★ Good
★★ Better
★★★ Best

series	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension
	through	blind	cutting	forming	flood	through	min–max		carbide	HSS-E-PM	HSS-E	HSS	type	form		
Spiral-Flute Taps *(continued)*																
GT80		X	X		X		M3–M20	WN48EG			X		semi-bottom	C	45°	DIN 371, 376
GT82		X	X		X		#2–1/2"	WN44EG			X		semi-bottom	C	45°	DIN/ANSI
GT82		X	X		X		M3–M12	WN44EG			X		semi-bottom	C	45°	DIN/ANSI
GT86		X	X		X		#2–1/2"	WN44EG			X		semi-bottom	C	25°	DIN/ANSI
GT86		X	X		X		M3–M12	WN44EG			X		semi-bottom	C	25°	DIN/ANSI
GT02		X	X		X		M3–M20	WP31MG		X			semi-bottom	C	25°	DIN 371, 374, 376
GT04		X	X		X		M3–M20	WH36MG		X			semi-bottom	C	42°	DIN 371, 374, 376
VTSFT50		X	X		X		#2–2"	WP42EG, WP49EG, WU41EG			X		semi-bottom	C	45°	ANSI 302A
VTSFT51		X	X		X		#4–3/4"	WP49EG			X		bottoming	E	45°	ANSI 302A
VTSFT90		X	X		X		#4–3/4"	WP42EG, WP49EG			X		semi-bottom	C	45°	DIN/ANSI
VTSFT97		X	X			X	1/4–1"	WP42EG			X		semi-bottom	C	45°	DIN/ANSI
VTSFT60		X	X		X		#4–1"	WU41EG, WP49EG			X		semi-bottom	C	45°	DIN 371, 376
VTSFT55		X	X		X		M3–M30	WP42EG, WP49EG, WU41EG			X		semi-bottom	C	45°	ANSI 302A
VTSFT55		X	X		X		M3–M18	WP49EG			X		bottoming	E	45°	ANSI 302A
VTSFT65		X	X		X		M2–M33	WP42EG, WP49EG, WU41EG			X		semi-bottom	C	45°	DIN 371, 374, 376
VTSFT65		X	X		X		M3–M20	WP42EG, WP49EG			X		bottoming	E	45°	DIN 371, 374, 376
VTSFT95		X	X		X		M3–M20	WP42EG, WP49EG			X		semi-bottom	C	45°	DIN/ANSI
VTSFT99		X	X			X	M6–M20	WP42EG			X		semi-bottom	C	45°	DIN/ANSI
VTSFT75		X	X		X		M3–M20	WU41EG			X		semi-bottom	C	45°	JIS

Selection Guide

	P				M	K		N			S				H			
	1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
	Steel <35 HRC	Steel >36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49–55 HRC	Hardened Steels 56–68 HRC	page(s)	recommended cutting parameters
Spiral-Flute Taps *(continued)*																		
								★★★									D97	—
								★★★	★★								D111	D126
								★★★	★★								D110	D126
								★★★	★★								D113	D126
								★★★	★★								D112	D126
		★★★		★★★	★	★	★					★					D97	D126
		★★★		★★★											★★★		D97	D126
	★★	★	★		★★	★	★★	★	★★	★★	★						D78–D79	D126
	★★	★	★		★★	★	★★	★	★★	★★	★						D79	D126
	★★	★	★		★★	★	★★	★	★★	★★	★						D74	D126
	★★	★	★		★★	★	★★	★	★★	★★	★						D77	D126
	★★	★	★		★★	★	★★	★	★★	★★	★						—	—
	★★	★	★		★★	★	★★	★	★★	★★	★						D75	—
	★★	★	★		★★	★	★★	★	★★	★★	★						D80	—
	★★	★	★		★★	★	★★	★	★★	★★	★						—	—
	★★	★	★		★★	★	★★	★	★★	★★	★						—	—
	★★	★	★		★★	★	★★	★	★★	★★	★						D76	—
	★★	★	★		★★	★	★★	★	★★	★★	★						D77	—
	★★	★	★		★★	★	★★	★	★★	★★	★						—	—

Selection Guide

★ Good
★★ Better
★★★ Best

series	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through	min–max		carbide	HSS-E-PM	HSS-E	HSS	type	form			
Spiral-Flute Taps *(continued)*																	
2314/5314	X		X		X		#4–3/4"	TiN, Uncoated				X	plug	–	45°	ANSI 302A	
2314/5314		X	X		X		#4–3/4"	TiN, Uncoated				X	bottoming	–	45°	ANSI 302A	
2364/5364	X		X		X		M3–M12	TiN, Uncoated				X	plug	–	45°	ANSI 302A	
2364/5364		X	X		X		M3–M12	TiN, Uncoated				X	bottom	–	45°	ANSI 302A	
5344	X		X		X		#10–3/4"	Oxide			X		plug	–	45°	ANSI 302A	
5344		X	X		X		#6–3/4"	Oxide			X		bottom	–	45°	ANSI 302A	
Straight-Flute Taps																	
GT40	X	X	X		X		#10–3/4"	WU32MG		X			semi-bottom	C	0°	ANSI 302A	
GT40	X	X	X		X		#6–1/2"	WU32MG		X			semi-bottom	C	0°	DIN/ANSI	
GT40	X	X	X		X		M3–M16	WU32MG		X			semi-bottom	C	0°	ANSI 302A	
GT40	X	X	X		X		M4–M22	WU32MG		X			semi-bottom	C	0°	DIN 371, 376	
GT41	X	X	X			X	1/4–1/2"	WU32MG		X			semi-bottom	C	0°	DIN/ANSI	
GT41	X	X	X			X	M4–M20	WU32MG		X			semi-bottom	C	0°	DIN 371, 374, 376	
GT42		X	X		X		M5–M20	WU32MG		X			bottoming	E	0°	DIN 371, 374, 376	
GT43		X	X			X	M5–M20	WU32MG		X			bottoming	E	0°	DIN 371, 374, 376	
GT06	X	X	X		X		M6–M16	WS32MG		X			semi-bottom	C	0°	DIN 371, 374, 376	
5305	X		X		X		#0–12	Oxide, Uncoated				X	taper	–	0°	ANSI 302	

Selection Guide

	P				M	K		N			S				H			
	1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
	Steel <35 HRC	Steel >36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49–55 HRC	Hardened Steels 56–68 HRC	page(s)	recommended cutting parameters
Spiral-Flute Taps *(continued)*																		
	★		★		★		★	★	★	★							D30	–
	★		★		★		★	★	★	★							D31	–
	★		★		★		★	★	★	★							D29	–
	★		★		★		★	★	★	★							D29	–
	★		★		★		★	★	★	★							–	–
	★		★		★		★	★	★	★							D32	–
Straight-Flute Taps *(continued)*																		
						★★★	★★★		★★★	★★							D103	D126
						★★★	★★★		★★★	★★							–	–
						★★★	★★★		★★★	★★							–	–
						★★★	★★★		★★★	★★							–	–
						★★★	★★★		★★★	★★							–	D126
						★★★	★★★		★★★	★★							–	D126
						★★★	★★★		★★★	★★							–	D126
						★★★	★★★		★★★	★★							–	D126
																★★★	D97	D126
	★		★		★	★	★	★	★	★							D37	–

Selection Guide

★ Good
★★ Better
★★★ Best

series	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through	min–max		carbide	HSS-E-PM	HSS-E	HSS	type	form			
Straight-Flute Taps *(continued)*																	
5303	X		X		X		1/4–1-1/2"	Oxide, Uncoated				X	taper	—	0°	ANSI 302	
5353	X		X		X		M2–M36	Uncoated				X	taper	—	0°	ANSI 302	
5305/2305	X		X		X		#0–12	TiCN, TiN, Oxide, Uncoated				X	plug	—	0°	ANSI 302	
5303/2303	X		X		X		1/4–1-1/2"	TiCN, TiN, Oxide, Uncoated				X	plug	—	0°	ANSI 302	
5305/2305		X	X		X		#0–12	TiCN, TiN, Oxide, Uncoated				X	bottom	—	0°	ANSI 302	
5303/2303		X	X		X		1/4–1-1/2"	TiCN, TiN, Oxide, Uncoated				X	bottom	—	0°	ANSI 302	
5305	X	X	X		X		#0–12	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302	
5303	X	X	X		X		1/4–1-1/2"	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302	
5305L/5303L	X	X	X		X		1/4–3/4"	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302	
5305 (EXT)/5303 (EXT)	X	X	X		X		#6–3/8"	Uncoated				X	bottoming	—	0°	ANSI 302	
5353	X		X		X		M1.6–M36	TiCN, TiN, Uncoated				X	plug	—	0°	ANSI 302	
5353	X	X	X		X		M3–M20	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302	
5353		X	X		X		M3–M36	TiCN, TiN, Uncoated				X	bottoming	—	0°	ANSI 302	
7305	X	X	X		X		#4–12	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302	
7303	X	X	X		X		1/4–1-1/2"	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302	
7353	X	X	X		X		M6–M24	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302	

Selection Guide

P				M	K		N			S				H			
1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
Steel <35 HRC	Steel >36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49–55 HRC	Hardened Steels 56–68 HRC	page(s)	recommended cutting parameters
Straight-Flute Taps *(continued)*																	
★		★		★	★	★	★	★	★							D33	—
★		★		★	★	★	★	★	★							D40	—
★		★		★	★	★	★	★	★							D38	—
★		★		★	★	★	★	★	★							D34–D35	—
★		★		★	★	★	★	★	★							D39	—
★		★		★	★	★	★	★	★							D36	—
★		★		★	★	★	★	★	★							D48	—
★		★		★	★	★	★	★	★							D47	—
★	★	★	★	★	★	★	★	★	★							D49	—
★	★	★	★	★	★	★	★	★	★							D43	—
★		★		★	★	★	★	★	★							D42	—
★		★		★	★	★	★	★	★							D45	—
★		★		★	★	★	★	★	★							D41	—
★	★	★	★	★	★	★	★	★	★							D46	—
★	★	★	★	★	★	★	★	★	★							D44	—
★	★	★	★	★	★	★	★	★	★							D46	—

Selection Guide

★ Good
★★ Better
★★★ Best

series	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through	min–max		carbide	HSS-E-PM	HSS-E	HSS	type	form			
Form Taps																	
GT22 	X	X		X	X		M3–M16	WP31MG, WN38MG		X			semi-bottom	C	–	DIN 2174	
GT23 	X	X		X		X	M5–M16	WP31MG, WN38MG		X			semi-bottom	C	–	DIN 2174	
GT24 	X	X		X	X		#6–3/4"	WU32MG		X			semi-bottom	C	–	DIN/ANSI	
GT24 	X	X		X	X		M3–M16	WU32MG		X			semi-bottom	C	–	DIN/ANSI	
GT25 	X	X		X		X	1/4–3/4"	WU32MG		X			semi-bottom	C	–	DIN/ANSI	
GT25 	X	X		X		X	M6–M16	WU32MG		X			semi-bottom	C	–	DIN/ANSI	
GT26 		X		X	X		#0–3/4"	WU32MG		X			bottom	E	–	DIN/ANSI	
GT26 		X		X	X		M3–M16	WU32MG		X			bottom	E	–	DIN/ANSI	
GT27 		X		X		X	1/4–3/4"	WU32MG		X			bottom	E	–	DIN/ANSI	
GT27 		X		X		X	M6–M16	WU32MG		X			bottom	E	–	DIN/ANSI	
5900 	X			X	X		#6–1/2"	TiCN, TiN, Uncoated				X	plug	D	–	ANSI 302A	
5910 	X			X	X		M6–M10	TiCN, TiN, Uncoated				X	plug	D	–	ANSI 302A	
5912 		X		X	X		M4–M12	TiCN, TiN, Uncoated				X	bottoming	E	–	ANSI 302A	
5902 		X		X	X		#6–1/2"	TiCN, TiN, Uncoated				X	bottoming	E	–	ANSI 302A	
2500/5500 	X			X	X		#4–3/4"	TiN, Uncoated				X	plug	D	–	ANSI 302A	
2502/5502 		X		X	X		#0–5/8"	TiCN, TiN, Uncoated				X	bottoming	E	–	ANSI 302A	
2510/5510 	X			X	X		M3–M12	TiN, Uncoated				X	plug	D	–	ANSI 302A	
2512/5512 		X		X	X		M3–M12	TiCN, TiN, Uncoated				X	bottoming	E	–	ANSI 302A	

Selection Guide

	P				M	K		N			S				H			
	1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
	Steel <35 HRC	Steel >36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49–55 HRC	Hardened Steels 56–68 HRC	page(s)	recommended cutting parameters
Form Taps *(continued)*																		
	★★★							★★★	★★								–	D126
	★★★							★★★	★★								–	D126
	★★★				★★												D119	D126
	★★★				★★												D120	D126
	★★★				★★												D121	–
	★★★				★★												D122	–
	★★★				★★												D123	D126
	★★★				★★												D124	D126
	★★★				★★												–	–
	★★★				★★												–	–
	★				★			★	★	★							D58	–
	★				★			★	★	★							D60	–
	★				★			★	★	★							D60	–
	★				★			★	★	★							D59	–
	★				★			★	★	★							D55	–
	★				★			★	★	★							D56	–
	★				★			★	★	★							D57	–
	★				★			★	★	★							D57	–

Selection Guide

Good ★★ Better ★★★ Best	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension	
series	through	blind	cutting	forming	flood	through	min–max		carbide	HSS-E-PM	HSS-E	HSS	type	form			
Pipe Taps																	
VTSFT80 	X	X	X		X		1/16–1"	WU40EG, WP49EG, WU41EG			X		standard	–	–	ANSI	
VTSTR 	X	X	X		X		1/8–3/4"	WU40EG			X		standard	–	–	ANSI	
2320/5320 	X	X	X		X		1/16–2"	TiN, Oxide, Uncoated				X	standard	–	–	ANSI	
5319 	X	X	X		X		#1/8–2"	Oxide, Uncoated				X	standard	–	–	ANSI	
5321 	X	X	X		X		1/8–1/2"	Uncoated				X	standard	–	–	ANSI	
5820 	X	X	X		X		1/4–1"	Uncoated				X	standard	–	–	ANSI	
5323 	X	X	X		X		1/8–1"	Uncoated				X	standard	–	–	ANSI	
7320 	X	X	X		X		1/8–2"	Uncoated				X	standard	–	–	ANSI	

Selection Guide

	P				M	K		N			S				H			
	1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2	page(s)	recommended cutting parameters
	Steel <35 HRC	Steel >36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49–55 HRC	Hardened Steels 56–68 HRC		
Pipe Taps *(continued)*																		
	★★	★	★		★★	★	★★	★	★★	★★	★						D86	–
	★★					★											D87	–
	★					★	★	★	★	★							D50	–
	★					★	★	★	★	★							D51	–
	★					★	★	★	★	★							–	–
	★							★	★	★							D53	–
	★				★	★	★	★	★	★							D52	–
	★	★	★	★	★	★	★	★	★	★							D54	–

General-Purpose Taps

HSS

General-Purpose Taps are made of high-speed steel, which provides high toughness by utilizing strong coatings and surface treatments, enhancing the wear resistance and ability to perform in all workpiece materials.

Spiral point GUN™ taps shoot chips ahead of the cutting action to reduce overloading and clogging in flutes, protecting the workpiece.

Multicoating/surface treatment options to suit customer-specific needs

HSS
Extremely tough material which enables to be used in demanding conditions

Versatile spiral-flute design for pulling chips out of the hole



The general-purpose taps are designed as per ANSI standards, offering a complete portfolio of straight-fluted, spiral point gun, spiral-fluted, taper pipe, true-ledge form taps hand and hand tap sets.

GRADES

TiCN		TiN		Oxide		Uncoated	
P	●	P	●	P	●	P	●
M	○	M	○	M	●	M	○
K	○	K	○	K	●	K	○
N	○	N	○	N	●	N	○
S		S		S		S	
H		H		H		H	

GENERAL-PURPOSE, VERSATILE, ALL-APPLICATION PRODUCT

WIDIA GTD

PRODUCT

GP Taps are the go-to product for affordability and versatility

INDUSTRY

GENERAL ENGINEERING

TRANSPORTATION

MATERIALS

P M K N

APPLICATIONS



THROUGH HOLE | BLIND HOLE | THREAD | FLOOD COOLANT: TAPPING | ANSI UNC | ANSI UNF | MANUFACTURER'S SPECS: M | HSS

STYLE	TYPE
Spiral-Point and Left-Hand Spiral-Flute	Production Gun Taps
Spiral Flute	Production Taps
Forming Taps	TRU-LEDE™ Fe Taps
Straight-Flute and Spiral-Flute Pipe Taps	NPT, ANPT, NPTF, NPS, NPSF

In sizes Machine Screw and Fractional, Metric ANSI.

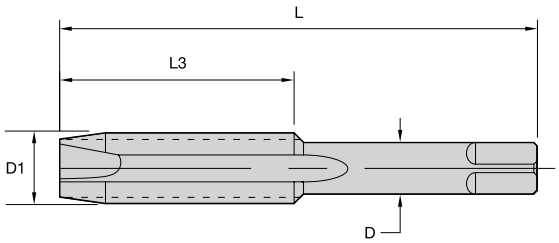
Shank Style

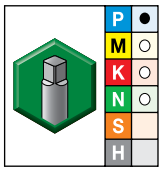
Ground h9 with square end.

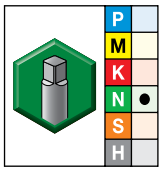


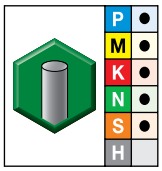
Series 5301/2301 • Spiral Point, Plug Chamfer

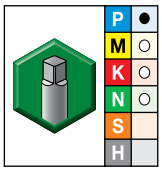












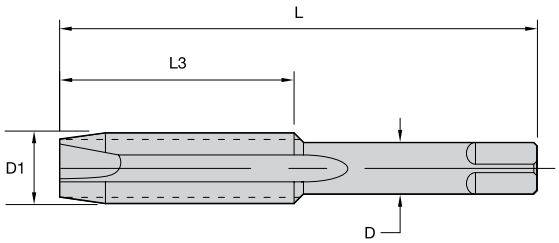
● first choice
○ alternate choice

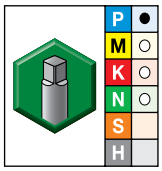
TiCN		uncoated		oxide		TiN						number	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	of flutes	limit
2746991	19011	2750249	13202	2750325	13111	2747016	19001	0 - 80	1.63	.31	.141	2	H2
–		2750246	13204	–		–		1 - 64	1.69	.38	.141	2	H2
–		2750241	13206	2750324	13115	–		1 - 72	1.69	.38	.141	2	H2
2746990	19012	2867063	13208	2750321	13117	2747001	19006	2 - 56	1.75	.44	.141	2	H2
–		2867066	13207	–		–		2 - 56	1.75	.44	.141	2	H1
–		2750238	13211	–		–		2 - 64	1.75	.44	.141	2	H2
–		2750236	13213	2750319	13119	2746999	19007	3 - 48	1.81	.50	.141	2	H2
–		2750231	13215	–		–		3 - 56	1.81	.50	.141	2	H2
–		2750230	13217	2750313	13126	–		4 - 36	1.88	.56	.141	2	H2
2746988	19013	2750228	13219	2750316	13123	2746982	19016	4 - 40	1.88	.56	.141	2	H2
–		2750225	13223	–		–		4 - 48	1.88	.56	.141	2	H2
2746986	19014	2750220	13225	2750312	13128	2746972	19021	5 - 40	1.94	.63	.141	2	H2
3171117	19464	2750218	13229	–		–		5 - 44	1.94	.63	.141	2	H2
–		2750210	13232	2750306	13132	2746946	19036	6 - 32	2.00	.69	.141	2	H3
–		2750212	13231	2750309	13131	2746954	19031	6 - 32	2.00	.69	.141	2	H2
–		2750209	13235	–		–		6 - 32	2.00	.69	.141	2	H7
2746944	19037	2750206	13237	–		2746942	19038	6 - 40	2.00	.69	.141	2	H2
–		2750202	13241	2750302	13136	2746941	19039	8 - 32	2.13	.75	.168	2	H2
–		2750199	13242	2750300	13137	2746928	19046	8 - 32	2.13	.75	.168	2	H3
–		2750204	13240	–		–		8 - 32	2.13	.75	.168	2	H1
–		2750195	13244	–		–		8 - 32	2.13	.75	.168	2	H7
–		2750193	13246	3047408	13139	–		8 - 36	2.13	.75	.168	2	H2
2746984	19015	2409831	13251	2750293	13142	2746913	19056	10 - 24	2.38	.88	.194	2	H3
–		2750190	13250	2750294	13141	–		10 - 24	2.38	.88	.194	2	H2
–		2750192	13249	–		–		10 - 24	2.38	.88	.194	2	H1
–		2750177	13256	2750291	13145	2746899	19069	10 - 32	2.38	.88	.194	2	H2
–		2750175	13257	2750290	13146	2746897	19071	10 - 32	2.38	.88	.194	2	H3
–		2750179	13255	–		–		10 - 32	2.38	.88	.194	2	H1
–		2750165	13260	–		–		10 - 32	2.38	.88	.194	2	H7
2746980	19017	2750160	13262	2750287	13148	2746889	19076	12 - 24	2.38	.94	.220	2	H3
3171130	19482	2750159	13264	2750286	13149	–		12 - 28	2.38	.94	.220	2	H3
–		2750154	13269	2750284	13151	2863790	19079	1/4 - 20	2.50	1.00	.255	2	H2
3171133	19485	2750152	13270	2750282	13152	2746879	19086	1/4 - 20	2.50	1.00	.255	2	H3
–		2750148	13272	2750280	13154	2746877	19088	1/4 - 20	2.50	1.00	.255	3	H3
–		2750156	13268	–		–		1/4 - 20	2.50	1.00	.255	2	H1
–		2750143	13273	–		2746869	19096	1/4 - 20	2.50	1.00	.255	2	H5
–		2750141	13274	–		–		1/4 - 20	2.50	1.00	.255	3	H5
–		2750128	13280	2750277	13158	2746865	19101	1/4 - 28	2.50	1.00	.255	2	H3
–		2750135	13277	–		–		1/4 - 28	2.50	1.00	.255	2	H1
–		2750132	13278	–		–		1/4 - 28	2.50	1.00	.255	2	H2
2746978	19018	2750129	13279	–		–		1/4 - 28	2.50	1.00	.255	3	H2
–		2750119	13282	–		–		1/4 - 28	2.50	1.00	.255	2	H4
3171144	19498	2750111	13291	2750276	13164	1916977	19106	5/16 - 18	2.72	1.13	.318	2	H3
2746976	19019	2750109	13293	1830468	13166	3171095	19384	5/16 - 18	2.72	1.13	.318	3	H3
–		2750115	13289	–		–		5/16 - 18	2.72	1.13	.318	2	H1
–		2750112	13290	–		–		5/16 - 18	2.72	1.13	.318	2	H2
–		2750105	13294	–		–		5/16 - 18	2.72	1.13	.318	2	H5
–		2750103	13295	–		–		5/16 - 18	2.72	1.13	.318	3	H5

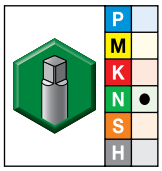
Series 5301/2301 • Spiral Point, Plug Chamfer

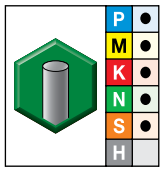
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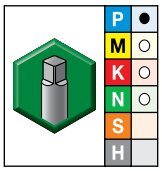












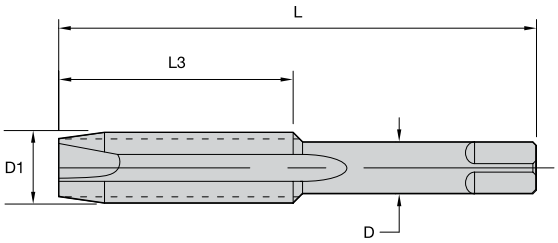
● first choice
○ alternate choice

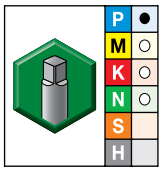
TiCN		uncoated		oxide		TiN							number	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		of flutes	limit
–		2750088	13300	2750271	13170	2746857	19108	5/16 - 24	2.72	1.13	.318		2	H3
–		2750094	13298	–		–		5/16 - 24	2.72	1.13	.318		2	H2
2746974	19020	2750084	13303	–		–		5/16 - 24	2.72	1.13	.318		3	H4
2746970	19022	2750078	13307	2750268	13176	2746855	19111	3/8 - 16	2.94	1.25	.381		3	H3
–		2750082	13305	–		–		3/8 - 16	2.94	1.25	.381		3	H1
–		2750080	13306	–		–		3/8 - 16	2.94	1.25	.381		3	H2
3171152	19509	2750075	13309	–		–		3/8 - 16	2.94	1.25	.381		3	H5
2746968	19023	2750067	13313	2750266	13180	2746853	19112	3/8 - 24	2.94	1.25	.381		3	H3
–		2750066	13315	–		–		3/8 - 24	2.94	1.25	.381		3	H4
2746966	19024	2750060	13319	2750264	13183	1893987	19113	7/16 - 14	3.16	1.44	.323		3	H3
–		2750058	13320	–		–		7/16 - 14	3.16	1.44	.323		3	H5
2746964	19025	2750055	13324	2750262	13185	2746849	19114	7/16 - 20	3.16	1.44	.323		3	H3
–		2750054	13325	–		–		7/16 - 20	3.16	1.44	.323		3	H5
2746962	19026	2750052	13328	2750261	13189	2746847	19116	1/2 - 13	3.38	1.66	.367		3	H3
–		2750053	13327	–		–		1/2 - 13	3.38	1.66	.367		3	H2
–		2750047	13330	–		–		1/2 - 13	3.38	1.66	.367		3	H5
2746960	19027	2750040	13334	2750259	13193	2746845	19117	1/2 - 20	3.38	1.66	.367		3	H3
2746958	19028	2750036	13339	2750257	13195	2746843	19118	5/8 - 11	3.81	1.81	.480		3	H3
–		2750032	13340	–		–		5/8 - 11	3.81	1.81	.480		3	H5
–		2750028	13342	2750255	13199	–		5/8 - 18	3.81	1.81	.480		3	H3
2746956	19029	2750024	13343	2750256	13197	2746841	19119	3/4 - 10	4.25	2.00	.590		3	H3
–		2750023	13344	–		–		3/4 - 10	4.25	2.00	.590		3	H5

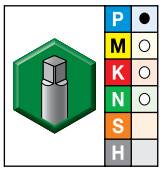
NOTE: GUN taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.

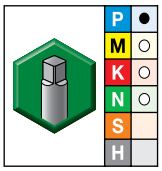
Series 5351/2351 • Metric ANSI • Spiral Point, Plug Chamfer











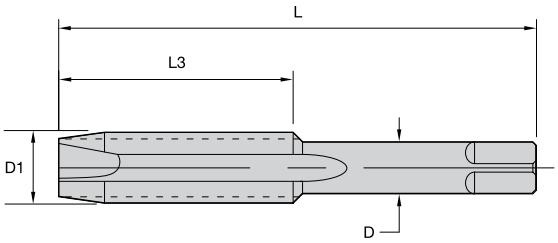
● first choice
○ alternate choice

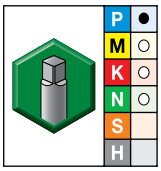
TiCN		uncoated		TiN							
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
–		2750021	13365	–		M1,6 X 0,35	1.63	.31	.141	2	D3
–		2750018	13367	–		M2 X 0,4	1.75	.44	.141	2	D3
–		2750017	13369	–		M2,5 X 0,45	1.81	.50	.141	2	D3
2747014	19002	2750015	13371	2746278	19920	M3 X 0,5	1.94	.63	.141	2	D3
–		2750013	13373	–		M3,5 X 0,6	2.00	.69	.141	2	D4
–		2750012	13375	2746276	19921	M4 X 0,7	2.13	.75	.168	2	D4
–		2750010	13377	–		M4,5 X 0,75	2.38	.88	.194	2	D4
2747010	19004	2750009	13379	2746274	19922	M5 X 0,8	2.38	.88	.194	2	D4
–		2750005	13381	2746272	19923	M6 X 1	2.50	1.00	.255	2	D5
–		2750002	13382	–		M6,3 X 1	2.50	1.00	.255	2	D5
–		2750000	13383	–		M7 X 1	2.72	1.13	.318	2	D5
2746997	19008	2749995	13385	2746270	19924	M8 X 1,25	2.72	1.13	.318	2	D5
2746995	19009	2749991	13389	2746268	19925	M10 X 1,5	2.94	1.25	.381	3	D6
2746993	19010	2749985	13393	2746266	19926	M12 X 1,75	3.38	1.66	.367	3	D6
–		2749982	13397	–		M14 X 2	3.59	1.66	.429	3	D7
–		2749979	13401	–		M16 X 2	3.81	1.81	.480	3	D7
–		2749977	13405	–		M18 X 2,5	4.03	1.81	.542	3	D7
–		2749975	13409	–		M20 X 2,5	4.47	2.00	.652	3	D7

NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.
Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Metric D limits suitable for ISO 6H tolerance class.
Refer to tables on page D128 for the recommended pitch diameter limit for 6H class of fit.

Series 5601 • Machine Screw and Fractional Heavy Duty • Spiral Point, Plug Chamfer







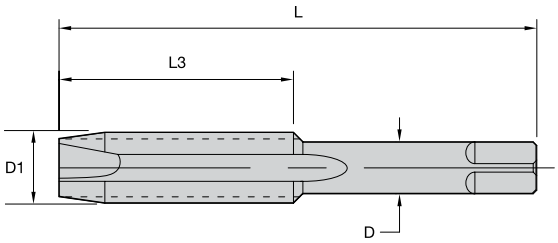
● first choice
○ alternate choice

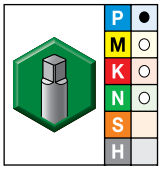
oxide/nitride						number	pitch diameter
order #	catalog #	D1 size	L	L3	D	of flutes	limit
2864368	**16802**	6 - 32	2.00	.69	.141	3	H3
2747975	**16805**	8 - 32	2.13	.75	.168	3	H3
2864362	**16807**	10 - 24	2.38	.88	.194	3	H3
2864359	**16809**	10 - 32	2.38	.88	.194	3	H3
2864356	**16810**	1/4 - 20	2.50	1.00	.255	3	H3
2747973	**16812**	1/4 - 28	2.50	1.00	.255	3	H3
2747971	**16814**	5/16 - 18	2.72	1.13	.318	3	H3
2747967	**16818**	3/8 - 16	2.94	1.25	.381	3	H3
2747965	**16820**	3/8 - 24	2.94	1.25	.381	3	H3
2747959	**16826**	1/2 - 13	3.38	1.66	.367	3	H3

NOTE: GUN™ taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 5301F • Fractional Sizes • Spiral Point, Plug Chamfer • Oversized







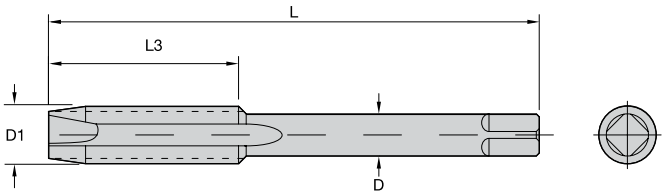
● first choice
○ alternate choice

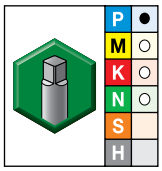
uncoated order #	catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
2750139	13275	1/4 - 20	2.50	1.00	.255	2	H11
2750101	13296	5/16 - 18	2.72	1.13	.318	2	H11
2750074	13310	3/8 - 16	2.94	1.25	.381	3	H11
2750046	13331	1/2 - 13	3.38	1.66	.367	3	H11
2750029	13341	5/8 - 11	3.81	1.81	.480	3	H11

NOTE: Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 5301 • Fractional Sizes • Spiral Point, Plug Chamfer • 6" Extension







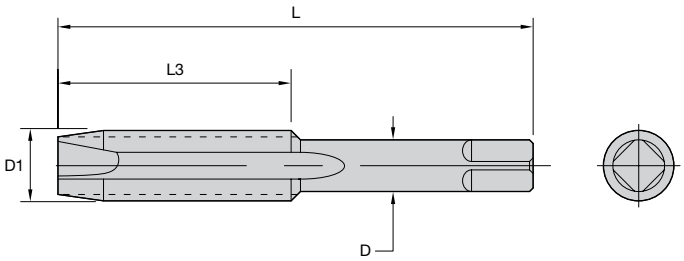
● first choice
○ alternate choice

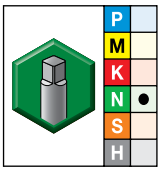
uncoated order #	catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
2747033	18932	8 - 32	6.00	.75	.168	2	H3
2747031	18934	10 - 24	6.00	.88	.194	2	H3
2747029	18935	10 - 32	6.00	.88	.194	2	H3
2747028	18936	1/4 - 20	6.00	1.00	.255	2	H3
2747026	18937	1/4 - 28	6.00	1.00	.255	2	H3
2747024	18938	5/16 - 18	6.00	1.13	.318	2	H3
2747020	18940	3/8 - 16	6.00	1.25	.381	3	H3
2747018	18941	3/8 - 24	6.00	1.25	.381	3	H3

NOTE: Also available in Hand Tap Series 5305 and 5303.
GUN™ taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 7301 • Plug Chamfer





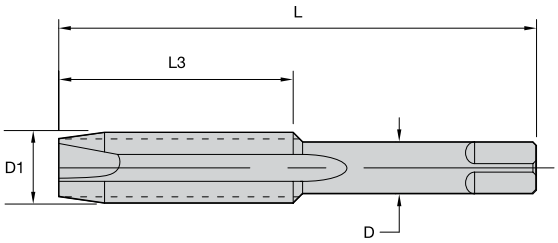


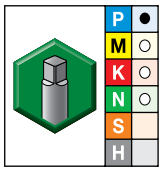
● first choice
○ alternate choice

uncoated order #	catalog #	D1 size	L	L3	D	class of fit
2750393	12027	4 - 40	1.88	.56	.141	2B
2750387	12032	6 - 32	2.00	.69	.141	2B
2750384	12034	8 - 32	2.15	.75	.168	2B
2750381	12036	10 - 24	2.38	.88	.194	2B
2750379	12037	10 - 32	2.38	.88	.194	2B
2750377	12038	12 - 24	2.38	.94	.220	2B
2750375	12040	1/4 - 20	2.50	1.00	.255	2B
2750374	12041	1/4 - 28	2.50	1.00	.255	2B
2750373	12042	5/16 - 18	2.72	1.13	.318	2B
2750371	12043	5/16 - 24	2.72	1.13	.318	2B
2750370	12044	3/8 - 16	2.94	1.25	.381	2B
2750369	12045	3/8 - 24	2.94	1.25	.381	2B
2750367	12046	7/16 - 14	3.16	1.44	.323	2B
2750364	12047	7/16 - 20	3.16	1.44	.323	2B
2750363	12048	1/2 - 13	3.38	1.66	.367	2B
2750360	12049	1/2 - 20	3.38	1.66	.367	2B
2750359	12050	5/8 - 11	3.81	1.81	.480	2B
2750357	12051	5/8 - 18	3.81	1.81	.480	2B
2750356	12052	3/4 - 10	4.25	1.81	.590	2B

Series 5302 • Machine Screw and Fractional • Spiral Point, Bottoming Chamfer







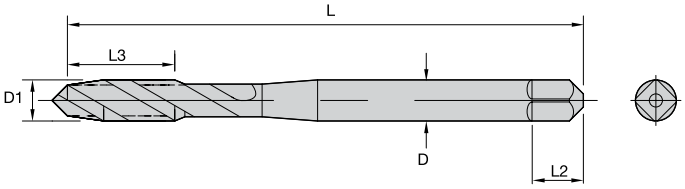
● first choice
○ alternate choice

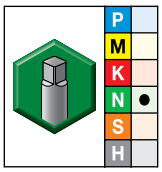
uncoated order #	uncoated catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
2749944	**13602**	0 - 80	1.63	.31	.141	2	H2
2749943	**13606**	2 - 56	1.75	.44	.141	2	H2
2749939	**13614**	4 - 40	1.88	.56	.141	2	H2
2749936	**13617**	5 - 40	1.94	.63	.141	2	H2
2749935	**13619**	6 - 32	2.00	.69	.141	2	H2
2749932	**13620**	6 - 32	2.00	.69	.141	2	H3
2749931	**13623**	6 - 40	2.00	.69	.141	2	H2
2749926	**13625**	8 - 32	2.13	.75	.168	2	H2
2749924	**13626**	8 - 32	2.13	.75	.168	2	H3
2866734	**13629**	10 - 24	2.38	.88	.194	2	H2
2749920	**13630**	10 - 24	2.38	.88	.194	2	H3
2749919	**13633**	10 - 32	2.38	.88	.194	2	H2
2866726	**13634**	10 - 32	2.38	.88	.194	2	H3
2749916	**13636**	12 - 24	2.38	.94	.220	2	H3
2749915	**13638**	1/4 - 20	2.50	1.00	.255	2	H3
2749914	**13639**	1/4 - 28	2.50	1.00	.255	2	H3
2749912	**13641**	5/16 - 18	2.72	1.13	.318	2	H3
2749909	**13642**	5/16 - 24	2.72	1.13	.318	2	H3

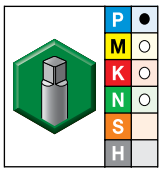
NOTE: Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 2364/5364 • Metric ANSI • Plug Chamfer









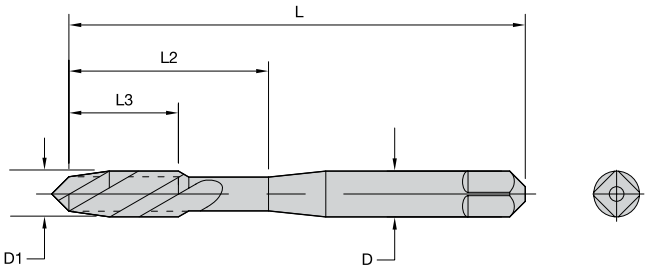
● first choice
○ alternate choice

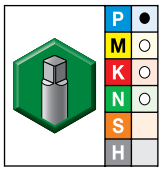
uncoated		TiN								
order #	catalog #	order #	catalog #	D1 size	L	L2	L3	D	number of flutes	pitch diameter limit
2748302	16053	2746264	19927	M3 X 0,5	1.94	—	.31	.141	2	D3
2748297	16057	2746260	19929	M4 X 0,7	2.13	.75	.38	.168	3	D4
2748295	16061	–		M5 X 0,8	2.38	.88	.50	.194	3	D4
2748291	16063	2746252	19933	M6 X 1	2.50	1.00	.63	.255	3	D5
2748285	16069	2746248	19935	M8 X 1,25	2.72	1.12	.69	.318	3	D5
2748281	16071	2746244	19937	M10 X 1,5	2.94	1.25	.75	.381	3	D6
2748273	16073	2746240	19939	M12 X 1,75	3.38	—	.94	.367	3	D6

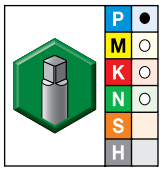
NOTE: Metric D limits are suitable for ISO 6H tolerance class.
Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Refer to tables on pages D128 for the recommended pitch diameter limit for 6H class of fit.

Series 2364/5364 • Metric ANSI • Bottoming Chamfer









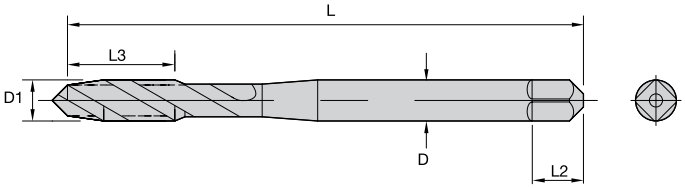
● first choice
○ alternate choice

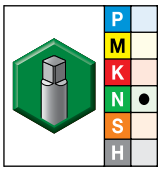
uncoated		TiN								
order #	catalog #	order #	catalog #	D1 size	L	L2	L3	D	number of flutes	pitch diameter limit
2748300	16054	2746262	19928	M3 X 0,5	1.94	—	.31	.141	2	D3
2748296	16058	2746258	19930	M4 X 0,7	2.13	.75	.38	.168	3	D4
2748293	16062	2746254	19932	M5 X 0,8	2.38	.88	.50	.194	3	D4
2748288	16064	2746250	19934	M6 X 1	2.50	.75	.38	.255	3	D5
2748284	16070	2746246	19936	M8 X 1,25	2.72	1.12	.69	.318	3	D5
2748275	16072	2746242	19938	M10 X 1,5	2.94	1.25	.75	.381	3	D6
2748271	16074	2746238	19940	M12 X 1,75	3.38	—	.94	.367	3	D6

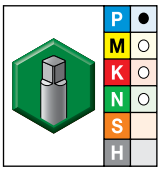
NOTE: Metric D limits are suitable for ISO 6H tolerance class.
Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.

Series 2314/5314 • Machine Screw and Fractional • Plug Chamfer







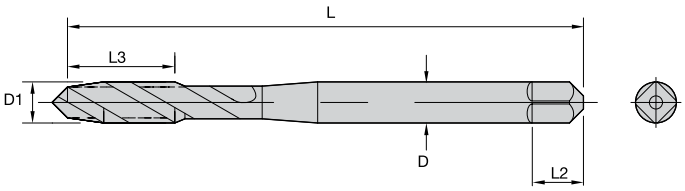


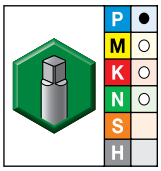
● first choice
○ alternate choice

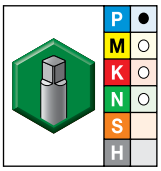
uncoated		TiN							number	pitch diameter
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	of flutes	limit
2748377	16003	2746484	19619	4 - 40	1.88	.56	—	.141	2	H2
2748372	16005	–		5 - 40	1.94	.63	—	.141	2	H2
2748369	16007	2746480	19622	6 - 32	2.00	.38	.69	.141	2	H3
2748366	16009	2746474	19626	8 - 32	2.13	.38	.75	.168	3	H3
2748363	16011	2746470	19628	10 - 24	2.38	.50	.88	.194	3	H3
2748360	16013	2746476	19624	10 - 32	2.38	.50	.88	.194	3	H3
2748355	16015	–		12 - 24	2.38	.50	.94	.220	3	H3
2748352	16017	2746464	19632	1/4 - 20	2.50	.63	1.00	.255	3	H3
2748348	16021	2746460	19634	1/4 - 28	2.50	.63	1.00	.255	3	H3
2748342	16023	2746458	19636	5/16 - 18	2.72	.69	1.12	.318	3	H3
2748336	16027	2746454	19638	5/16 - 24	2.72	.69	1.12	.318	3	H3
2748335	16029	2746450	19641	3/8 - 16	2.94	.75	1.25	.381	3	H3
2748332	16033	2746447	19643	3/8 - 24	2.94	.75	1.25	.381	3	H3
2748328	16035	2746437	19646	7/16 - 14	3.16	.88	—	.323	3	H3
2748318	16039	2746433	19648	1/2 - 13	3.38	.94	—	.367	3	H3
2748311	16047	–		5/8 - 11	3.81	1.09	—	.480	4	H3
2748307	16051	–		3/4 - 10	4.25	1.22	—	.590	4	H3

Series 2314/5314 • Machine Screw and Fractional • Bottoming Chamfer









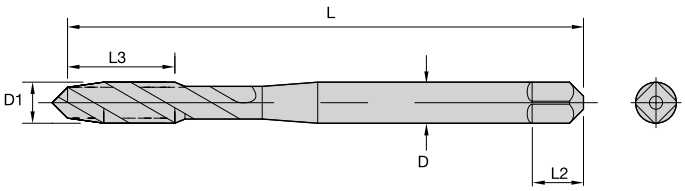
● first choice
○ alternate choice

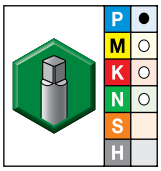
uncoated		TiN							number	pitch diameter
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	of flutes	limit
2748375	16004	2746482	19621	4 - 40	1.88	.56	—	.141	2	H2
2748370	16006	–		5 - 40	1.94	.56	—	.141	2	H2
2748367	16008	2746478	19623	6 - 32	2.00	.38	.69	.141	2	H3
3083563	16010	2746472	19627	8 - 32	2.13	.38	.75	.168	3	H3
2748361	16012	2746468	19629	10 - 24	2.38	.50	.88	.194	3	H3
2748356	16014	2746466	19631	10 - 32	2.38	.50	.88	.194	3	H3
2748353	16016	–		12 - 24	2.38	.50	.94	.220	3	H3
2748351	16018	2746462	19633	1/4 - 20	2.50	.63	1.00	.255	3	H3
1775500	16022	2746427	19651	1/4 - 28	2.50	.63	1.00	.255	3	H3
2748339	16024	2746456	19637	5/16 - 18	2.72	.69	1.12	.318	3	H3
3012779	16028	2746452	19639	5/16 - 24	2.72	.69	1.12	.318	3	H3
3083460	16030	2746448	19642	3/8 - 16	2.94	.75	1.25	.381	3	H3
2748329	16034	2746439	19644	3/8 - 24	2.94	.75	1.25	.381	3	H3
2748325	16036	2746435	19647	7/16 - 14	3.16	.88	—	.323	3	H3
2748321	16038	–		7/16 - 20	3.16	.88	—	.323	3	H3
2748317	16040	2746431	19649	1/2 - 13	3.38	.94	—	.367	3	H3
2748309	16048	–		5/8 - 11	3.81	1.09	—	.480	4	H3
3083458	16052	–		3/4 - 10	4.25	1.22	—	.590	4	H3

NOTE: Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 5344 • Machine Screw and Fractional • Bottoming Chamfer • Heavy Duty







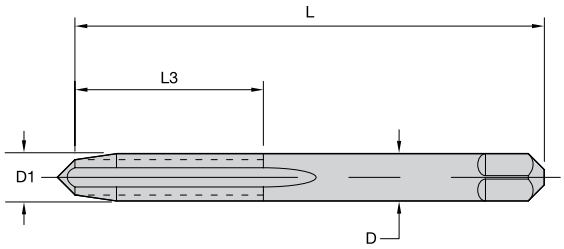
● first choice
○ alternate choice

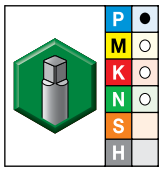
oxide order #	catalog #	D1 size	L	L2	L3	D	number of flutes	pitch diameter limit
2748054	**16502**	6 - 32	2.00	—	.38	.141	3	H3
2748050	**16504**	8 - 32	2.13	—	.38	.168	3	H3
2748046	**16506**	10 - 24	2.38	—	.50	.194	3	H3
2748042	**16508**	10 - 32	2.38	—	.50	.194	3	H3
2748038	**16510**	1/4 - 20	2.50	—	.63	.255	3	H3
2748030	**16514**	5/16 - 18	2.72	—	.69	.318	3	H3
2748026	**16516**	5/16 - 24	2.72	—	.69	.318	3	H3
2748022	**16518**	3/8 - 16	2.94	—	.75	.381	3	H3
2748018	**16520**	3/8 - 24	2.94	1.25	.75	.381	3	H3
2748014	**16522**	7/16 - 14	3.16	—	.88	.323	3	H3
2748006	**16526**	1/2 - 13	3.38	—	.94	.367	3	H3
2748002	**16528**	1/2 - 20	3.38	—	1.66	.367	3	H3
2747995	**16538**	3/4 - 10	4.25	—	1.22	.590	4	H3

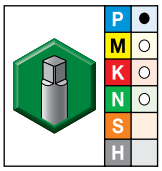
NOTE: Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 5303 • Fractional Sizes • Taper Chamfer • Hand Taps









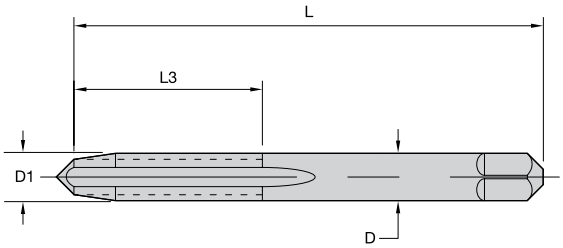
● first choice
○ alternate choice

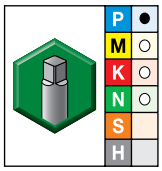
uncoated		oxide							
order #	catalog #	order #	catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
2749838	14010	–		1/4 - 20	2.50	1.00	.255	4	H1
2749832	14015	–		1/4 - 20	2.50	1.00	.255	4	H2
3139335	14022	2709949	19167	1/4 - 20	2.50	1.00	.255	4	H3
2749775	14055	2709942	19208	1/4 - 28	2.50	1.00	.255	4	H3
2749737	14092	2709937	19237	5/16 - 18	2.72	1.13	.318	4	H3
2749689	14122	–		5/16 - 24	2.72	1.13	.318	4	H3
2749651	14157	2709923	19278	3/8 - 16	2.94	1.25	.381	4	H3
2749611	14190	–		3/8 - 24	2.94	1.25	.381	4	H3
2749586	14221	–		7/16 - 14	3.16	1.44	.323	4	H3
2749568	14246	–		7/16 - 20	3.16	1.44	.323	4	H3
2749543	14281	2709916	19354	1/2 - 13	3.38	1.66	.367	4	H3
2749514	14308	–		1/2 - 20	3.38	1.66	.367	4	H3
3139336	14338	–		9/16 - 12	3.59	1.66	.429	4	H3
2749476	14356	–		9/16 - 18	3.59	1.66	.429	4	H3
2749460	14379	2709902	19407	5/8 - 11	3.81	1.81	.480	4	H3
2749432	14402	–		5/8 - 18	3.81	1.81	.480	4	H3
2749394	14448	–		3/4 - 10	4.25	2.00	.590	4	H3
2749374	14471	–		3/4 - 16	4.25	2.00	.590	4	H3
2749356	14499	–		7/8 - 9	4.69	2.22	.697	4	H4
2749340	14516	–		7/8 - 14	4.69	2.22	.697	4	H4
2749327	14544	–		1 - 8	5.13	2.50	.800	4	H4
2749308	14557	–		1 - 12	5.13	2.50	.800	4	H4
2749294	14568	–		1 - 14	5.13	2.50	.800	4	H4
2749281	14594	–		1 1/8 - 7	5.44	2.56	.896	4	H4
2749274	14603	–		1 1/8 - 12	5.44	2.56	.896	4	H4
2749265	14612	–		1 1/4 - 7	5.75	2.56	1.021	4	H4
3171056	14620	–		1 1/4 - 12	5.75	2.56	1.021	6	H4
3012774	14632	–		1 3/8 - 6	6.06	3.00	1.108	4	H4
3171057	14640	–		1 3/8 - 12	6.06	3.00	1.108	6	H4
2749241	14645	–		1 1/2 - 6	6.38	3.00	1.233	4	H4
3012776	14653	–		1 1/2 - 12	6.38	3.00	1.233	6	H4

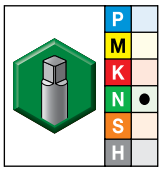
NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

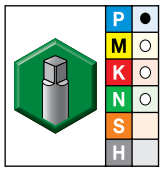
Series 5303/2303 • Fractional Sizes • Plug Chamfer • Hand Taps

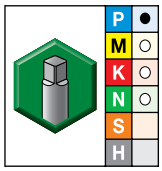












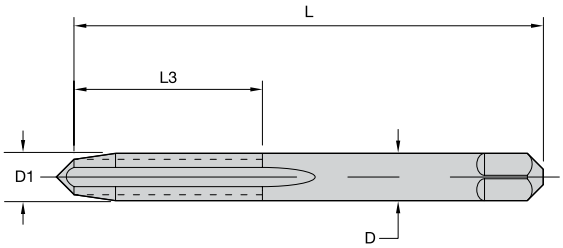
● first choice
○ alternate choice

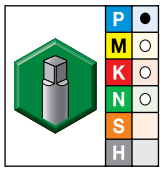
TiCN		uncoated		oxide		TiN						number	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	of flutes	limit
2749839	14009	2957247	14023	2863727	19170	2463627	19247	1/4 - 20	2.50	1.00	.255	4	H3
–		2749837	14011	–		–		1/4 - 20	2.50	1.00	.255	4	H1
–		2749830	14016	–		–		1/4 - 20	2.50	1.00	.255	4	H2
–		3180806	14020	–		–		1/4 - 20	2.50	1.00	.255	3	H2
–		3102009	14030	–		2748577	15453	1/4 - 20	2.50	1.00	.255	2	H3
–		2749802	14032	–		3171060	15454	1/4 - 20	2.50	1.00	.255	3	H3
–		2749780	14052	–		–		1/4 - 28	2.50	1.00	.255	4	H2
–		2749777	14053	–		–		1/4 - 28	2.50	1.00	.255	4	H2
2746827	19128	2749772	14056	2746703	19210	2463629	19253	1/4 - 28	2.50	1.00	.255	4	H3
–		2749759	14063	–		–		1/4 - 28	2.50	1.00	.255	2	H3
–		2749757	14065	–		2748574	15456	1/4 - 28	2.50	1.00	.255	3	H3
–		2749751	14067	–		–		1/4 - 28	2.50	1.00	.255	4	H4
2746826	19129	2749734	14093	2746665	19240	2746637	19258	5/16 - 18	2.72	1.13	.318	4	H3
–		3102021	14100	–		–		5/16 - 18	2.72	1.13	.318	2	H3
–		–		–		2748569	15459	5/16 - 18	2.72	1.13	.318	2	H3
–		–		–		2710689	15460	5/16 - 18	2.72	1.13	.318	3	H3
–		2749714	14102	–		–		5/16 - 18	2.72	1.13	.318	3	H3
–		2749694	14113	–		–		5/16 - 24	2.72	1.13	.318	4	H1
2746824	19131	2749686	14123	–		–		5/16 - 24	2.72	1.13	.318	4	H3
–		1295391	14130	–		2748566	15462	5/16 - 24	2.72	1.13	.318	3	H3
2746822	19132	2749649	14158	2746615	19280	2746625	19268	3/8 - 16	2.94	1.25	.381	4	H3
–		2749635	14165	–		2748563	15464	3/8 - 16	2.94	1.25	.381	3	H3
–		2749629	14169	–		–		3/8 - 16	2.94	1.25	.381	4	H5
–		2749655	14152	–		–		3/8 - 16	2.94	1.25	.381	4	H2
–		2749595	14198	–		2748560	15466	3/8 - 24	2.94	1.25	.381	3	H3
–		2749591	14201	–		–		3/8 - 24	2.94	1.25	.381	4	H4
2746820	19134	2749609	14191	–		2746621	19273	3/8 - 24	2.94	1.25	.381	4	H3
2746818	19135	2749584	14222	–		2746617	19277	7/16 - 14	3.16	1.44	.323	4	H3
–		2749573	14229	–		2748558	15467	7/16 - 14	3.16	1.44	.323	3	H3
2746816	19136	1951473	14247	–		–		7/16 - 20	3.16	1.44	.323	4	H3
–		2749530	14289	–		2748552	15469	1/2 - 13	3.38	1.66	.367	3	H3
–		2957246	14293	–		–		1/2 - 13	3.38	1.66	.367	4	H5
2746814	19137	2415661	14282	2746576	19360	2746605	19291	1/2 - 13	3.38	1.66	.367	4	H3
–		2749493	14316	–		2748550	15470	1/2 - 20	3.38	1.66	.367	3	H3
2746812	19138	2749513	14309	2746568	19375	2746595	19297	1/2 - 20	3.38	1.66	.367	4	H3
–		2866187	14339	–		–		9/16 - 12	3.59	1.66	.429	4	H3
–		2749475	14357	–		–		9/16 - 18	3.59	1.66	.429	4	H3
2746810	19139	2749458	14380	2746564	19410	2863589	19307	5/8 - 11	3.81	1.81	.480	4	H3
2746808	19140	2749431	14403	–		2746592	19317	5/8 - 18	3.81	1.81	.480	4	H3
–		–		2746560	19445	–		3/4 - 10	4.25	2.00	.590	4	H3
–		–		–		2746588	19327	3/4 - 10	4.25	2.00	.590	4	H3
2746806	19141	–		–		–		3/4 - 10	4.25	2.00	.590	4	H3
–		2749392	14449	–		–		3/4 - 10	4.25	2.00	.590	4	H3
–		1825322	14472	–		–		3/4 - 16	4.25	2.00	.590	4	H3

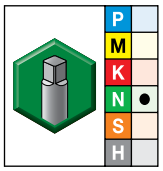
Series 5303/2303 • Fractional Sizes • Plug Chamfer • Hand Taps

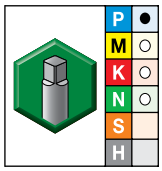
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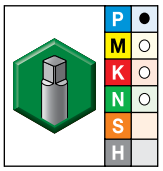












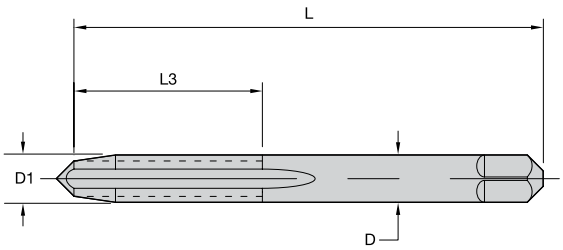
● first choice
○ alternate choice

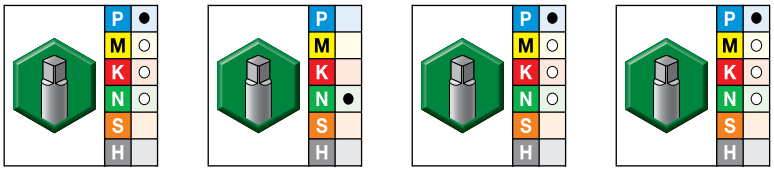
TiCN		uncoated		oxide		TiN						number	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	of flutes	limit
–		–		2746556	19455	–		3/4 - 16	4.25	2.00	.590	4	H3
–		–		–		2746584	19337	3/4 - 16	4.25	2.00	.590	4	H3
2746804	19142	–		–		–		3/4 - 16	4.25	2.00	.590	4	H3
–		–		2709889	19465	–		7/8 - 9	4.69	2.22	.697	4	H4
–		2749354	14500	–		–		7/8 - 9	4.69	2.22	.697	4	H4
–		–		–		2863567	19347	7/8 - 9	4.69	2.22	.697	4	H4
–		2749338	14517	–		–		7/8 - 14	4.69	2.22	.697	4	H4
–		–		2709874	19475	–		1 - 8	5.13	2.50	.800	4	H4
–		–		–		2746572	19367	1 - 8	5.13	2.50	.800	4	H4
–		2749326	14545	–		–		1 - 8	5.13	2.50	.800	4	H4
–		2749305	14558	–		–		1 - 12	5.13	2.50	.800	4	H4
–		2749292	14569	–		–		1 - 14	5.13	2.50	.800	4	H4
–		2749280	14595	–		–		1 1/8 - 7	5.44	2.56	.896	4	H4
–		2749271	14604	–		–		1 1/8 - 12	5.44	2.56	.896	4	H4
–		2749263	14613	–		–		1 1/4 - 7	5.75	2.56	1.021	4	H4
–		2749258	14621	–		–		1 1/4 - 12	5.75	2.56	1.021	6	H4
–		2749252	14633	–		–		1 3/8 - 6	6.06	3.00	1.108	4	H4
–		2749247	14641	–		–		1 3/8 - 12	6.06	3.00	1.108	6	H4
–		3012775	14646	–		–		1 1/2 - 6	6.38	3.00	1.233	4	H4
–		2749234	14654	–		–		1 1/2 - 12	6.38	3.00	1.233	6	H4

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Refer to table on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 5303/2303 • Fractional Sizes • Bottoming Chamfer • Hand Taps







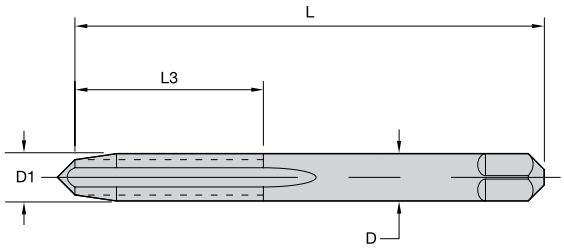
● first choice
○ alternate choice

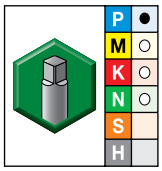
TiCN		uncoated		oxide		TiN							number	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		of flutes	limit
–		2749836	14012	–		–		1/4 - 20	2.50	1.00	.255		4	H1
–		2749826	14017	–		–		1/4 - 20	2.50	1.00	.255		4	H2
2746741	19184	2749818	14024	2746748	19180	2463628	19251	1/4 - 20	2.50	1.00	.255		4	H3
–		2749805	14031	–		–		1/4 - 20	2.50	1.00	.255		2	H3
–		2749800	14033	–		–		1/4 - 20	2.50	1.00	.255		3	H3
–		2749793	14037	–		–		1/4 - 20	2.50	1.00	.255		4	H5
2746739	19185	2749766	14057	2746691	19220	2463630	19256	1/4 - 28	2.50	1.00	.255		4	H3
–		2749758	14064	–		–		1/4 - 28	2.50	1.00	.255		2	H3
–		2749755	14066	–		2748576	15455	1/4 - 28	2.50	1.00	.255		3	H3
–		1854370	14068	–		–		1/4 - 28	2.50	1.00	.255		4	H4
–		2749742	14083	–		–		5/16 - 18	2.72	1.13	.318		4	H1
–		2749739	14088	–		–		5/16 - 18	2.72	1.13	.318		4	H2
2746737	19186	2749732	14094	2746657	19245	2746633	19261	5/16 - 18	2.72	1.13	.318		4	H3
–		2749716	14101	–		2748573	15457	5/16 - 18	2.72	1.13	.318		2	H3
–		2749712	14103	–		2748571	15458	5/16 - 18	2.72	1.13	.318		3	H3
–		2749706	14105	–		–		5/16 - 18	2.72	1.13	.318		4	H5
2746735	19187	2038474	14124	2746629	19265	2746627	19266	5/16 - 24	2.72	1.13	.318		4	H3
–		2749669	14131	–		2748568	15461	5/16 - 24	2.72	1.13	.318		3	H3
–		2749656	14148	–		–		3/8 - 16	2.94	1.25	.381		4	H1
–		2749652	14153	–		–		3/8 - 16	2.94	1.25	.381		4	H2
2746733	19188	2749647	14159	2746609	19285	2746623	19271	3/8 - 16	2.94	1.25	.381		4	H3
–		2749633	14166	–		2748565	15463	3/8 - 16	2.94	1.25	.381		3	H3
–		2749625	14170	–		–		3/8 - 16	2.94	1.25	.381		4	H5
2746731	19189	1951472	14192	2746593	19310	2746619	19275	3/8 - 24	2.94	1.25	.381		4	H3
–		2749593	14199	–		2748561	15465	3/8 - 24	2.94	1.25	.381		3	H3
2746729	19191	2749582	14223	–		2746613	19281	7/16 - 14	3.16	1.44	.323		4	H3
–		2749570	14233	–		–		7/16 - 14	3.16	1.44	.323		4	H5
2746727	19192	2038865	14248	–		2746607	19287	7/16 - 20	3.16	1.44	.323		4	H3
–		2749548	14257	–		–		7/16 - 20	3.16	1.44	.323		4	H5
2746725	19193	2749540	14283	2746580	19355	2746601	19293	1/2 - 13	3.38	1.66	.367		4	H3
–		2749526	14290	–		2748556	15468	1/2 - 13	3.38	1.66	.367		3	H3
–		2749520	14294	–		–		1/2 - 13	3.38	1.66	.367		4	H5
2746723	19194	1951476	14310	2746566	19380	3113801	19303	1/2 - 20	3.38	1.66	.367		4	H3
–		2866184	14340	–		–		9/16 - 12	3.59	1.66	.429		4	H3
–		2749474	14358	–		–		9/16 - 18	3.59	1.66	.429		4	H3
2746721	19197	2749456	14381	2746562	19415	2863585	19313	5/8 - 11	3.81	1.81	.480		4	H3
–		2749441	14389	–		–		5/8 - 11	3.81	1.81	.480		4	H5
2746719	19198	2749428	14404	–		2746590	19323	5/8 - 18	3.81	1.81	.480		4	H3
–		2749403	14425	–		–		11/16 - 11	4.03	1.06	.542		4	H3
2746717	19199	3180808	14450	2746558	19450	2746586	19333	3/4 - 10	4.25	2.00	.590		4	H3
–		2749370	14473	2746553	19460	2863572	19343	3/4 - 16	4.25	2.00	.590		4	H3
–		2749358	14483	–		–		3/4 - 16	4.25	2.00	.590		4	H5
–		2749352	14501	2709881	19470	2746582	19353	7/8 - 9	4.69	2.22	.697		4	H4
–		2749336	14518	–		–		7/8 - 14	4.69	2.22	.697		4	H4
–		2749324	14546	2709867	19480	2746570	19373	1 - 8	5.13	2.50	.800		4	H4
–		3006761	14559	–		–		1 - 12	5.13	2.50	.800		4	H4
–		3180807	14570	–		–		1 - 14	5.13	2.50	.800		4	H4
–		2749278	14596	–		–		1 1/8 - 7	5.44	2.56	.896		4	H4
–		2749269	14605	–		–		1 1/8 - 12	5.44	2.56	.896		4	H4
–		2749261	14614	–		–		1 1/4 - 7	5.75	2.56	1.021		4	H4
–		2749256	14622	–		–		1 1/4 - 12	5.75	2.56	1.021		6	H4
–		2749251	14634	–		–		1 3/8 - 6	6.06	3.00	1.108		4	H4
–		2749246	14642	–		–		1 3/8 - 12	6.06	3.00	1.108		6	H4
–		2749240	14647	–		–		1 1/2 - 6	6.38	3.00	1.233		4	H4
–		2749233	14655	–		–		1 1/2 - 12	6.38	3.00	1.233		6	H4

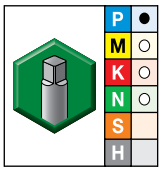
NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 5305 • Machine Screw Sizes • Taper Chamfer • Hand Taps









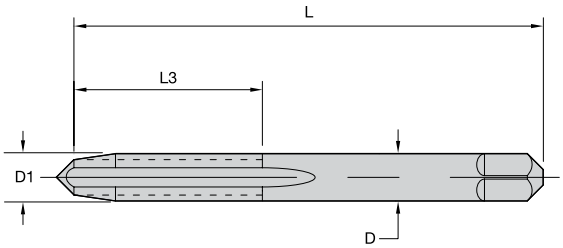
● first choice
○ alternate choice

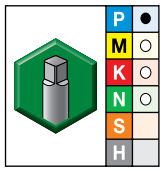
uncoated		oxide							
order #	catalog #	order #	catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
2748991	15102	–		0 - 80	1.63	.31	.141	2	H1
2748975	15114	–		1 - 64	1.69	.38	.141	2	H1
2748964	15120	–		1 - 72	1.69	.38	.141	2	H1
2748951	15134	–		2 - 56	1.75	.44	.141	3	H2
2748935	15144	–		2 - 64	1.75	.44	.141	3	H2
2748925	15156	–		3 - 48	1.81	.50	.141	3	H2
2748913	15166	–		3 - 56	1.81	.50	.141	3	H2
2748887	15184	2709836	19563	4 - 40	1.88	.56	.141	3	H2
2748869	15196	–		4 - 48	1.88	.56	.141	3	H2
2865323	15209	–		5 - 40	1.94	.63	.141	3	H2
2748858	15220	–		5 - 44	1.94	.63	.141	3	H2
2865295	15225	–		6 - 32	2.00	.69	.141	3	H1
2748845	15231	–		6 - 32	2.00	.69	.141	3	H2
2865268	15237	2709816	19573	6 - 32	2.00	.69	.141	3	H3
2748827	15257	–		6 - 40	2.00	.69	.141	3	H2
2748806	15275	–		8 - 32	2.13	.75	.168	4	H2
2748787	15283	2709810	19583	8 - 32	2.13	.75	.168	4	H3
2748764	15301	–		8 - 36	2.13	.75	.168	4	H2
2748747	15320	–		10 - 24	2.38	.88	.194	4	H2
2748738	15327	–		10 - 24	2.38	.88	.194	4	H3
2748708	15344	–		10 - 32	2.38	.88	.194	4	H1
2748694	15352	–		10 - 32	2.38	.88	.194	4	H2
2748679	15360	2709796	19613	10 - 32	2.38	.88	.194	4	H3
2748645	15383	–		12 - 24	2.38	.94	.220	4	H3
2748631	15390	–		12 - 28	2.38	.94	.220	4	H3

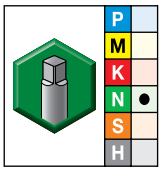
NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

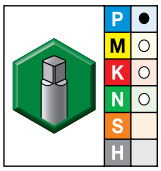
Series 5305/2305 • Machine Screw Sizes • Plug Chamfer • Hand Taps

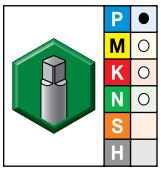












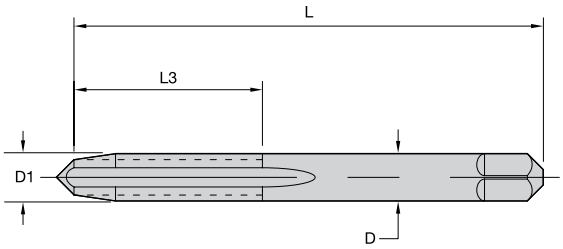
● first choice
○ alternate choice

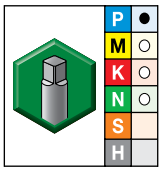
TiCN		uncoated		oxide		TiN						number	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	of flutes	limit
–		2748988	15103	–		–		0 - 80	1.63	.31	.141	2	H1
2746839	19121	2748979	15107	–		–		0 - 80	1.63	.31	.141	2	H2
–		2748972	15115	–		–		1 - 64	1.69	.38	.141	2	H1
–		2748963	15121	–		–		1 - 72	1.69	.38	.141	2	H1
2746837	19122	2748950	15135	–		–		2 - 56	1.75	.44	.141	3	H2
–		2748943	15138	–		–		2 - 56	1.75	.44	.141	2	H2
–		2748933	15145	–		–		2 - 64	1.75	.44	.141	3	H2
–		2748924	15157	–		–		3 - 48	1.81	.50	.141	3	H2
–		2748916	15160	–		2748614	15433	3 - 48	1.81	.50	.141	2	H2
–		2748911	15167	–		–		3 - 56	1.81	.50	.141	3	H2
2746835	19123	2748885	15185	2709830	19565	2041049	19211	4 - 40	1.88	.56	.141	3	H2
–		2748878	15189	–		–		4 - 40	1.88	.56	.141	2	H2
–		2748867	15197	–		–		4 - 48	1.88	.56	.141	3	H2
2746833	19124	2865319	15210	–		2746697	19216	5 - 40	1.94	.63	.141	3	H2
–		2865310	15214	–		2748606	15437	5 - 40	1.94	.63	.141	2	H2
–		2748855	15221	–		–		5 - 44	1.94	.63	.141	3	H2
2748850	15224	2748843	15238	2746500	19575	–		6 - 32	2.00	.69	.141	3	H3
–		2865279	15232	–		2041051	19221	6 - 32	2.00	.69	.141	3	H2
–		2748836	15245	–		–		6 - 32	2.00	.69	.141	2	H3
–		2748825	15258	–		–		6 - 40	2.00	.69	.141	3	H2
–		2748816	15262	–		–		6 - 40	2.00	.69	.141	2	H2
2748810	15270	2748785	15284	2746492	19585	–		8 - 32	2.13	.75	.168	4	H3
–		2748804	15276	–		2463623	19226	8 - 32	2.13	.75	.168	4	H2
–		2748774	15291	–		–		8 - 32	2.13	.75	.168	2	H3
–		2748768	15293	–		2748598	15442	8 - 32	2.13	.75	.168	3	H3
–		2748761	15302	–		–		8 - 36	2.13	.75	.168	4	H2
–		2748746	15321	–		–		10 - 24	2.38	.88	.194	4	H2
2746831	19126	2748736	15328	2746490	19600	2603956	19231	10 - 24	2.38	.88	.194	4	H3
–		2748730	15335	–		–		10 - 24	2.38	.88	.194	2	H3
–		2748726	15337	–		2748595	15444	10 - 24	2.38	.88	.194	3	H3
2748697	15348	2748678	15361	2746486	19615	2622811	19236	10 - 32	2.38	.88	.194	4	H3
–		2748692	15353	–		–		10 - 32	2.38	.88	.194	4	H2
–		2748666	15368	–		–		10 - 32	2.38	.88	.194	2	H3
–		2748662	15370	–		–		10 - 32	2.38	.88	.194	3	H3
2746830	19127	2748643	15384	–		–		12 - 24	2.38	.94	.220	4	H3
–		2748628	15391	–		–		12 - 28	2.38	.94	.220	4	H3

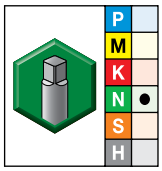
NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

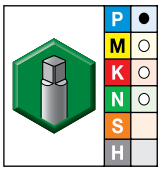
Series 5305/2305 • Machine Screw Sizes • Bottoming Chamfer • Hand Taps

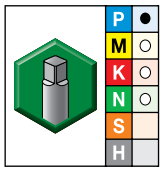












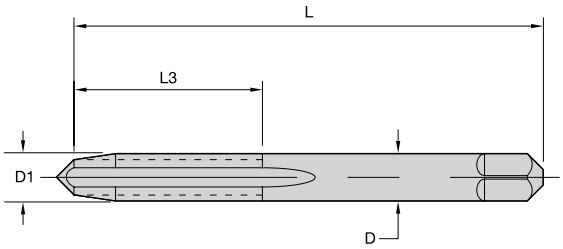
● first choice
○ alternate choice

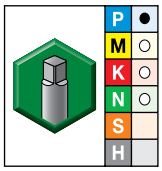
TiCN		uncoated		oxide		TiN						number	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	of flutes	limit
–		2748985	15104	–		–		0 - 80	1.63	.31	.141	2	H1
2863721	19174	2748977	15108	–		–		0 - 80	1.63	.31	.141	2	H2
–		2748970	15116	–		–		1 - 64	1.69	.38	.141	2	H1
–		2748962	15122	–		–		1 - 72	1.69	.38	.141	2	H1
3171079	19175	2748947	15136	–		–		2 - 56	1.75	.44	.141	3	H2
–		2748942	15139	–		–		2 - 56	1.75	.44	.141	2	H2
–		2748930	15146	–		–		2 - 64	1.75	.44	.141	3	H2
–		2748920	15158	–		–		3 - 48	1.81	.50	.141	3	H2
–		2748914	15161	–		2748616	15432	3 - 48	1.81	.50	.141	2	H2
–		2748906	15168	–		–		3 - 56	1.81	.50	.141	3	H2
2746756	19176	2748882	15186	2709823	19570	–		4 - 40	1.88	.56	.141	3	H2
–		2748876	15190	–		2748612	15434	4 - 40	1.88	.56	.141	2	H2
–		2748864	15198	–		–		4 - 48	1.88	.56	.141	3	H2
2746754	19177	2865316	15211	–		–		5 - 40	1.94	.63	.141	3	H2
–		3177073	15215	–		2748607	15436	5 - 40	1.94	.63	.141	2	H2
–		2748852	15222	–		–		5 - 44	1.94	.63	.141	3	H2
–		2865289	15227	–		–		6 - 32	2.00	.69	.141	3	H1
–		2865277	15233	–		2041052	19223	6 - 32	2.00	.69	.141	3	H2
–		2891496	15236	–		–		6 - 32	2.00	.69	.141	2	H2
2746752	19178	2748840	15239	2746494	19580	–		6 - 32	2.00	.69	.141	3	H3
–		2748835	15246	–		2748604	15438	6 - 32	2.00	.69	.141	2	H3
–		2748820	15259	–		–		6 - 40	2.00	.69	.141	3	H2
–		2748811	15269	–		–		8 - 32	2.13	.75	.168	4	H1
–		2748803	15277	–		1773455	19228	8 - 32	2.13	.75	.168	4	H2
–		2748795	15280	–		–		8 - 32	2.13	.75	.168	2	H2
2709451	19860	2748781	15285	2863495	19590	–		8 - 32	2.13	.75	.168	4	H3
–		2748773	15292	–		–		8 - 32	2.13	.75	.168	2	H3
–		2969917	15294	–		–		8 - 32	2.13	.75	.168	3	H3
–		2748758	15303	–		–		8 - 36	2.13	.75	.168	4	H2
–		2748744	15322	–		–		10 - 24	2.38	.88	.194	4	H2
2746747	19181	2748733	15329	2746488	19605	2603957	19233	10 - 24	2.38	.88	.194	4	H3
–		2748728	15336	–		–		10 - 24	2.38	.88	.194	2	H3
–		2748722	15338	–		2748597	15443	10 - 24	2.38	.88	.194	3	H3
–		2748689	15354	–		–		10 - 32	2.38	.88	.194	4	H2
–		2748682	15357	–		–		10 - 32	2.38	.88	.194	2	H2
2746745	19182	2748675	15362	2863477	19620	2622812	19238	10 - 32	2.38	.88	.194	4	H3
–		2748663	15369	–		2748593	15445	10 - 32	2.38	.88	.194	2	H3
–		2748661	15371	–		–		10 - 32	2.38	.88	.194	3	H3
2746743	19183	2748641	15385	–		2746661	19243	12 - 24	2.38	.94	.220	4	H3
–		2748624	15392	–		–		12 - 28	2.38	.94	.220	4	H3

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 5353 • Metric ANSI • Taper Chamfer • Hand Taps







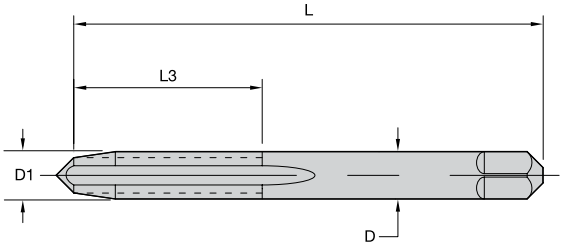
● first choice
○ alternate choice

uncoated order #	uncoated catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
2749221	**14725**	M2 X 0,4	1.75	.44	.141	3	D3
2749207	**14741**	M3 X 0,5	1.94	.63	.141	3	D3
2749197	**14757**	M4 X 0,7	2.13	.75	.168	4	D4
2749189	**14773**	M5 X 0,8	2.38	.88	.194	4	D4
2749161	**14797**	M8 X 1,25	2.72	1.13	.318	4	D5
2749152	**14813**	M10 X 1,5	2.94	1.25	.381	4	D6
2749144	**14829**	M12 X 1,75	3.38	1.66	.367	4	D6
2749134	**14845**	M14 X 2	3.59	1.66	.429	4	D7
2749123	**14861**	M16 X 2	3.81	1.81	.480	4	D7
2749117	**14877**	M18 X 2,5	4.03	1.06	.542	4	D7
2749106	**14893**	M20 X 2,5	4.47	2.00	.652	4	D7
2749096	**14909**	M24 X 3	4.91	2.22	.760	4	D8
2749086	**14925**	M30 X 3,5	5.44	2.56	1.021	4	D9
2749077	**14941**	M36 X 4	6.06	3.00	1.233	4	D9

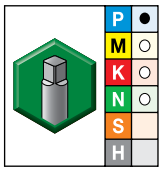
NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.
Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Refer to tables on pages D128 for the recommended pitch diameter limit for 6H class of fit.

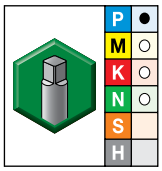
Series 5353 • Metric ANSI • Bottoming Chamfer • Hand Taps

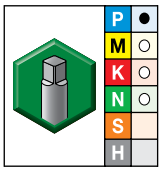




● first choice
○ alternate choice







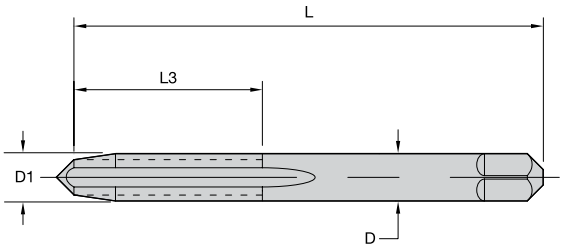
● first choice
○ alternate choice

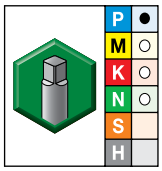
TiCN		uncoated		TiN							number	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		of flutes	limit
2896313	19201	2749204	14743	–		M3 X 0,5	1.94	.63	.141		3	D3
2746713	19203	–		2978979	15474	M4 X 0,7	2.13	.75	.168		4	D4
2746709	19205	2749182	14775	2746294	19907	M5 X 0,8	2.38	.88	.194		4	D4
2746707	19206	–		–		M6 X 1	2.50	1.00	.255		4	D5
2746701	19212	–		–		M8 X 1,25	2.72	1.13	.318		4	D5
2746699	19214	–		2746282	19916	M10 X 1,5	2.94	1.25	.381		4	D6
3171080	19215	–		–		M12 X 1,75	3.38	1.66	.367		4	D6
–		2749127	14847	–		M14 X 2	3.59	1.66	.429		4	D7
–		2749122	14863	–		M16 X 2	3.81	1.81	.480		4	D7
–		2749102	14895	–		M20 X 2,5	4.47	2.00	.652		4	D7
–		2749093	14911	–		M24 X 3	4.91	2.22	.760		4	D8
–		2749081	14927	–		M30 X 3,5	5.44	2.56	1.021		4	D9
–		2749073	14943	–		M36 X 4	6.06	3.00	1.233		4	D9

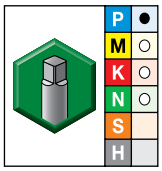
NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.
Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Refer to tables on pages D128 for the recommended pitch diameter limit for 6H class of fit.

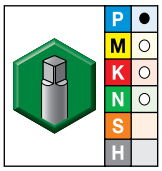
Series 5353 • Metric ANSI • Plug Chamfer • Hand Taps











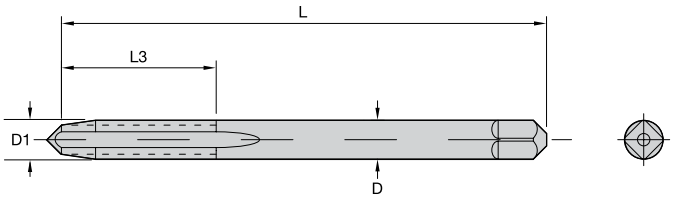
● first choice
○ alternate choice

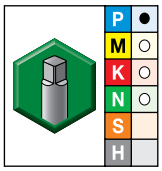
TiCN		uncoated		TiN							
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
–		2749224	14718	–		M1,6 X 0,35	1.63	.31	.141	2	D3
–		2749219	14726	–		M2 X 0,4	1.75	.44	.141	3	D3
–		2749210	14734	–		M2,5 X 0,45	1.81	.50	.141	3	D3
3171081	19217	2749205	14742	–		M3 X 0,5	1.94	.63	.141	3	D3
–		2749199	14750	–		M3,5 X 0,6	2.00	.69	.141	3	D4
2746693	19219	2749194	14758	2748549	15473	M4 X 0,7	2.13	.75	.168	4	D4
–		2749191	14766	–		M4,5 X 0,75	2.38	.88	.194	4	D4
2746687	19222	2749186	14774	2863245	19906	M5 X 0,8	2.38	.88	.194	4	D4
2746683	19224	2749177	14782	–		M6 X 1	2.50	1.00	.255	4	D5
–		2749167	14790	–		M7 X 1	2.72	1.13	.318	4	D5
2746681	19225	2749160	14798	2746288	19912	M8 X 1,25	2.72	1.13	.318	4	D5
2746677	19227	2749151	14814	2746284	19915	M10 X 1,5	2.94	1.25	.381	4	D6
3005011	19229	2749141	14830	2746209	19955	M12 X 1,75	3.38	1.66	.367	4	D6
–		2749284	14586	–		M14 X 1,25	3.59	1.66	.429	4	H4
–		2749131	14846	–		M14 X 2	3.59	1.66	.429	4	D7
–		3012777	14862	–		M16 X 2	3.81	1.81	.480	4	D7
–		2749282	14590	–		M18 X 1,5	4.03	1.81	.542	4	H4
–		2749113	14878	–		M18 X 2,5	4.03	1.06	.542	4	D7
–		2749104	14894	–		M20 X 2,5	4.47	2.00	.652	4	D7
–		2749094	14910	–		M24 X 3	4.91	2.22	.760	4	D8
–		2749084	14926	–		M30 X 3,5	5.44	2.56	1.021	4	D9
–		2749076	14942	–		M36 X 4	6.06	3.00	1.233	4	D9

NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.
Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Refer to tables on pages D128 for the recommended pitch diameter limit for 6H class of fit.

Series 5305(EXT)/5303(EXT) • Machine Screw and Fractional • Plug Chamfer • Hand Taps 6" Extension







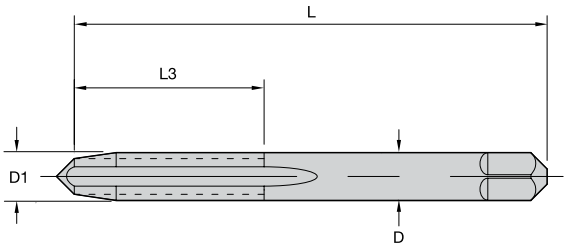
● first choice
○ alternate choice

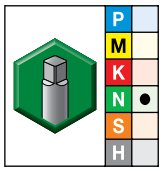
uncoated							
order #	catalog #	D1 TPI	L	L3	D	number of flutes	pitch diameter limit
2747078	**18827**	6 - 32	6.00	.69	.141	3	H3
2747039	**18891**	8 - 32	6.00	.75	.168	4	H3
2747074	**18833**	10 - 24	6.00	.88	.194	4	H3
2747070	**18836**	10 - 32	6.00	.88	.194	4	H3
2747067	**18839**	1/4 - 20	6.00	1.00	.255	4	H3
2747063	**18842**	1/4 - 28	6.00	1.00	.255	4	H3
2747059	**18845**	5/16 - 18	6.00	.67	.318	4	H3
2747051	**18851**	3/8 - 16	6.00	1.25	.381	4	H3

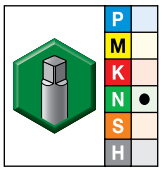
NOTE: See pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

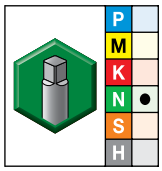
Series 7303 • Fractional • Taper, Plug, Bottoming Chamfer, and Tap Sets

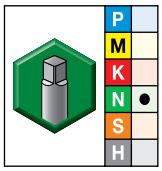










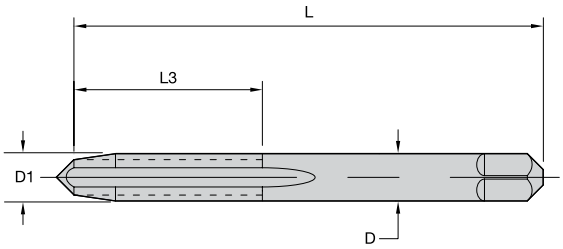


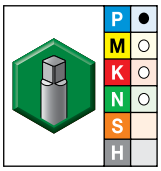
● first choice
○ alternate choice

taper chamfer 7–10 pitch		plug chamfer 3–5 pitch		full bottom 1–2 pitch		taper and plug bottoming set						
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	class of fit
2751033	11584	–		2751031	11586	2751030	11587	3/16 - 24	2	.88	.194	2B
2751027	11596	2751025	11597	2751023	11598	2751020	11599	1/4 - 20	3	1.00	.255	2B
2751019	11600	2751015	11601	2751013	11602	2751011	11603	1/4 - 28	3	1.00	.255	2B
2751010	11604	2751008	11605	2751007	11606	2751004	11607	5/16 - 18	3	1.13	.318	2B
2751002	11608	2751001	11609	2750999	11610	2750998	11611	5/16 - 24	3	1.13	.318	2B
2750996	11612	2750995	11613	2750993	11614	2750991	11615	3/8 - 16	3	1.25	.381	2B
2750990	11616	2750988	11617	2750986	11618	2750985	11619	3/8 - 24	3	1.25	.381	2B
2750984	11620	2750983	11621	2750980	11622	2750975	11623	7/16 - 14	3	1.44	.323	2B
2750972	11624	2750969	11625	2750967	11626	2750965	11627	7/16 - 20	3	1.44	.323	2B
2750962	11628	2750959	11629	2750957	11630	2750953	11631	1/2 - 13	3	1.66	.367	2B
2750951	11632	2750948	11633	2750946	11634	2750945	11635	1/2 - 20	3	1.66	.367	2B
2750943	11636	2750941	11637	2750940	11638	2750939	11639	9/16 - 12	4	1.66	.429	2B
2750937	11640	2750935	11641	2750933	11642	2750932	11643	9/16 - 18	4	1.66	.429	2B
2750928	11644	2750926	11645	2750923	11646	2750920	11647	5/8 - 11	4	1.81	.480	2B
2750918	11648	2750917	11649	2750916	11650	–		5/8 - 18	3	1.25	.381	2B
–		–		–		2750915	11651	5/8 - 18	4	1.81	.480	2B
2750912	11652	2750910	11653	2750907	11654	2750906	11655	3/4 - 10	4	2.00	.590	2B
2750904	11656	2750902	11657	2750901	11658	2750900	11659	3/4 - 16	4	2.00	.590	2B
2750898	11660	2750896	11661	2750895	11662	2750893	11663	7/8 - 9	5	2.22	.697	2B
2750892	11664	2750888	11665	2750886	11666	2750885	11667	7/8 - 14	5	2.22	.697	2B
2750883	11668	2750882	11669	2750880	11670	2750879	11671	1 - 8	5	2.50	.800	2B
2750878	11672	–		2750875	11674	2750873	11675	1 - 12	5	2.50	.800	2B
2750871	11676	2750868	11677	2750867	11678	–		1 - 14	5	2.50	.800	2B
2750862	11680	2750857	11681	2750856	11682	2750854	11683	1 1/8 - 7	5	2.56	.896	2B
–		2750852	11685	2750848	11686	–		1 1/8 - 8	5	2.56	.896	2B
2750843	11688	2750841	11689	2750838	11690	–		1 1/8 - 12	5	2.56	.896	2B
2750835	11692	2750834	11693	2750832	11694	2750831	11695	1 1/4 - 7	6	2.56	1.021	2B
2750827	11696	2750824	11697	2750822	11698	–		1 1/4 - 8	6	2.56	1.021	2B
2750812	11700	2750809	11701	2750807	11702	–		1 1/4 - 12	6	2.56	1.021	2B
2750780	11716	2750778	11717	2750777	11718	2750776	11719	1 1/2 - 6	6	3.00	1.233	2B
–		2750770	11721	2750667	11722	–		1 1/2 - 8	6	3.00	1.233	2B
2750621	11724	–		2750617	11726	–		1 1/2 - 12	6	3.00	1.233	2B

Series 5353 • Metric ANSI • Sets of One Each, Taper, Plug, Bottoming Chamfer • Tap Sets







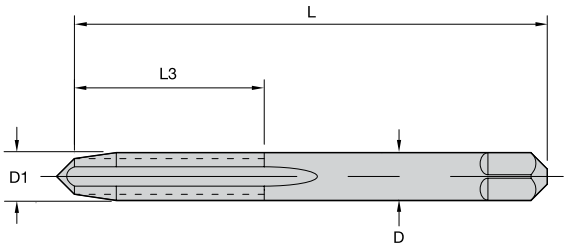
● first choice
○ alternate choice

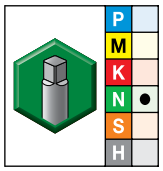
uncoated							
order #	catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
2749202	**14744**	M3 X 0,5	1.94	.63	.141	3	D3
2749192	**14760**	M4 X 0,7	2.13	.75	.168	4	D4
2749181	**14777**	M5 X 0,8	2.38	.88	.194	4	D4
2749171	**14784**	M6 X 1	2.50	1.00	.255	4	D5
2749153	**14800**	M8 X 1,25	2.72	1.13	.318	4	D5
2749145	**14816**	M10 X 1,5	2.94	1.25	.381	4	D6
2749136	**14832**	M12 X 1,75	3.38	1.66	.367	4	D6
2749125	**14848**	M14 X 2	3.59	1.66	.429	4	D7
2749119	**14864**	M16 X 2	3.81	1.81	.480	4	D7
2749099	**14896**	M20 X 2,5	4.47	2.00	.652	4	D7

NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.
Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Refer to tables on pages D128 for the recommended pitch diameter limit for 6H class of fit.

Series 7305 • Machine Screw • Taper, Plug, Bottoming Chamfer, and Tap Sets





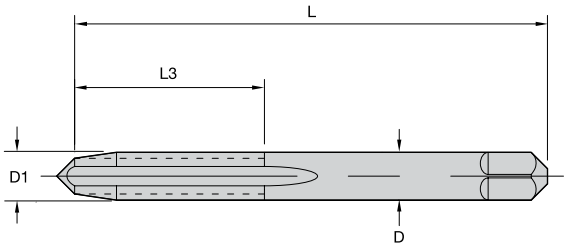


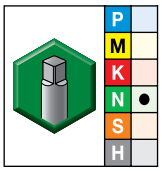
● first choice
○ alternate choice

taper chamfer 7–10 pitch		plug chamfer 3–5 pitch		full bottom 1–2 pitch		taper and plug bottoming set						
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	class of fit
2751095	11516	2751092	11517	2751090	11518	2751086	11519	4 - 40	2	.56	.141	2B
2751081	11524	2751080	11525	2751079	11526	2751077	11527	5 - 40	2	.63	.141	2B
2751075	11528	2751073	11529	2751071	11530	2751070	11531	6 - 32	2	.69	.141	2B
–		2751068	11537	–		–		6 - 40	2	.69	.141	2B
2751066	11540	2751064	11541	2751060	11542	2751058	11543	8 - 32	2	.75	.168	2B
–		2751056	11545	–		–		8 - 36	2	.75	.168	2B
2751055	11548	2751053	11549	2751051	11550	2751048	11551	10 - 24	2	.88	.194	2B
2751047	11552	2751045	11553	2751043	11554	2885052	11555	10 - 32	2	.88	.194	2B
2751041	11556	2751040	11557	2751037	11558	2751036	11559	12 - 24	2	.94	.220	2B

Series 7353 • Metric ANSI • Plug Chamfer • Hand Taps







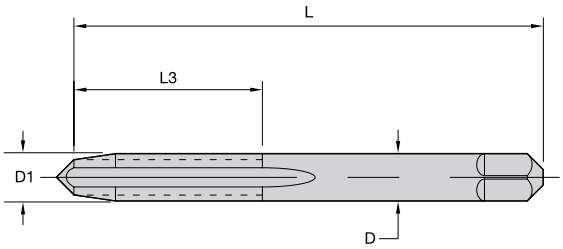
● first choice
○ alternate choice

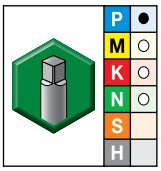
uncoated						
order #	catalog #	D1 size	L	L3	D	number of flutes
2750421	11900	M6 X 1	2.50	1.00	.255	6H
2750420	11901	M8 X 1,25	2.72	1.13	.318	6H
2750418	11902	M10 X 1,5	2.94	1.25	.381	6H
2750415	11903	M12 X 1,75	3.38	1.66	.367	6H
2750412	11904	M14 X 1,25	3.59	1.66	.429	6H
2750410	11905	M14 X 2	3.59	1.66	.429	6H
2750409	11906	M16 X 2	3.81	1.81	.480	6H
2750407	11907	M18 X 1,5	4.03	1.59	.542	6H
2750406	11908	M18 X 2,5	4.03	1.59	.542	6H
2750402	11909	M20 X 2,5	4.47	2.00	.652	6H
2750400	11910	M22 X 2,5	4.69	2.22	.697	6H
2750397	11911	M24 X 3	4.91	2.22	.760	6H

NOTE: Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.

Series 5303 • Fractional Sizes • Taper, Plug, and Bottoming Chamfer • Tap Sets







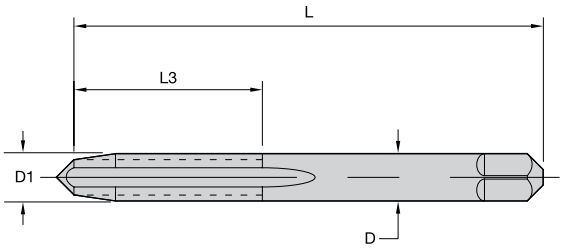
● first choice
○ alternate choice

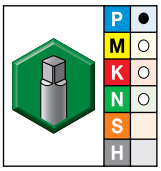
uncoated order #	catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
2749824	14018	1/4 - 20	2.50	1.00	.255	4	H2
2749815	14025	1/4 - 20	2.50	1.00	.255	4	H3
2749764	14058	1/4 - 28	2.50	1.00	.255	4	H3
2749729	14095	5/16 - 18	2.72	1.13	.318	4	H3
2749680	14125	5/16 - 24	2.72	1.13	.318	4	H3
2749644	14160	3/8 - 16	2.94	1.25	.381	4	H3
2749605	14193	3/8 - 24	2.94	1.25	.381	4	H3
2749581	14224	7/16 - 14	3.16	1.44	.323	4	H3
2749560	14249	7/16 - 20	3.16	1.44	.323	4	H3
2749538	14284	1/2 - 13	3.38	1.66	.367	4	H3
2749503	14311	1/2 - 20	3.38	1.66	.367	4	H3
2749488	14341	9/16 - 12	3.59	1.66	.429	4	H3
2749472	14359	9/16 - 18	3.59	1.66	.429	4	H3
2749454	14382	5/8 - 11	3.81	1.81	.480	4	H3
2749426	14405	5/8 - 18	3.81	1.81	.480	4	H3
2749388	14451	3/4 - 10	4.25	2.00	.590	4	H3
2749368	14474	3/4 - 16	4.25	2.00	.590	4	H3
2749350	14502	7/8 - 9	4.69	2.22	.697	4	H4
2749335	14519	7/8 - 14	4.69	2.22	.697	4	H4
2749320	14547	1 - 8	5.13	2.50	.800	4	H4
3303777	14560	1 - 12	5.13	2.50	.800	4	H4
2749288	14571	1 - 14	5.13	2.50	.800	4	H4
2749275	14597	1 1/8 - 7	5.44	2.56	.896	4	H4
2749267	14606	1 1/8 - 12	5.44	2.56	.896	4	H4
2749260	14615	1 1/4 - 7	5.75	2.56	1.021	4	H4
2749254	14623	1 1/4 - 12	5.75	2.56	1.021	6	H4
2749249	14635	1 3/8 - 6	6.06	3.00	1.108	4	H4
2749243	14643	1 3/8 - 12	6.06	3.00	1.108	6	H4
2749237	14648	1 1/2 - 6	6.38	3.00	1.233	4	H4
2749231	14656	1 1/2 - 12	6.38	3.00	1.233	6	H4

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Tap sets include one of each: taper, plug, and bottoming chamfer.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 5305 • Machine Screw Sizes • Taper, Plug, and Bottoming Chamfer • Tap Sets







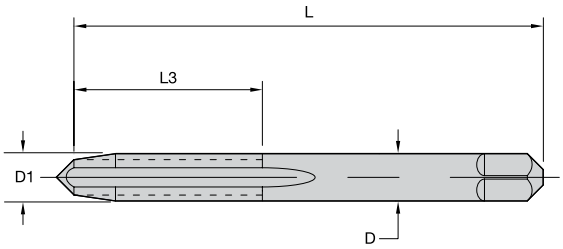
● first choice
○ alternate choice

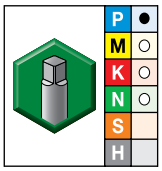
uncoated order #	catalog #	D1 size	L	L3	D	number of flutes	pitch diameter limit
2748981	15105	0 - 80	1.63	.31	.141	2	H1
2748968	15117	1 - 64	1.69	.38	.141	2	H1
2748961	15123	1 - 72	1.69	.38	.141	2	H1
2748945	15137	2 - 56	1.75	.44	.141	3	H2
2748928	15147	2 - 64	1.75	.44	.141	3	H2
2748918	15159	3 - 48	1.81	.50	.141	3	H2
2748902	15169	3 - 56	1.81	.50	.141	3	H2
2748880	15187	4 - 40	1.88	.56	.141	3	H2
2748863	15199	4 - 48	1.88	.56	.141	3	H2
2865313	15212	5 - 40	1.94	.63	.141	3	H2
2748851	15223	5 - 44	1.94	.63	.141	3	H2
2865286	15228	6 - 32	2.00	.69	.141	3	H1
2865274	15234	6 - 32	2.00	.69	.141	3	H2
2748838	15240	6 - 32	2.00	.69	.141	3	H3
2748818	15260	6 - 40	2.00	.69	.141	3	H2
2748801	15278	8 - 32	2.13	.75	.168	4	H2
2865185	15286	8 - 32	2.13	.75	.168	4	H3
2748756	15304	8 - 36	2.13	.75	.168	4	H2
2748743	15323	10 - 24	2.38	.88	.194	4	H2
2748731	15330	10 - 24	2.38	.88	.194	4	H3
2748685	15355	10 - 32	2.38	.88	.194	4	H2
2748670	15363	10 - 32	2.38	.88	.194	4	H3
2748637	15386	12 - 24	2.38	.94	.220	4	H3
2748623	15393	12 - 28	2.38	.94	.220	4	H3

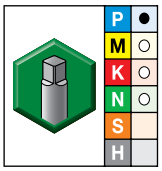
NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.
Tap sets include one of each: taper, plug, and bottoming chamfer.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

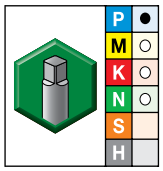
Series 5305L/5303L • Fractional Sizes • Taper, Plug, and Bottoming Chamfer • LH Threads & LH Tap Sets

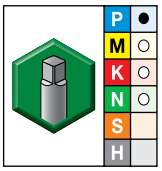












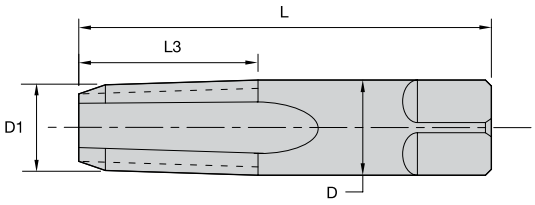
● first choice
○ alternate choice

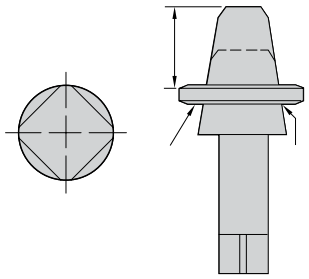
taper chamfer 7–10 pitch		plug chamfer 3–5 pitch		full bottom 1–2 pitch		taper and plug bottoming set							
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	D	number of flutes	pitch diameter limit
2749814	14026	2749813	14027	2749811	14028	2749810	14029	1/4 - 20	2.50	1.00	.255	4	H3
–		3171054	14060	–		–		1/4 - 28	2.50	1.00	.255	4	H3
2749727	14096	2749724	14097	2749721	14098	2749719	14099	5/16 - 18	2.72	1.13	.318	4	H3
2749679	14126	2749677	14127	2749675	14128	2749674	14129	5/16 - 24	2.72	1.13	.318	4	H3
2749642	14161	2749639	14162	2749637	14163	2749636	14164	3/8 - 16	2.94	1.25	.381	4	H3
2749603	14194	2749601	14195	2749599	14196	2749597	14197	3/8 - 24	2.94	1.25	.381	4	H3
2749580	14225	–		–		–		7/16 - 14	3.16	1.44	.323	4	H3
3171055	14250	2749557	14251	2749554	14252	–		7/16 - 20	3.16	1.44	.323	4	H3
2866246	14285	2749535	14286	2749533	14287	2749531	14288	1/2 - 13	3.38	1.66	.367	4	H3
2749502	14312	2749499	14313	2749497	14314	2749495	14315	1/2 - 20	3.38	1.66	.367	4	H3
2749470	14360	–		–		–		9/16 - 18	3.59	1.66	.429	4	H3
2749451	14383	2749449	14384	2749447	14385	–		5/8 - 11	3.81	1.81	.480	4	H3
2749424	14406	2749421	14407	2749420	14408	–		5/8 - 18	3.81	1.81	.480	4	H3
2749386	14452	2749384	14453	2749382	14454	–		3/4 - 10	4.25	2.00	.590	4	H3
2749367	14475	2749365	14476	2749363	14477	–		3/4 - 16	4.25	2.00	.590	4	H3

NOTE: Refer to table on page D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

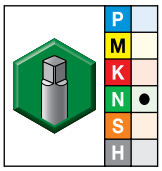
Series 2320/5320 • Standard Chamfer • Standard Projection • NPT/ANPT, NPTF

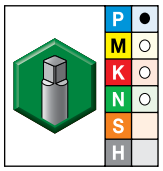


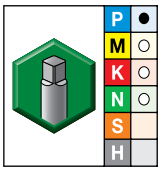




**Standard Projection
Shortest Projection
L1 Ring Gage
Basic Size







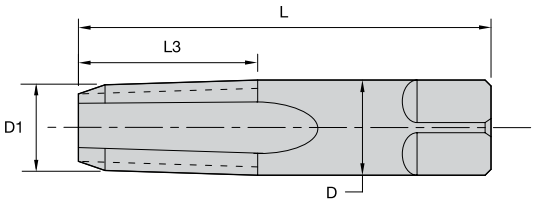
● first choice
○ alternate choice

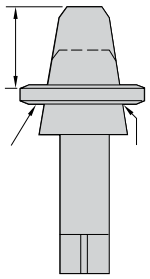
uncoated		oxide		TiN						number	
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	of flutes	thread series
3139338	16201	2746417	19690	2746411	19698	1/16 - 27	2.13	.69	.313	4	NPT/ANPT
2748216	16203	–		–		1/16 - 27	2.13	.69	.313	4	NPTF
2873746	16204	–		2603958	19707	1/8 - 27	2.13	.75	.313	4	NPT/ANPT
2748210	16205	2746413	19695	2746397	19712	1/8 - 27	2.13	.75	.438	4	NPT/ANPT
2748206	16209	–		2746407	19701	1/8 - 27	2.13	.75	.313	4	NPTF
2748203	16210	–		2746405	19702	1/8 - 27	2.13	.75	.438	4	NPTF
2748199	16212	2746399	19710	2622810	19728	1/4 - 18	2.44	1.06	.563	4	NPT/ANPT
2748193	16215	–		2746393	19721	1/4 - 18	2.44	1.06	.563	4	NPTF
2748189	16217	2746386	19730	2746380	19738	3/8 - 18	2.56	1.06	.700	4	NPT/ANPT
2748185	16220	–		–		3/8 - 18	2.56	1.06	.700	4	NPTF
–		–		2746382	19736	3/8 - 18	2.56	1.25	.700	4	NPTF
2748177	16225	–		2746373	19746	1/2 - 14	3.13	1.66	.687	4	NPTF
2748181	16222	2746378	19740	2603959	19748	1/2 - 14	3.13	1.66	.687	4	NPT/ANPT
2748169	16230	–		2746361	19766	3/4 - 14	3.25	1.38	.906	5	NPTF
2748173	16227	2746366	19760	2746359	19768	3/4 - 14	3.25	1.38	.906	5	NPT/ANPT
2748159	16235	–		2746357	19776	1 - 11 1/2	3.75	1.75	1.125	5	NPTF
2748165	16232	–		2746355	19778	1 - 11 1/2	3.75	1.75	1.125	5	NPT/ANPT
2748153	16239	–		–		1 1/4 - 11 1/2	4.00	1.75	1.313	5	NPTF
2748155	16237	–		–		1 1/4 - 11 1/2	4.00	1.75	1.313	5	NPT/ANPT
2748147	16242	–		–		1 1/2 - 11 1/2	4.25	3.00	1.500	7	NPTF
2748151	16240	–		–		1 1/2 - 11 1/2	4.25	3.00	1.500	7	NPT/ANPT
2748143	16245	–		–		2 - 11 1/2	4.25	1.75	1.875	7	NPTF
2748145	16243	–		–		2 - 11 1/2	4.25	1.75	1.875	7	NPT/ANPT

*** Pipe tap projection is the distance the small end of the tap projects through an American National Standard NPTF Thin Ring Gage.*
NOTE: ANPT Taps marked NPT may be used for NPT and ANPT applications.
For gage measurement projection, see technical page D133.

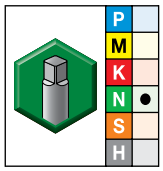
Series 5319 • Standard Pipe Chamfer • Standard Projection • NPT/ANPT, NPTF Interrupted

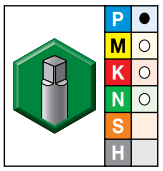






**Standard Projection
Shortest Projection
L1 Ring Gage
Basic Size





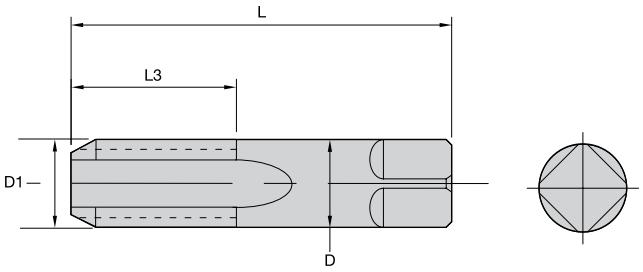
● first choice
○ alternate choice

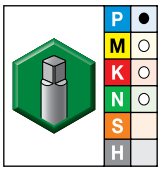
uncoated		oxide							
order #	catalog #	order #	catalog #	D1 size	L	L3	D	number of flutes	thread series
2748270	16101	–		1/8 - 27	2.13	.75	.313	5	NPT/ANPT
1854963	16102	2746429	19650	1/8 - 27	2.13	.75	.438	5	NPT/ANPT
2748264	16103	–		1/8 - 27	2.13	.75	.313	5	NPTF
2748262	16104	–		1/8 - 27	2.13	.75	.438	5	NPTF
2748259	16105	2746425	19655	1/4 - 18	2.44	1.06	.563	5	NPT/ANPT
2748257	16106	–		1/4 - 18	2.44	1.06	.563	5	NPTF
2748255	16107	2746423	19656	3/8 - 18	2.56	1.06	.700	5	NPT/ANPT
3175997	16108	–		3/8 - 18	2.56	1.06	.700	5	NPTF
2748250	16109	2746421	19665	1/2 - 14	3.13	1.66	.688	5	NPT/ANPT
2748247	16110	–		1/2 - 14	3.13	1.66	.688	5	NPTF
2748244	16111	2746419	19675	3/4 - 14	3.25	1.38	.906	5	NPT/ANPT
2748238	16112	–		3/4 - 14	3.25	1.38	.906	5	NPTF
2748237	16113	–		1 - 11 1/2	3.75	1.75	1.125	5	NPT/ANPT
2748234	16114	–		1 - 11 1/2	3.75	1.75	1.125	5	NPTF
2864744	16115	–		1 1/4 - 11 1/2	4.00	1.75	1.313	5	NPT/ANPT
2748230	16117	–		1 1/2 - 11 1/2	4.25	3.00	1.500	7	NPT/ANPT
2748225	16118	–		2 - 11 1/2	4.25	1.75	1.875	7	NPT/ANPT

*** Pipe tap projection is the distance the small end of the tap projects through an American National Standard NPTF Thin Ring Gage.*
NOTE: NPT taps may be used for ANPT applications.
For gage measurement projection, see technical page D133.

Series 5323 • Modified Bottoming Chamfer • NPS, NPSF





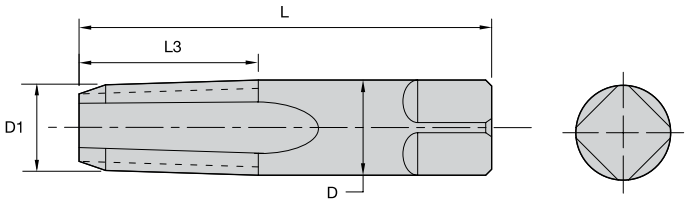


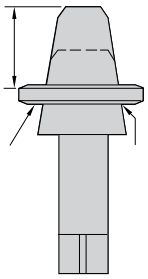
● first choice
○ alternate choice

uncoated order #	catalog #	D1 size	L	L3	D	number of flutes	thread series
2748090	**16351**	1/8 - 27	2.13	.75	.313	4	NPS
2748088	**16352**	1/8 - 27	2.13	.75	.438	4	NPS
2748086	**16353**	1/8 - 27	2.13	.75	.313	4	NPSF
2748084	**16354**	1/8 - 27	2.13	.75	.438	4	NPSF
2748082	**16355**	1/4 - 18	2.44	1.06	.563	4	NPS
2748080	**16356**	1/4 - 18	2.44	1.06	.563	4	NPSF
2748078	**16357**	3/8 - 18	2.56	1.06	.700	4	NPS
2748076	**16358**	3/8 - 18	2.56	1.06	.700	4	NPSF
2748074	**16359**	1/2 - 14	3.13	1.66	.688	4	NPS
2748072	**16360**	1/2 - 14	3.13	1.66	.688	4	NPSF
2748070	**16361**	3/4 - 14	3.25	1.38	.906	5	NPS
2748068	**16362**	3/4 - 14	3.25	1.38	.906	5	NPSF
2748066	**16363**	1 - 11 1/2	3.75	1.75	1.125	5	NPS

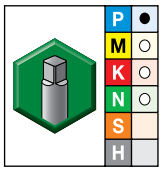
Series 5820 • Standard Pipe Chamfer • Standard Projection • NPT/ANPT, NPTF High Hook







**Standard Projection
Shortest Projection
L1 Ring Gage
Basic Size



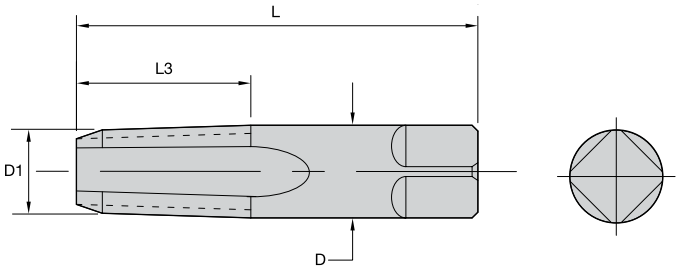
● first choice
○ alternate choice

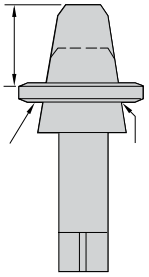
uncoated							
order #	catalog #	D1 size	L	L3	D	number of flutes	thread series
2748196	**16213**	1/4 - 18	2.44	1.06	.563	4	NPT/ANPT
2748187	**16218**	3/8 - 18	2.56	1.06	.700	4	NPT/ANPT
2748179	**16223**	1/2 - 14	3.13	1.66	.688	4	NPT/ANPT
2748171	**16228**	3/4 - 14	3.25	1.38	.906	5	NPT/ANPT
2748163	**16233**	1 - 11 1/2	3.75	1.75	1.125	5	NPT/ANPT

*** Pipe tap projection is the distance the small end of the tap projects through an American National Standard NPTF Thin Ring Gage.*
NOTE: NPT taps may be used for ANPT applications.
For gage measurement projection, see technical page D133.

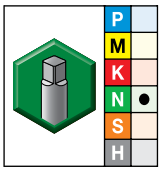
Series 7320 • Standard Chamfer 2-1/2–3-1/2 Pitches • Pipe Taps







**Standard Projection
Shortest Projection
L1 Ring Gage
Basic Size

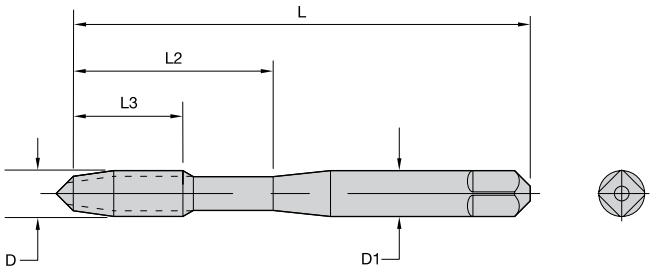


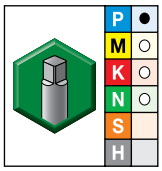
● first choice
○ alternate choice

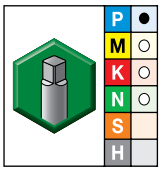
uncoated						
order #	catalog #	D1 size	L	L3	D	thread series
2750443	11800	1/8 - 27	2.13	.75	.313	NPT
2750441	11801	1/8 - 27	2.13	.75	.438	NPT
2750437	11802	1/4 - 18	2.44	1.06	.563	NPT
2750435	11803	3/8 - 18	2.56	1.06	.700	NPT
2750431	11804	1/2 - 14	3.13	1.38	.688	NPT
2750430	11805	3/4 - 14	3.25	1.38	.906	NPT
2750428	11806	1 - 11 1/2	3.75	1.75	1.125	NPT
2750426	11807	1 1/4 - 11 1/2	4.00	1.75	1.313	NPT
2750425	11808	1 1/2 - 11 1/2	4.25	1.75	1.500	NPT
2750423	11809	2 - 11 1/2	4.50	1.75	1.875	NPT

Series 2500/5500 • Machine Screw and Fractional • Plug Entry Taper • Form Taps









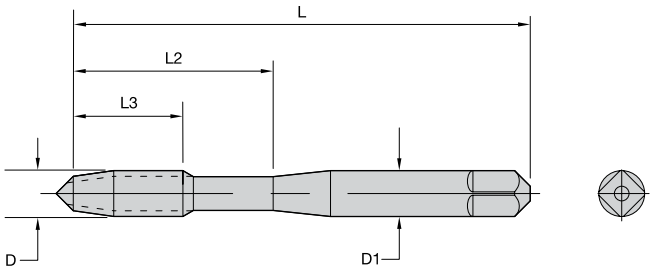
● first choice
○ alternate choice

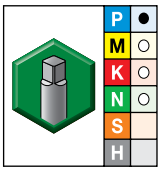
uncoated		TiN							number of	pitch diameter
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	lube grooves	limit
2864322	17000	2746344	19821	4 - 40	1.88	.31	.56	.141	—	H3
2864313	17004	–		5 - 40	1.94	.31	.63	.141	4	H3
2864310	17008	2746342	19822	6 - 32	2.00	.38	.69	.141	4	H3
2864307	17009	–		6 - 32	2.00	.38	.69	.141	4	H5
2864298	17013	2746338	19824	8 - 32	2.13	.38	.75	.168	4	H3
1295731	17018	2746333	19827	10 - 24	2.38	.50	.88	.194	4	H4
1295732	17020	2746331	19828	10 - 32	2.38	.50	.88	.194	4	H4
2747916	17027	2746327	19841	1/4 - 20	2.50	.63	1.00	.255	4	H4
2747910	17030	2746325	19842	1/4 - 28	2.50	.63	1.00	.255	4	H4
–		2746324	19846	5/16 - 18	2.72	.69	1.13	.318	4	H5
2747904	17033	–		5/16 - 18	2.72	.69	1.13	.318	4	H5
2747898	17036	–		5/16 - 24	2.72	.69	1.13	.318	4	H5
2747892	17039	2746322	19847	3/8 - 16	2.94	.75	1.25	.381	4	H5
2747886	17042	–		3/8 - 24	2.94	.75	—	.323	4	H8
2747882	17049	–		1/2 - 13	3.38	.94	—	.367	4	H5
2747878	17051	–		1/2 - 20	3.38	.94	—	.367	4	H5
2747876	17053	–		5/8 - 11	3.81	1.09	—	.480	6	H7
2747872	17057	–		3/4 - 10	4.25	1.22	—	.590	6	H7

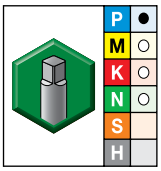
NOTE: Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

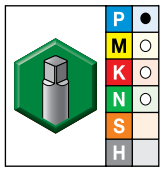
Series 2502/5502 • Machine Screw and Fractional • Bottoming Chamfer • Form Taps











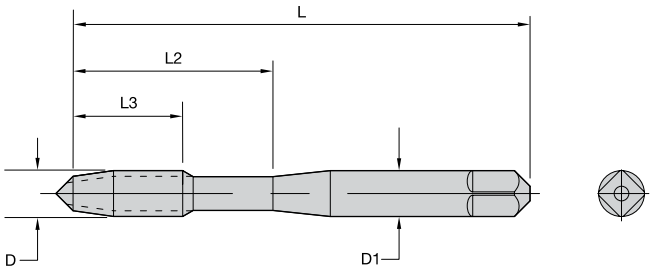
● first choice
○ alternate choice

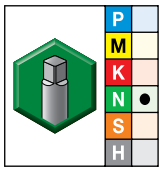
TiCN		uncoated		TiN								
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	number of lube grooves	pitch diameter limit
–		2747635	17200	–		0 - 80	1.63	.31	—	.141	0	H2
–		2747623	17206	–		2 - 56	1.75	.44	—	.141	0	H2
–		2747621	17207	–		2 - 56	1.75	.44	—	.141	0	H3
–		2747609	17214	2746320	19849	4 - 40	1.88	.31	.56	.141	0	H3
–		2747607	17215	–		4 - 40	1.88	.31	.56	.141	0	H5
–		2747601	17218	–		5 - 40	1.94	.31	.63	.141	4	H3
2746535	19522	2747598	17222	2746315	19852	6 - 32	2.00	.38	.69	.141	4	H3
–		2747595	17223	–		6 - 32	2.00	.38	.69	.141	4	H5
2746531	19527	2747588	17227	2746311	19857	8 - 32	2.13	.38	.75	.168	4	H3
–		2747584	17228	–		8 - 32	2.13	.38	.75	.168	4	H5
–		2747576	17232	2746307	19862	10 - 24	2.38	.50	.88	.194	4	H4
2746526	19535	2747569	17235	2746305	19866	10 - 32	2.38	.50	.88	.194	4	H4
–		2747568	17236	–		10 - 32	2.38	.50	.88	.194	4	H6
–		2747566	17238	–		12 - 24	2.38	.50	.94	.220	4	H4
2746524	19542	2747561	17242	2746304	19869	1/4 - 20	2.50	.63	1.00	.255	4	H4
–		2747559	17243	–		1/4 - 20	2.50	.63	1.00	.255	4	H6
–		2747554	17245	2746302	19871	1/4 - 28	2.50	.63	1.00	.255	4	H4
–		–		2746300	19872	5/16 - 18	2.72	.69	1.13	.318	4	H5
–		2747547	17249	–		5/16 - 18	2.72	.69	1.13	.318	4	H7
–		2747549	17248	–		5/16 - 18	2.72	.69	1.13	.318	4	H5
2746516	19554	2747537	17254	2746298	19873	3/8 - 16	2.94	.75	1.25	.381	4	H5
–		2747534	17257	–		3/8 - 24	2.94	.75	1.25	.381	4	H5
–		2747528	17265	–		1/2 - 13	3.38	.94	—	.367	4	H8
–		2747530	17264	–		1/2 - 13	3.38	.94	—	.367	4	H5
–		2747524	17266	–		1/2 - 20	3.38	.94	—	.367	4	H5
–		2747499	17280	–		5/8 - 11	3.81	1.09	—	.480	6	H7

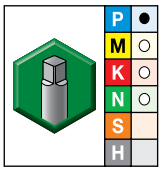
NOTE: Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

Series 2510/5510 • Metric ANSI • Plug Entry Taper • Form Taps









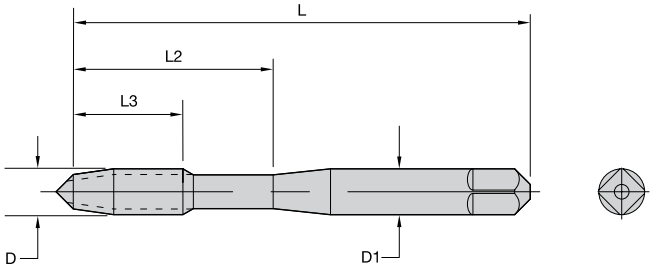
● first choice
○ alternate choice

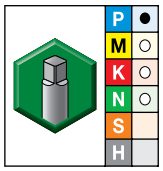
uncoated		TiN							number of lube grooves	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2747866	17082	2746236	19941	M3 X 0,5	1.94	.31	.63	.141	4	D5
2747864	17084	2746234	19942	M4 X 0,7	2.13	.38	.75	.168	4	D6
2747862	17086	2746232	19943	M5 X 0,8	2.38	.50	.88	.194	4	D7
2747860	17087	2746231	19944	M6 X 1	2.50	.63	1.00	.255	4	D8
2747858	17090	2746229	19945	M8 X 1,25	2.72	.69	1.13	.318	4	D9
–		2746227	19946	M10 X 1,5	2.94	.75	1.25	.381	4	D10
–		2746225	19947	M12 X 1,75	3.38	.94	—	.367	4	D11

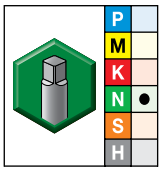
NOTE: Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.
Refer to tables on page D128 for the recommended pitch diameter limit for 6H class of fit.

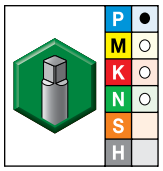
Series 2512/5512 • Metric ANSI • Bottom Entry Taper • Form Taps











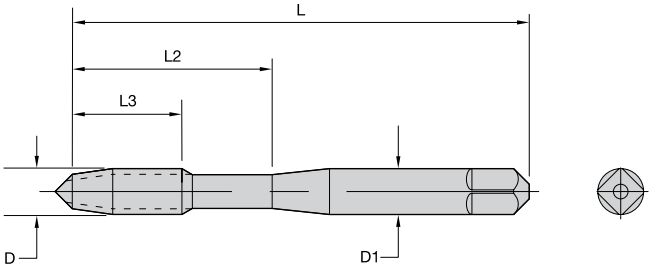
● first choice
○ alternate choice

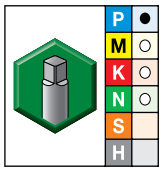
TiCN		uncoated		TiN							number of lube grooves	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2746510	19567	2747522	17267	2746223	19948	M3 X 0,5	1.94	.31	.63	.141	4	D5
–		2747518	17269	2746221	19949	M4 X 0,7	2.13	.38	.75	.168	4	D6
–		2747515	17271	2746219	19950	M5 X 0,8	2.38	.50	.88	.194	4	D7
2746504	19572	2747513	17272	2746217	19951	M6 X 1	2.50	.63	1.00	.255	4	D8
2746502	19574	2747509	17275	2746215	19952	M8 X 1,25	2.72	.69	1.13	.318	4	D9
–		2747505	17276	2746213	19953	M10 X 1,5	2.94	.75	1.25	.381	4	D10
–		–		2746211	19954	M12 X 1,75	3.38	.94	—	.367	4	D11

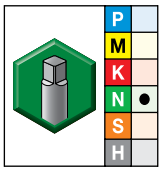
NOTE: Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.
Refer to tables on page D128 for the recommended pitch diameter limit for 6H class of fit.

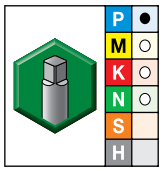
Series 5900 • Machine Screw and Fractional • Plug Entry Taper • Form Taps











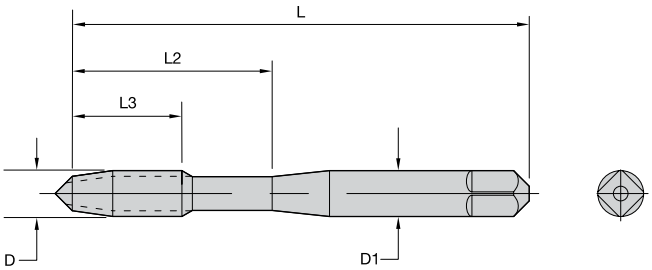
● first choice
○ alternate choice

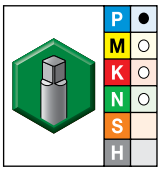
TiCN		uncoated		TiN								
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	number of lube grooves	pitch diameter limit
—		2747479	18202	—		6 - 32	2.00	.38	.69	.141	4	H5
—		2747477	18203	2747338	18303	6 - 32	2.00	.38	.69	.141	4	H3
—		2747461	18210	—		8 - 32	2.13	.38	.75	.168	4	H5
—		2747459	18211	2747322	18311	8 - 32	2.13	.38	.75	.168	4	H3
—		2747447	18217	2747311	18317	10 - 24	2.38	.50	.88	.194	4	H4
—		2747441	18220	—		10 - 32	2.38	.50	.88	.194	4	H6
2747180	18721	2747439	18221	3171069	18321	10 - 32	2.38	.50	.88	.194	4	H4
—		2747437	18224	—		12 - 24	2.38	.50	.94	.220	4	H4
—		2747427	18228	2747296	18328	1/4 - 20	2.50	.63	1.00	.255	4	H6
—		2747425	18229	2747293	18329	1/4 - 20	2.50	.63	1.00	.255	4	H4
—		2747419	18232	2747288	18332	1/4 - 28	2.50	.63	1.00	.255	4	H6
2747165	18733	2747417	18233	—		1/4 - 28	2.50	.63	1.00	.255	4	H4
2747156	18737	2747409	18237	2747277	18337	5/16 - 18	2.72	.69	1.13	.318	4	H5
—		2747401	18241	—		5/16 - 24	2.72	.69	1.13	.318	4	H5
2747141	18745	2747391	18245	2747265	18345	3/8 - 16	2.94	.75	1.25	.381	4	H5
—		2747378	18252	—		1/2 - 13	3.38	.94	—	.367	4	H5

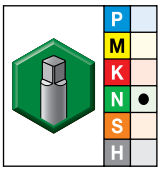
NOTE: Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

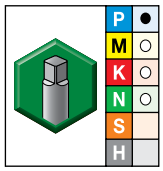
Series 5902 • Machine Screw and Fractional • Bottom Entry Taper • Form Taps











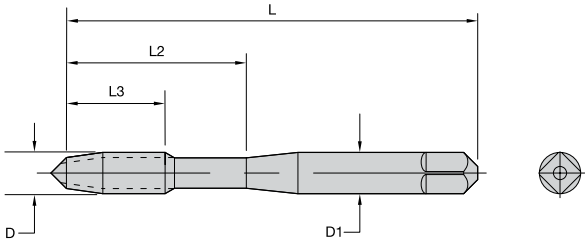
● first choice
○ alternate choice

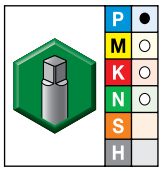
TiCN		uncoated		TiN								
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	number of lube grooves	pitch diameter limit
–		2747485	18200	2747344	18300	6 - 32	2.00	.38	.69	.141	4	H3
2747220	18701	2747483	18201	–		6 - 32	2.00	.38	.69	.141	4	H5
–		2747467	18208	2747328	18308	8 - 32	2.13	.38	.75	.168	4	H5
2747204	18709	2747463	18209	2747326	18309	8 - 32	2.13	.38	.75	.168	4	H3
2747194	18714	2747453	18214	–		10 - 24	2.38	.50	.88	.194	4	H6
2747192	18715	2747451	18215	3171068	18315	10 - 24	2.38	.50	.88	.194	4	H4
2747186	18718	2747445	18218	2747310	18318	10 - 32	2.38	.50	.88	.194	4	H6
2747184	18719	2747443	18219	2747308	18319	10 - 32	2.38	.50	.88	.194	4	H4
–		3324580	18223	–		12 - 24	2.38	.50	.94	.220	4	H4
2747179	18726	2747433	18226	2747300	18326	1/4 - 20	2.50	.63	1.00	.255	4	H4
2747177	18727	2747431	18227	2747298	18327	1/4 - 20	2.50	.63	1.00	.255	4	H6
2747169	18731	2747421	18231	2747289	18331	1/4 - 28	2.50	.63	1.00	.255	4	H4
2747162	18734	2747415	18234	–		5/16 - 18	2.72	.69	1.13	.318	4	H5
–		2747413	18235	–		5/16 - 18	2.72	.69	1.13	.318	4	H7
2747145	18743	2747397	18243	–		3/8 - 16	2.94	.75	1.25	.381	4	H7
–		2747383	18249	2747257	18349	1/2 - 13	3.38	.94	–	.367	4	H7
2747131	18750	2747381	18250	–		1/2 - 13	3.38	.94	–	.367	4	H5
–		–		2747271	18342	3/8 - 16	2.94	.75	1.25	.381	4	H5

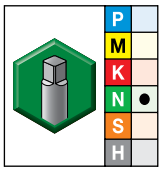
NOTE: Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.
Refer to tables on pages D127–D128 for the recommended pitch diameter limit for 2B or 3B class of fit.

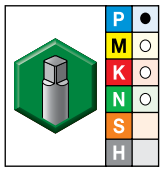
Series 5910 • Metric ANSI • Plug Entry Taper • Form Taps











● first choice
○ alternate choice

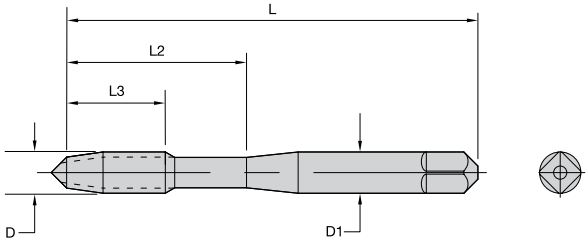
TiCN		uncoated		TiN							number of	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	lube grooves	limit
2747101	18760	2747360	18260	2747236	18360	M6 X 1	64	16	25	6,5	4	D8
2747096	18762	2747355	18262	2747232	18362	M8 X 1,25	69	17	29	8,1	4	D9
2747092	18764	2747351	18264	2747228	18364	M10 X 1,5	75	19	32	9,7	4	D10

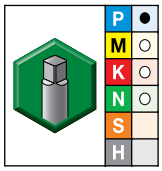
NOTE: Series 5910TC • TiCN Coated
Series 5910T • TiN Coated
Series 5910 • Uncoated

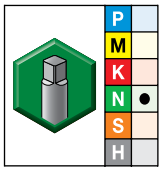
NOTE: Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.
Refer to table on page D128 for the recommended pitch diameter limit for 6H class of fit.

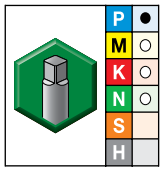
Series 5912 • Metric ANSI • Bottom Entry Taper • Form Taps











● first choice
○ alternate choice

TiCN		uncoated		TiN							number of	pitch diameter
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	lube grooves	limit
2747120	18755	–		2747246	18355	M4 X 0,7	54	10	19	4,3	4	D6
2747117	18757	2747367	18257	2747241	18357	M5 X 0,8	60	13	22	4,9	4	D7
2747113	18759	2747364	18259	2747238	18359	M6 X 1	64	16	25	6,5	4	D8
–		2747357	18261	–		M8 X 1,25	69	17	28	8,1	4	D9
2747099	18761	–		–		M8 X 1,25	69	17	29	8,1	4	D9
2747090	18765	2747347	18265	–		M12 X 1,75	86	24	–	9,3	4	D11

NOTE: Series 5912TC • TiCN Coated
Series 5912T • TiN Coated
Series 5912 • Uncoated

NOTE: Metric taps are manufactured to USCTI specifications and dimensions.
Metric tap blank dimensions are equivalent to inch taps.
Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.
See pages D128 for the recommended pitch diameter limit for 6H class of fit.

Tapping Guide

coating	properties and application	precautions
Titanium Nitride (TiN)	Proprietary TiN coating (hardness 2300 Vickers) offers significantly improved wear life and thread finish, often at higher tapping speeds, in a broad range of materials, especially steels, irons, and plastics. Golden color.	Use with caution in non-ferrous materials such as aluminum because of tendency to gall.
Titanium Carbonitride (TiCN)	Proprietary TiCN coating (hardness 3000 Vickers) is harder, tougher, and more wear resistant than TiN under conditions of moderate cutting temperatures. Like TiN, TiCN may be used at higher cutting speeds in a broad range of materials, especially steels and irons. Blue-gray color.	Use with caution in non-ferrous materials such as aluminum because of tendency to gall. TiAlN is a better choice when used at extreme temperatures.
Titanium Nitride + Chromium Carbide Carbon (TiN + CrC/C)	Proprietary coating (hardness 2300 Vickers) that combines the wear resistance of smooth TiN coating with a lubricous top layer of chromium carbide carbon. Effective in stainless steel and non-ferrous materials including aluminum and titanium. Ideal choice for 300 series stainless steels, wrought, and die cast aluminums. Black/gray color.	Effective in both ferrous and non-ferrous materials.
Titanium Aluminum Nitride (TiAlN)	Nanolayer TiAlN coating (hardness 3300 Vickers) offers improved wear life and thread finish, especially in conditions where high temperatures can be generated. Use for PH stainless steels and nickel-based alloys like INCONEL®. Violet/gray color.	Use with caution in non-ferrous materials because of tendency to gall.
Chromium Nitride (CrN)	CrN is medium hard (hardness 1800 Vickers) and has a lower wear resistance than TiN, TiCN, and TiAlN. However, unlike these coatings, CrN does not gall when used in some non-ferrous work materials. Use for brass, bronze, zinc alloys, and magnesium alloys. Silver color.	Ineffective in ferrous materials.
Nitride	Hardened case extends wear life in abrasive materials. Use for aluminum and other non-ferrous materials.	Avoid on taper pipe, fast spiral, and small diameter (<#6) or fine pitch taps due to tendency for thread chipping.
Oxide	Helps prevent galling in ferrous (iron-based) materials. For free machining steel. Use for steels, stainless steels, and irons.	Has a tendency to cause galling in non-ferrous materials such as aluminum.
Nitride and Oxide	Combines the benefits of nitride and oxide surface treatments. For steels, stainless steels, and nickel alloys.	See precautions for nitride and oxide surface treatments.

Tapping Speeds

Factors when trying to determine the best tapping speeds:

- Material to be tapped
- Length of chamfer on tap
- Percentage of full thread to be cut
- Length of hole (depth of thread)
- Pitch of thread
- Cutting fluids
- Machine equipment
- Horizontal or vertical tapping

The best and most efficient operating speeds for taps cannot be calculated with the same certainty, as for many other metalcutting tools.

With other tools, the feed per revolution can be set at any desired point and can be varied as conditions demand. Taps, on the other hand, must always be advanced at a rate equal to one pitch for every revolution. The style of tap may vary the conditions.

For example, with a bottoming tap, the first thread on each land cuts the full height of thread, while, with a taper or starting tap, a number of threads do their share of the cutting before the full height of thread is reached.

The depth of thread also varies, depending on the pitch. The coarser the thread, the greater the advance of the tap per revolution and the greater the amount of material removed.

The method of feeding the tap, and the type of equipment for driving, also influences the permissible speeds. If taps are mechanically fed at the proper rate of advance, they can be operated at higher speeds than if they are required to feed themselves and pull some part of the machine along with them.

Speeds may be modified to take into account any or all of these factors:

- Speeds must be lowered as length of thread increases because, in deep thread holes, the accumulated chips increase friction and interfere with lubrication.
- Bottoming taps must be run slower than plug taps.
- Tapping full height of thread calls for slower speed than if the commercial 75% height only is required.
- Coarse-thread taps in the larger diameters should be run more slowly than fine-thread taps of the same diameters.
- The quantity and quality of cutting fluid may affect the permissible speeds as much as 100%.
- Taper threaded taps, such as pipe taps, should be operated from 1/2–3/4 the speed of a straight thread tap of comparable major diameter.

RPM Formulas

SFM = Surface Feet per Minute
RPM = Revolutions per Minute
IPM = Inches per Minute
TPI = Threads per Inch

S m/min = Surface Meters per Minute
π = 3.1416
mm/min = millimeters per minute
P = Pitch (1/number of threads per inch)

Inch Sizes

SFM	=	$\frac{\text{RPM x tool diameter}}{3.82}$	or	0.26 x RPM x tool diameter
RPM	=	$\frac{3.82 \text{ x SFM}}{\text{tool diameter}}$		
IPM	=	$\frac{\text{RPM}}{\text{TPI*}}$	or	*P x RPM

Metric Sizes

S m/min	=	$\frac{\pi \text{ x tool diameter x RPM}}{1000}$
RPM	=	$\frac{\text{mm/min x 1000}}{\pi \text{ x tool diameter}}$
mm/min	=	mm π x RPM

General-Purpose Table of Speeds

UNC/UNF and NPT/NPTF

		surface feet per minute (SFM)																	
		5'	10'	15'	20'	25'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'
tap size	taper pipe taps	revolutions per minute (RPM)																	
0	–	318	637	955	1273	1592	1910	2546	3183	3820	4456	5093	5729	6366	7003	7639	8276	8913	9549
1	–	273	546	819	1046	1308	1570	2093	2617	3140	3663	4186	4710	5233	5756	6279	6805	7326	1849
2	–	212	424	637	888	1110	1333	1777	2221	2665	3109	3554	3999	4442	4886	5330	5774	6218	6662
3	–	191	382	573	772	964	1157	1543	1929	2315	2701	3086	3472	3858	4244	4629	5015	5401	5787
4	–	174	347	521	682	853	1023	1364	1705	2046	2387	2728	3069	3411	3751	4092	4434	4775	5115
5	–	147	294	441	611	764	917	1222	1528	1833	2139	2445	2750	3056	3361	3667	3973	4278	4584
6	–	136	273	409	553	691	829	1106	1382	1859	1935	2212	2488	2766	3042	3318	3595	3871	4148
8	–	119	239	358	466	583	699	932	1165	1398	1631	1864	2097	2330	2563	2796	3029	3262	3495
10	–	101	201	302	402	502	603	804	1005	1205	1406	1607	1808	2009	2210	2411	2612	2813	3014
12	–	87	174	260	354	442	531	707	884	1061	1238	1415	1592	1769	1945	2122	2300	2476	2653
1/4	–	76	153	229	306	382	458	611	764	917	1070	1222	1375	1528	1681	1833	1986	2139	2292
5/16	–	62	123	185	245	306	367	489	611	733	856	978	1100	1222	1345	1467	1589	1711	1833
3/8	–	50	101	151	204	255	305	407	509	611	713	815	917	1019	1120	1222	1324	1426	1528
7/16	1/8	43	87	130	175	219	262	349	437	524	611	698	786	873	960	1048	1135	1222	1310
1/2	–	38	76	115	153	191	229	305	382	458	535	611	688	764	840	917	993	1070	1146
9/16	1/4	34	68	102	137	172	206	274	342	410	478	547	616	683	752	820	888	952	1020
5/8	–	32	64	96	122	153	183	244	306	367	428	489	550	611	672	733	794	856	917
11/16	3/8	28	55	83	111	138	167	222	278	333	389	444	500	556	611	667	722	778	833
3/4	–	25	51	76	102	128	153	203	255	305	357	407	458	509	560	611	662	713	764
7/8	1/2	22	43	65	87	109	131	175	218	262	306	350	392	437	480	524	568	611	655
1	–	19	38	57	76	96	115	153	191	230	268	305	344	382	420	458	497	535	573
1-1/8	3/4	17	34	51	68	84	102	136	170	204	238	272	306	340	373	407	441	475	509
1-1/4	–	15	31	46	61	76	92	122	153	183	214	244	275	305	336	367	397	428	458
1-3/8	1	14	28	42	56	69	83	111	139	167	194	222	250	278	306	333	361	389	417
1-1/2	–	13	25	38	51	63	76	102	127	153	178	204	229	255	280	305	331	356	382
1-5/8	–	12	23	35	47	59	71	94	118	141	165	188	212	235	259	282	306	329	353
1-3/4	–	11	22	33	44	55	65	87	109	131	153	175	196	218	240	262	284	306	327
1-7/8	–	10	20	30	41	51	61	81	102	122	143	163	183	204	224	244	265	285	306
2	–	9	19	29	38	48	57	76	96	115	134	153	172	191	210	229	248	267	287

Metric

	vc = meters per minute (m/min)																	
	1,5	3	4,5	6	7,5	10	12	15	18	21	24	27	30	33	36	39	42	45
metric taps	revolutions per minute (RPM)																	
M1	490	979	1469	1959	2449	2938	3918	4897	5877	6856	7836	8815	9795	10774	11754	12733	13713	14692
M2	242	484	725	967	1209	1451	1934	2418	2901	3385	3868	4352	4835	5319	5803	6286	6770	7253
M3	162	324	486	347	809	971	1295	1619	1942	2266	2590	2914	3237	3561	3885	4208	4532	4856
M3.5	138	277	415	554	692	830	1107	1384	1661	1938	2214	1491	2768	3045	3322	3599	3875	4152
M4	122	243	365	487	608	730	973	1217	1460	1703	1946	2190	2433	2676	2920	3163	3406	3650
M5	97	194	291	388	485	582	776	970	1163	1357	1551	1745	1939	2133	2327	2521	2715	2905
M6	81	162	243	324	405	486	647	809	971	1133	1295	1457	1619	1781	1942	2104	2266	2428
M7	69	138	208	277	346	415	554	692	830	969	1107	1246	1384	1522	1661	1799	1938	2076
M8	61	121	182	243	303	364	485	606	728	849	970	1091	1213	1334	1455	1577	1698	1819
M10	48	97	145	194	242	291	388	485	582	679	776	873	970	1067	1163	1260	1357	1454
M12	40	81	121	162	202	243	324	405	486	567	647	728	809	890	971	1052	1133	1214
M14	35	69	104	139	173	208	277	347	416	485	555	624	693	763	832	901	971	1040
M16	30	61	91	121	152	182	243	303	364	424	485	546	606	667	728	788	849	910
M18	27	54	81	108	135	162	216	269	323	377	431	485	539	593	647	700	754	808
M20	24	49	73	97	121	146	194	243	291	340	388	437	485	534	582	631	680	728
M22	22	44	66	88	110	132	176	221	265	309	353	397	441	485	529	573	618	662
M24	20	40	61	81	101	121	162	202	243	283	323	364	404	445	485	526	566	606
M27	18	36	54	72	90	108	144	180	216	252	287	323	359	395	431	467	503	539
M30	16	32	49	65	81	97	129	162	194	226	259	291	323	356	388	420	453	485

VariTap has optimized geometries capable of working in a wide variety of ductile materials – including carbon and alloy steels, stainless steels, ductile iron, and cast aluminum.

Advanced spiral-flute design
Smooth ejection of chip to reduce or eliminate bird-nesting

Multiple tap dimension options
ANSI, DIN, JIS, & DIN/ANSI

High-vanadium HSS-E
Improved wear characteristics, longer tool life



The VariTap platform is designed with a positive rake face and a flute optimized for tapping multiple materials



GRADES

WP42EG	TiCN
	P ●
	M ●
	K ●
	N ●
	S
	H

WU41EG	TiN
	P ●
	M ○
	K ○
	N ○
	S
	H

WP49EG	Oxide
	P ○
	M ○
	K ○
	N
	S
	H

WU40EG	Bright
	P ○
	M ○
	K ○
	N ○
	S
	H

VERSATILE MULTI-MATERIAL TAPS

WIDIA GTD

PRODUCT

VariTap™ taps deliver performance for value in multi-material tapping applications.

INDUSTRY

ENERGY

GENERAL ENGINEERING

TRANSPORTATION

MATERIALS

P M K N

APPLICATIONS


BLIND HOLE


THROUGH HOLE



HSS-E



FORM E



FORM C



FORM B



ANSI UNC



ANSI UNF



ANSI M



ANSI MF


FLOOD COOLANT: TAPPING



CLASS OF FIT: 2B



CLASS OF FIT: 3B



CLASS OF FIT: 6H

SPIRAL POINT WITH ANSI DIMENSIONS

SIZE RANGE	CHAMFER STYLE	GRADE
2–56 to 1–12"	Plug (Form B)	**WP49EG**, **WP42EG** — All H Limits; **WU41EG** — 3B Only
1-1/8–8" to 2–4-1/2"	Plug (Form B)	**WP49EG**
M3 x 0.50 to M12 x 1.75	Plug (Form B)	**WP49EG**, **WP42EG**, **WU41EG** — 6H D Limits; **WP49EG**, **WP42EG** — D11
M14 x 1.5 to M20 x 2.5	Plug (Form B)	**WP49EG**, **WP42EG**
M22 x 1.5 to M30 x 3.5	Plug (Form B)	**WP49EG**

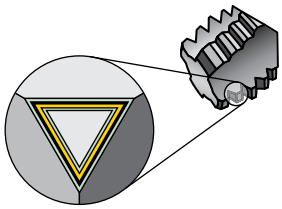
SPIRAL FLUTE WITH ANSI DIMENSIONS

SIZE RANGE	CHAMFER STYLE	GRADE
2–56 to 1–12"	Semi-Bottom (Form C)	**WP49EG**, **WP42EG** — All H Limits
1-1/8–8" to 2–4-1/2"	Semi-Bottom (Form C)	**WP49EG**
4–40 to ¾–16	Bottom (Form E)	**WP49EG**
M3 x 0.50 to M12 x 1.75	Semi-Bottom (Form C)	**WP49EG**, **WP42EG**, **WU41EG** — 6H D Limits; **WP49EG**, **WP42EG** — D11
M14 x 1.5 to M20 x 2.5	Semi-Bottom (Form C)	**WP49EG**, **WP42EG**
M22 x 1.5 to M30 x 3.5	Semi-Bottom (Form C)	**WP49EG**
M3 x 0.50 to M18 x 1.5	Bottom (Form E)	**WP49EG**

Shank Style

ANSI, DIN, JIS, & DIN/ANSI precision ground to h9 tolerance

Grades and Grade Descriptions



Coatings are designed for optimized tapping performance in specific materials.

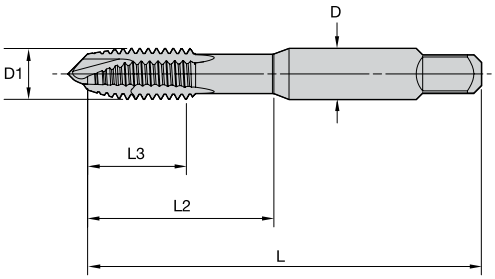
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

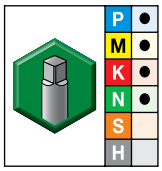
Grade

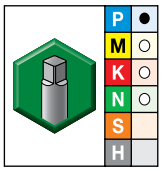
Coating	Grade Description		wear resistance ← → toughness								
			05	10	15	20	25	30	35	40	45
WP42EG	Coated HSS-E substrate with TiCN PVD layer. Use in multiple applications, including steel, stainless steel, ductile cast iron, and cast aluminum. WP42EG is more abrasion-resistant than WU41EG.	P							■	■	■
		M							■	■	■
		K							■	■	■
		N							■	■	■
WU41EG	Coated HSS-E substrate with TiN PVD layer. Use in multiple applications, including steel, stainless steel, ductile cast iron, and cast aluminum.	P							■	■	■
		M							■	■	■
		K								■	■
		N								■	■
WP49EG	HSS-E substrate with black oxide surface treatment. Use in a variety of materials, including steel, stainless steel, and ductile iron. Not recommended for non-ferrous materials.	P								■	■
		M								■	■
		K									■
WU40EG	Uncoated HSS-E grade with bright surface. Use in easy-to-machine, general-purpose applications.	P								■	■
		M								■	■
		K									■
		N									■

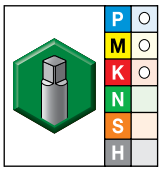
VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • ANSI











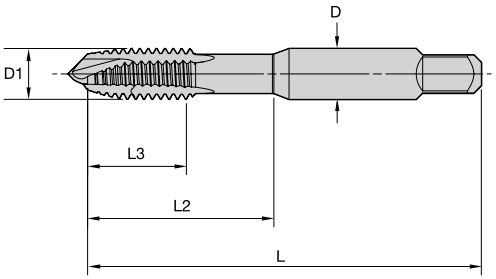
● first choice
○ alternate choice

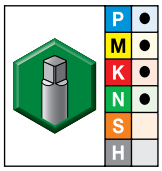
grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide								
order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5365807	VTSPO5045	5365808	VTSPO5045	5365806	VTSPO5045	1/4 - 20	2.50	.63	1.00	.255	3	H3
5365821	VTSPO5046		–	5365820	VTSPO5046	1/4 - 20	2.50	.63	1.00	.255	3	H5
5365825	VTSPO5047		–	5365823	VTSPO5047	1/4 - 20	2.50	.63	1.00	.255	3	H7
5365827	VTSPO5048		–	5365826	VTSPO5048	1/4 - 20	2.50	.63	1.00	.255	3	H11
5365840	VTSPO5049	5365841	VTSPO5049	5365829	VTSPO5049	1/4 - 28	2.50	.63	1.00	.255	3	H3
5365844	VTSPO5050		–		–	1/4 - 28	2.50	.63	1.00	.255	3	H4
5365849	VTSPO5051		–	5365848	VTSPO5051	1/4 - 28	2.50	.63	1.01	.255	3	H5
5365922	VTSPO5052		–		–	1/4 - 28	2.50	.63	1.01	.255	3	H6
5365925	VTSPO5053		–	5365924	VTSPO5053	1/4 - 28	2.50	.63	1.01	.255	3	H7
	–		–	5365928	VTSPO5054	1/4 - 28	2.50	.63	1.01	.255	3	H11
5365932	VTSPO5055	5365933	VTSPO5055	5365931	VTSPO5055	5/16 - 18	2.72	.69	1.14	.318	3	H3
5365936	VTSPO5056		–	5365935	VTSPO5056	5/16 - 18	2.72	.69	1.14	.318	3	H5
5365939	VTSPO5057		–	5365938	VTSPO5057	5/16 - 18	2.72	.69	1.14	.318	3	H7
5365942	VTSPO5058		–	5365941	VTSPO5058	5/16 - 18	2.72	.69	1.14	.318	3	H11
5365946	VTSPO5059	5365947	VTSPO5059	5365945	VTSPO5059	5/16 - 24	2.72	.69	1.14	.318	3	H3
5365960	VTSPO5060		–	5365949	VTSPO5060	5/16 - 24	2.72	.69	1.14	.318	3	H4
5365963	VTSPO5061		–	5365962	VTSPO5061	5/16 - 24	2.72	.69	1.14	.318	3	H5
	–		–	5365965	VTSPO5062	5/16 - 24	2.72	.69	1.14	.318	3	H6
5365972	VTSPO5064		–	5365971	VTSPO5064	5/16 - 24	2.72	.69	1.14	.318	3	H11
5365975	VTSPO5065	5365976	VTSPO5065	5365974	VTSPO5065	3/8 - 16	2.94	.75	1.27	.381	3	H3
5366898	VTSPO5066		–	5366897	VTSPO5066	3/8 - 16	2.94	.75	1.27	.381	3	H5
5366941	VTSPO5067		–	5366940	VTSPO5067	3/8 - 16	2.94	.75	1.27	.381	3	H7
5366944	VTSPO5068		–	5366943	VTSPO5068	3/8 - 16	2.94	.75	1.27	.381	3	H11
5366947	VTSPO5069	5366948	VTSPO5069	5366946	VTSPO5069	3/8 - 24	2.94	.75	1.27	.381	3	H3
	–		–	5366950	VTSPO5070	3/8 - 24	2.94	.75	1.27	.381	3	H4
5366954	VTSPO5071		–	5366953	VTSPO5071	3/8 - 24	2.94	.75	1.27	.381	3	H5
	–		–	5366956	VTSPO5072	3/8 - 24	2.94	.75	1.27	.381	3	H6
5366960	VTSPO5073		–	5366959	VTSPO5073	3/8 - 24	2.94	.75	1.27	.381	3	H7
5366966	VTSPO5075	5366967	VTSPO5075	5366965	VTSPO5075	7/16 - 14	3.16	.88	1.49	.323	3	H3
5366970	VTSPO5076		–	5366969	VTSPO5076	7/16 - 14	3.16	.88	1.49	.323	3	H5
5366976	VTSPO5078		–		–	7/16 - 14	3.16	.88	1.49	.323	3	H11
5366979	VTSPO5079	5366980	VTSPO5079	5366978	VTSPO5079	7/16 - 20	3.16	.88	1.49	.323	3	H3
5366983	VTSPO5080		–	5366982	VTSPO5080	7/16 - 20	3.16	.88	1.49	.323	3	H5
	–		–	5366036	VTSPO5081	7/16 - 20	3.16	.88	1.49	.323	3	H6
5366075	VTSPO5084	5366076	VTSPO5084	5366074	VTSPO5084	1/2 - 13	3.38	.94	1.74	.367	3	H3
5366079	VTSPO5085		–	5366078	VTSPO5085	1/2 - 13	3.38	.94	1.74	.367	3	H5
5366083	VTSPO5086		–	5366081	VTSPO5086	1/2 - 13	3.38	.94	1.74	.367	3	H7
5366086	VTSPO5087		–	5366085	VTSPO5087	1/2 - 13	3.38	.94	1.74	.367	3	H11
5366089	VTSPO5088	5366110	VTSPO5088	5366088	VTSPO5088	1/2 - 20	3.38	.94	1.74	.367	3	H3
5366113	VTSPO5089		–	5366112	VTSPO5089	1/2 - 20	3.38	.94	1.74	.367	3	H5
	–		–	5366115	VTSPO5090	1/2 - 20	3.38	.94	1.74	.367	3	H6
5366117	VTSPO5091		–	5366116	VTSPO5091	1/2 - 20	3.38	.94	1.74	.367	3	H7
	–		–	5366119	VTSPO5092	1/2 - 20	3.38	.94	1.74	.367	3	H11
5366133	VTSPO5093	5366134	VTSPO5093	5366132	VTSPO5093	9/16 - 12	3.59	1.00	1.74	.429	3	H3
5366137	VTSPO5094	5366138	VTSPO5094	5366136	VTSPO5094	9/16 - 18	3.59	1.00	1.74	.429	3	H3
5366141	VTSPO5095	5366142	VTSPO5095	5366140	VTSPO5095	5/8 - 11	3.81	1.09	1.89	.480	3	H3
5366145	VTSPO5096		–	5366144	VTSPO5096	5/8 - 11	3.81	1.09	1.89	.480	3	H5
	–		–	5367003	VTSPO5097	5/8 - 11	3.81	1.09	1.89	.480	3	H7
5367005	VTSPO5098		–	5367004	VTSPO5098	5/8 - 18	3.81	1.09	1.89	.480	3	H3
5367008	VTSPO5099		–	5367007	VTSPO5099	5/8 - 18	3.81	1.09	1.89	.480	3	H5
5367032	VTSPO5101		–	5367031	VTSPO5101	5/8 - 18	3.81	1.09	1.89	.480	3	H7
5367035	VTSPO5102	5367036	VTSPO5102	5367034	VTSPO5102	3/4 - 10	4.25	1.22	2.08	.590	3	H3

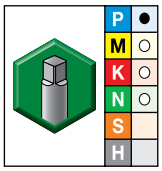
VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • ANSI

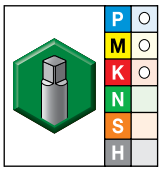
(continued)











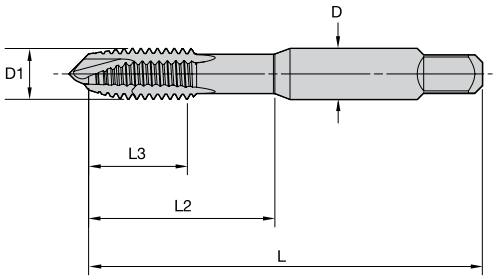
● first choice
○ alternate choice

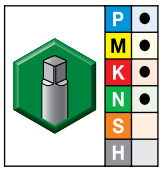
grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide								
order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5367039	VTSPO5103		–	5367038	VTSPO5103	3/4 - 10	4.25	1.22	2.08	.590	3	H5
5367062	VTSPO5104	5367063	VTSPO5104	5367061	VTSPO5104	3/4 - 16	4.25	1.22	2.08	.590	3	H3
5367066	VTSPO5105		–	5367065	VTSPO5105	3/4 - 16	4.25	1.22	2.08	.590	3	H5
5367069	VTSPO5106	5367070	VTSPO5106	5367068	VTSPO5106	7/8 - 9	4.69	1.34	2.30	.697	3	H4
5367073	VTSPO5107		–	5367072	VTSPO5107	7/8 - 9	4.69	1.34	2.30	.697	3	H5
5367076	VTSPO5108		–	5367075	VTSPO5108	7/8 - 14	4.69	1.34	2.30	.697	3	H4
5366406	VTSPO5109	5366407	VTSPO5109	5366404	VTSPO5109	1 - 8	5.13	1.50	2.58	.800	3	H5
5366440	VTSPO5110		–	5366409	VTSPO5110	1 - 12	5.13	1.50	2.58	.800	3	H4
	–		–	5366442	VTSPO5111	1 1/8 - 7	5.44	1.71	2.56	.896	4	H6
	–		–	5366443	VTSPO5112	1 1/8 - 8	5.44	1.71	2.56	.896	4	H6
	–		–	5366444	VTSPO5113	1 1/8 - 12	5.44	1.71	2.56	.896	4	H5
	–		–	5366445	VTSPO5114	1 1/4 - 7	5.75	1.71	2.56	1.021	4	H6
	–		–	5366446	VTSPO5115	1 1/4 - 8	5.75	1.71	2.56	1.020	4	H6
	–		–	5366447	VTSPO5116	1 1/4 - 12	5.75	1.71	2.56	1.021	4	H5
	–		–	5366448	VTSPO5117	1 3/8 - 6	6.07	2.00	3.00	1.108	4	H6
	–		–	5366449	VTSPO5118	1 3/8 - 8	6.07	2.00	3.00	1.108	4	H6
	–		–	5366450	VTSPO5119	1 3/8 - 12	6.07	2.00	3.00	1.108	4	H5
	–		–	5366451	VTSPO5120	1 1/2 - 6	6.38	2.00	3.00	1.233	4	H6
	–		–	5366452	VTSPO5121	1 1/2 - 8	6.38	2.00	3.00	1.233	4	H6
	–		–	5366453	VTSPO5122	1 1/2 - 12	6.38	2.00	3.00	1.233	4	H5
5357242	VTSPO5001		–	5357241	VTSPO5001	2 - 56	1.75	.39	.50	.141	2	H2
	–		–	5357244	VTSPO5002	2 - 56	1.75	.39	.50	.141	2	H3
	–		–	5357245	VTSPO5003	2 - 56	1.75	.39	.50	.141	2	H4
	–		–	5366454	VTSPO5123	2 - 4 1/2	7.63	2.67	3.56	1.643	4	H7
5357247	VTSPO5004		–	5357246	VTSPO5004	3 - 48	1.82	.45	.57	.141	2	H2
5357260	VTSPO5005	5357261	VTSPO5005	5357249	VTSPO5005	4 - 40	1.88	.51	.69	.141	2	H2
5357264	VTSPO5006		–	5357263	VTSPO5006	4 - 40	1.88	.51	.69	.141	2	H3
	–		–	5357266	VTSPO5007	4 - 40	1.88	.51	.69	.141	2	H4
5357272	VTSPO5008		–	5357271	VTSPO5008	4 - 40	1.88	.51	.69	.141	2	H5
	–		–	5357274	VTSPO5009	4 - 40	1.88	.51	.69	.141	2	H6
5357276	VTSPO5010		–	5357275	VTSPO5010	4 - 48	1.88	.51	.69	.141	2	H2
5357280	VTSPO5012		–	5357279	VTSPO5012	5 - 40	1.94	.58	.75	.141	2	H2
5631491	VTSPO5365		–	5631490	VTSPO5365	5 - 40	1.94	.58	.75	.141	3	H2
5357283	VTSPO5013		–	5357282	VTSPO5013	6 - 32	1.99	.38	.71	.141	2	H2
5357286	VTSPO5014	5357287	VTSPO5014	5357285	VTSPO5014	6 - 32	1.99	.38	.71	.141	2	H3
	–		–	5357289	VTSPO5015	6 - 32	1.99	.38	.71	.141	2	H4
5357293	VTSPO5016		–	5357292	VTSPO5016	6 - 32	1.99	.38	.71	.141	2	H5
5357296	VTSPO5017		–		–	6 - 32	1.99	.38	.71	.141	2	H6
5357299	VTSPO5018		–	5357298	VTSPO5018	6 - 32	1.99	.38	.71	.141	2	H7
5365704	VTSPO5019		–		–	6 - 32	1.99	.38	.71	.141	2	H11
	–		–	5365706	VTSPO5020	6 - 40	1.99	.38	.71	.141	2	H2
	–		–	5365709	VTSPO5021	6 - 40	1.99	.38	.71	.141	2	H3
	–		–	5631506	VTSPO5364	6 - 32	1.99	.38	.71	.141	3	H6
5631494	VTSPO5366		–	5631493	VTSPO5366	6 - 32	1.99	.38	.71	.141	3	H2
5631497	VTSPO5367		–		–	6 - 32	1.99	.38	.71	.141	3	H3
	–		–	5631500	VTSPO5368	6 - 32	1.99	.38	.71	.141	3	H4
	–		–	5631503	VTSPO5369	6 - 32	1.99	.38	.71	.141	3	H5
	–		–	5631509	VTSPO5370	6 - 32	1.99	.38	.71	.141	3	H7
	–		–	5631512	VTSPO5371	6 - 32	1.99	.38	.71	.141	3	H11
5365771	VTSPO5029		–	5365769	VTSPO5029	8 - 36	2.11	.38	.76	.168	2	H2
5365741	VTSPO5022		–	5365740	VTSPO5022	8 - 32	2.12	.38	.76	.168	2	H2
5365744	VTSPO5023	5365745	VTSPO5023	5365743	VTSPO5023	8 - 32	2.12	.38	.76	.168	2	H3

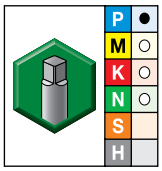
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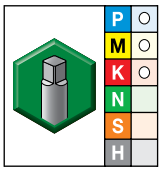
(continued)











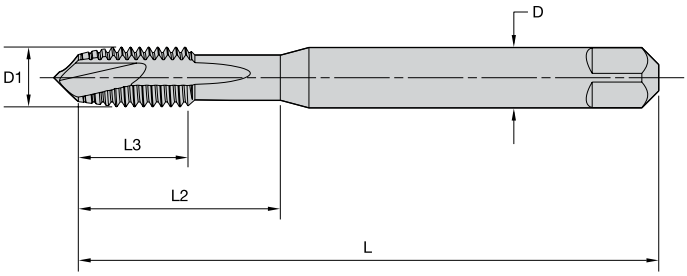
● first choice
○ alternate choice

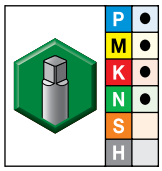
grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide								
order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
–		–		5365747	VTSPO5024	8 - 32	2.12	.38	.76	.168	2	H4
5365751	VTSPO5025	–		5365750	VTSPO5025	8 - 32	2.12	.38	.76	.168	2	H5
–		–		5365753	VTSPO5026	8 - 32	2.12	.38	.76	.168	2	H6
5365758	VTSPO5027	–		5365757	VTSPO5027	8 - 32	2.12	.38	.76	.168	2	H7
–		–		5365762	VTSPO5028	8 - 32	2.12	.38	.76	.168	2	H11
5631523	VTSPO5375	–		5631522	VTSPO5375	8 - 32	2.12	.38	.76	.168	3	H3
–		–		5631526	VTSPO5376	8 - 32	2.12	.38	.76	.168	3	H4
–		–		5631529	VTSPO5377	8 - 32	2.12	.38	.76	.168	3	H5
–		–		5631532	VTSPO5378	8 - 32	2.12	.38	.76	.168	3	H6
–		–		5631538	VTSPO5379	8 - 32	2.12	.38	.76	.168	3	H7
–		–		5631544	VTSPO5380	8 - 32	2.12	.38	.76	.168	3	H11
5365785	VTSPO5040	–		5365783	VTSPO5040	10 - 32	2.36	.50	.91	.194	2	H6
5365791	VTSPO5041	–		5365789	VTSPO5041	10 - 32	2.36	.50	.91	.194	2	H7
5365797	VTSPO5042	–		5365795	VTSPO5042	10 - 32	2.36	.50	.91	.194	2	H11
5365779	VTSPO5039	–		5365777	VTSPO5039	10 - 32	2.36	.50	.91	.194	2	H5
5365759	VTSPO5036	–		5365756	VTSPO5036	10 - 32	2.36	.50	.91	.194	2	H2
5365764	VTSPO5037	5365766	VTSPO5037	5365763	VTSPO5037	10 - 32	2.36	.50	.91	.194	2	H3
5365772	VTSPO5038	–		5365770	VTSPO5038	10 - 32	2.36	.50	.91	.194	2	H4
5631600	VTSPO5389	5631602	VTSPO5389	5631598	VTSPO5389	10 - 32	2.36	.50	.91	.194	3	H3
–		–		5631606	VTSPO5390	10 - 32	2.36	.50	.91	.194	3	H4
5631614	VTSPO5391	–		–		10 - 32	2.36	.50	.91	.194	3	H5
–		–		5365782	VTSPO5031	10 - 24	2.37	.50	.91	.194	2	H4
5365796	VTSPO5035	–		–		10 - 24	2.37	.50	.91	.194	2	H11
5365776	VTSPO5030	5365778	VTSPO5030	5365774	VTSPO5030	10 - 24	2.37	.50	.91	.194	2	H3
5631558	VTSPO5382	5631560	VTSPO5382	5631556	VTSPO5382	10 - 24	2.37	.50	.91	.194	3	H3
–		–		5631563	VTSPO5383	10 - 24	2.37	.50	.91	.194	3	H4
–		–		5631572	VTSPO5385	10 - 24	2.37	.50	.91	.194	3	H6
–		–		5631575	VTSPO5387	10 - 24	2.37	.50	.91	.194	3	H11
5365786	VTSPO5032	–		5365784	VTSPO5032	10 - 24	2.37	.50	.91	.194	2	H5
–		–		5365790	VTSPO5033	10 - 24	2.37	.50	.91	.194	2	H6
–		–		5365792	VTSPO5034	10 - 24	2.37	.50	.91	.194	2	H7
5365801	VTSPO5043	–		5365800	VTSPO5043	12 - 24	2.37	.50	.96	.220	2	H3
5365804	VTSPO5044	–		5365803	VTSPO5044	12 - 28	2.37	.50	.96	.220	2	H3
5631635	VTSPO5395	–		5631634	VTSPO5395	12 - 24	2.37	.50	.96	.220	3	H3
5631638	VTSPO5396	–		–		12 - 28	2.37	.50	.96	.220	3	H3

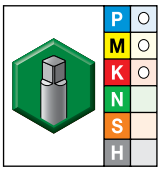
NOTE: VariTap for 3B class of fit is suitable for UNJ aerospace internal threading applications.

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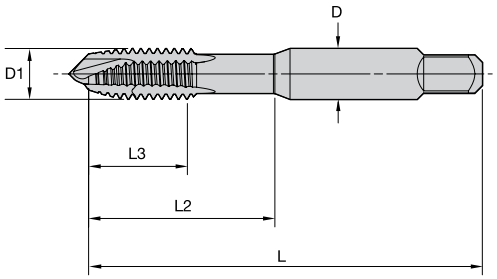


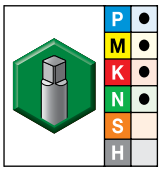
● first choice
○ alternate choice

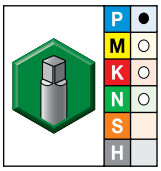
grade WP42EG TiCN		grade WP49EG Oxide									
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	dimension standard	class of fit
5366572	VTSPO9004	5366571	VTSPO9004	4 - 40	2.20	.31	.71	.141	2	DIN-ANSI	2B
	–	5366573	VTSPO9005	6 - 32	2.20	.35	.79	.141	2	DIN-ANSI	2B
5366576	VTSPO9006	5366575	VTSPO9006	8 - 32	2.48	.43	.83	.168	2	DIN-ANSI	2B
5366578	VTSPO9007	5366577	VTSPO9007	10 - 24	2.76	.47	.98	.194	2	DIN-ANSI	2B
5366580	VTSPO9008	5366579	VTSPO9008	10 - 32	2.75	.47	.98	.194	2	DIN-ANSI	2B
5366582	VTSPO9009	5366581	VTSPO9009	1/4 - 20	3.15	.59	1.18	.255	3	DIN-ANSI	2B
5366584	VTSPO9010		–	1/4 - 28	3.14	.58	1.17	.255	3	DIN-ANSI	2B
5366586	VTSPO9011	5366585	VTSPO9011	5/16 - 18	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5366588	VTSPO9012	5366587	VTSPO9012	5/16 - 24	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5366590	VTSPO9013	5366589	VTSPO9013	3/8 - 16	3.94	.75	1.54	.381	3	DIN-ANSI	2B
	–	5366591	VTSPO9014	3/8 - 24	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5366594	VTSPO9015	5366593	VTSPO9015	7/16 - 14	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5366596	VTSPO9016	5366595	VTSPO9016	7/16 - 20	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5366598	VTSPO9017	5366597	VTSPO9017	1/2 - 13	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5366602	VTSPO9019	5366601	VTSPO9019	5/8 - 11	4.33	.94	2.01	.480	3	DIN-ANSI	2B
	–	5366603	VTSPO9020	5/8 - 18	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5366606	VTSPO9021	5366605	VTSPO9021	3/4 - 10	4.92	1.18	2.52	.590	3	DIN-ANSI	2B
	–	5366607	VTSPO9022	3/4 - 16	4.92	1.18	2.52	.590	3	DIN-ANSI	2B

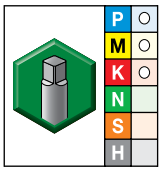
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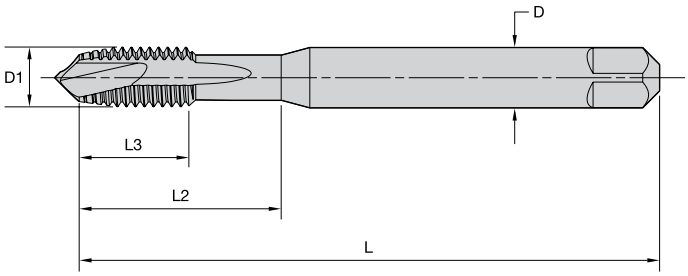


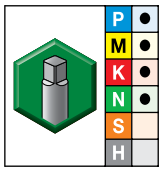
● first choice
○ alternate choice

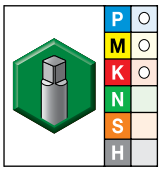
grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide			L		L3		L2		D			
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	mm	in	mm	in	mm	in	mm	in	number of flutes	pitch diameter limit
5362670	VTSPO5505	5362671	VTSPO5505	5362589	VTSPO5505	M3 X 0,5	49,30	1.94	14,80	.58	19,10	.75	3,581	.141	2	D3
	–		–	5362673	VTSPO5506	M3 X 0,5	49,30	1.94	14,80	.58	19,10	.75	3,581	.141	2	D11
5631641	VTSPO5613		–	5631640	VTSPO5613	M3 X 0,5	49,30	1.94	14,80	.58	19,10	.75	3,581	.141	3	D3
5631645	VTSPO5614		–	5631644	VTSPO5614	M3 X 0,5	49,30	1.94	14,80	.58	19,10	.75	3,581	.141	3	D11
5362677	VTSPO5507		–	5362676	VTSPO5507	M3,5 X 0,6	50,50	1.99	9,70	.38	18,00	.71	3,581	.141	2	D4
	–		–	5631646	VTSPO5615	M3,5 X 0,6	50,50	1.99	9,70	.38	18,00	.71	3,581	.141	3	D4
	–		–	5362695	VTSPO5510	M4 X 0,7	53,80	2.12	9,70	.38	19,40	.76	4,267	.168	2	D11
5362692	VTSPO5509	5362693	VTSPO5509	5362691	VTSPO5509	M4 X 0,7	53,80	2.12	9,70	.38	19,40	.76	4,267	.168	2	D4
5631652	VTSPO5617	5631653	VTSPO5617	5631651	VTSPO5617	M4 X 0,7	53,80	2.12	9,70	.38	19,40	.76	4,267	.168	3	D4
	–		–	5631655	VTSPO5618	M4 X 0,7	53,80	2.12	9,70	.38	19,40	.76	4,267	.168	3	D11
5362702	VTSPO5512		–	5362701	VTSPO5512	M5 X 0,8	60,30	2.37	12,70	.50	23,20	.91	4,928	.194	2	D11
5362698	VTSPO5511	5362699	VTSPO5511	5362697	VTSPO5511	M5 X 0,8	60,30	2.37	12,70	.50	23,20	.91	4,928	.194	2	D4
5631659	VTSPO5619	5631670	VTSPO5619	5631658	VTSPO5619	M5 X 0,8	60,30	2.37	12,70	.50	23,20	.91	4,928	.194	3	D4
5362704	VTSPO5513	5362705	VTSPO5513	5362703	VTSPO5513	M6 X 1	63,50	2.50	16,00	.63	25,40	1.00	6,477	.255	3	D5
5362708	VTSPO5514		–	5362707	VTSPO5514	M6 X 1	63,50	2.50	16,00	.63	25,40	1.00	6,477	.255	3	D11
5362710	VTSPO5515		–	5362709	VTSPO5515	M7 X 1	69,20	2.72	17,50	.69	29,30	1.15	8,077	.318	3	D5
5362715	VTSPO5517		–	5362714	VTSPO5517	M8 X 1	68,70	2.71	17,50	.69	28,50	1.12	8,077	.318	3	D5
5362722	VTSPO5519	5362723	VTSPO5519	5362720	VTSPO5519	M8 X 1,25	68,90	2.71	17,50	.69	28,60	1.13	8,077	.318	3	D5
5362728	VTSPO5520		–	5362727	VTSPO5520	M8 X 1,25	68,90	2.71	17,50	.69	28,60	1.13	8,077	.318	3	D11
5362730	VTSPO5521		–	5362729	VTSPO5521	M10 X 1	74,00	2.91	19,10	.75	31,60	1.24	9,677	.381	3	D5
5362733	VTSPO5522		–	5362732	VTSPO5522	M10 X 1	74,00	2.91	19,10	.75	31,60	1.24	9,677	.381	3	D11
	–		–	5367307	VTSPO5524	M10 X 1,25	74,10	2.92	18,90	.74	31,80	1.25	9,677	.381	3	D11
5367305	VTSPO5523		–	5367304	VTSPO5523	M10 X 1,25	74,10	2.92	18,90	.74	31,80	1.25	9,677	.381	3	D5
5367340	VTSPO5525	5367341	VTSPO5525	5367309	VTSPO5525	M10 X 1,5	74,30	2.92	19,10	.75	31,90	1.26	9,677	.381	3	D6
5367344	VTSPO5526		–	5367343	VTSPO5526	M10 X 1,5	74,30	2.92	19,10	.75	31,90	1.26	9,677	.381	3	D11
5367346	VTSPO5527		–	5367345	VTSPO5527	M12 X 1,25	85,80	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D6
	–		–	5367353	VTSPO5530	M12 X 1,5	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D11
5367351	VTSPO5529		–	5367350	VTSPO5529	M12 X 1,5	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D6
5367360	VTSPO5532		–		–	M12 X 1,75	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D11
5367356	VTSPO5531	5367357	VTSPO5531	5367355	VTSPO5531	M12 X 1,75	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D6
5367362	VTSPO5533		–	5367361	VTSPO5533	M14 X 1,5	91,20	3.59	25,40	1.00	44,20	1.74	10,897	.429	3	D6
5367365	VTSPO5534		–	5367364	VTSPO5534	M14 X 2	91,20	3.59	25,40	1.00	44,20	1.74	10,897	.429	3	D7
5366476	VTSPO5535		–	5366475	VTSPO5535	M16 X 1,5	96,80	3.81	27,70	1.09	48,00	1.89	12,192	.480	3	D6
5366480	VTSPO5536	5366481	VTSPO5536	5366479	VTSPO5536	M16 X 2	96,80	3.81	27,70	1.09	48,00	1.89	12,192	.480	3	D7
5366485	VTSPO5537		–	5366483	VTSPO5537	M18 X 1,5	102,40	4.03	27,70	1.09	48,00	1.89	13,767	.542	3	D6
5366488	VTSPO5538		–	5366487	VTSPO5538	M18 X 2,5	102,40	4.03	31,00	1.22	48,00	1.89	13,767	.542	3	D7
5366491	VTSPO5539		–	5366490	VTSPO5539	M20 X 1,5	113,50	4.47	31,00	1.22	52,80	2.08	16,561	.652	3	D6
5366493	VTSPO5540		–	5366492	VTSPO5540	M20 X 2,5	113,50	4.47	31,00	1.22	52,80	2.08	16,561	.652	3	D7
	–		–	5366494	VTSPO5541	M22 X 1,5	119,10	4.69	31,00	1.22	58,40	2.30	17,704	.697	3	D6
	–		–	5366495	VTSPO5542	M22 X 2,5	119,10	4.69	31,00	1.22	58,40	2.30	17,704	.697	3	D7
	–		–	5366496	VTSPO5543	M24 X 2	124,70	4.91	31,00	1.22	58,40	2.30	19,314	.760	3	D7
	–		–	5366497	VTSPO5544	M24 X 3	124,70	4.91	31,00	1.22	58,40	2.30	19,314	.760	3	D8
	–		–	5366498	VTSPO5545	M27 X 1,5	130,30	5.13	31,00	1.22	63,50	2.50	22,758	.896	4	D7
	–		–	5366499	VTSPO5546	M27 X 3	130,30	5.13	31,00	1.22	63,50	2.50	22,758	.896	4	D8
	–		–	5366510	VTSPO5547	M30 X 1,5	138,20	5.44	31,00	1.22	65,00	2.56	25,933	1.021	4	D6
	–		–	5366511	VTSPO5548	M30 X 3,5	138,20	5.44	31,00	1.22	65,00	2.56	25,933	1.021	4	D9

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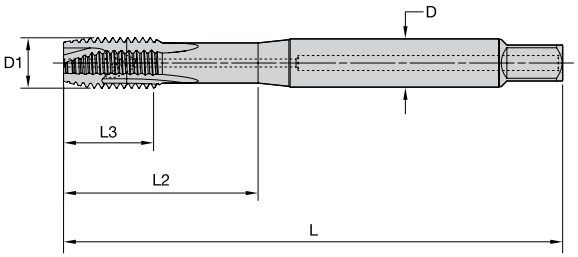


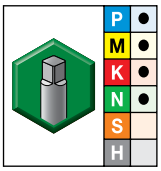
● first choice
○ alternate choice

grade WP42EG TiCN		grade WP49EG Oxide									
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5368174	VTSPO9507	5368173	VTSPO9507	M4 X 0,7	2.48	.43	.83	.168	2	DIN-ANSI	6H
5368176	VTSPO9508	5368175	VTSPO9508	M5 X 0,8	2.75	.47	.97	.194	2	DIN-ANSI	6H
5368178	VTSPO9509	5368177	VTSPO9509	M6 X 1	3.15	.47	1.18	.255	3	DIN-ANSI	6H
5368180	VTSPO9510	5368179	VTSPO9510	M8 X 1,25	3.54	.59	1.37	.318	3	DIN-ANSI	6H
5368184	VTSPO9512	5368183	VTSPO9512	M10 X 1,5	3.94	.71	1.53	.381	3	DIN-ANSI	6H
–	–	5368187	VTSPO9514	M12 X 1,5	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5368190	VTSPO9515	5368189	VTSPO9515	M12 X 1,75	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5368197	VTSPO9518	5368196	VTSPO9518	M16 X 1,5	4.33	.94	2.01	.480	3	DIN-ANSI	6H
5368199	VTSPO9519	5368198	VTSPO9519	M16 X 2	4.33	.94	2.01	.480	3	DIN-ANSI	6H
–	–	5368200	VTSPO9520	M18 X 1,5	4.92	1.18	2.28	.542	3	DIN-ANSI	6H
–	–	5368202	VTSPO9521	M18 X 2,5	4.92	1.18	2.28	.542	3	DIN-ANSI	6H
5368207	VTSPO9523	–	–	M20 X 2,5	5.51	1.18	2.52	.652	3	DIN-ANSI	6H

VT-SPO • Form B Plug Chamfer • Through Coolant • Fractional • DIN Length ANSI Shank





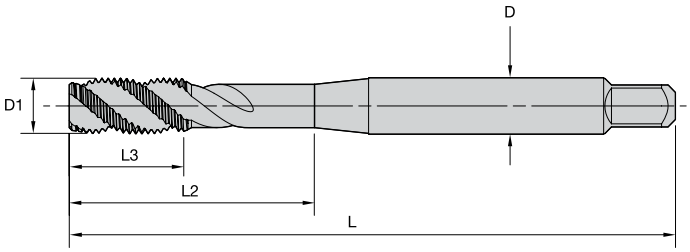


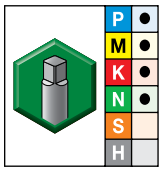
● first choice
○ alternate choice

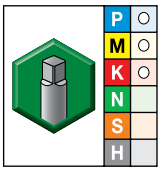
order #	catalog #	grade WP42EG TiCN	D1 TPI	L	L3	L2	D	number of flutes	dimension standard	class of fit
5368496	VTSPO9709		3/8 - 16	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5368501	VTSPO9713		1/2 - 13	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5368503	VTSPO9715		9/16 - 18	4.33	.98	2.09	.429	3	DIN-ANSI	2B
5368508	VTSPO9719		3/4 - 16	4.92	1.18	2.52	.590	3	DIN-ANSI	2B

VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • DIN Length ANSI Shank









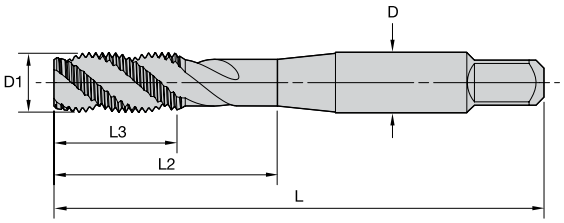
● first choice
○ alternate choice

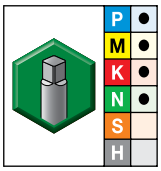
grade WP42EG TiCN		grade WP49EG Oxide								
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5436673	VTSFT9008		–	4 - 40	2.20	.31	.71	.141	2	DIN-ANSI	2B
5436675	VTSFT9009	5436674	VTSFT9009	6 - 32	2.20	.35	.79	.141	2	DIN-ANSI	2B
5436677	VTSFT9010		–	8 - 32	2.48	.43	.83	.168	3	DIN-ANSI	2B
5436679	VTSFT9011		–	10 - 24	2.76	.47	.99	.194	3	DIN-ANSI	2B
5436701	VTSFT9012		–	10 - 32	2.75	.47	.98	.194	3	DIN-ANSI	2B
5436703	VTSFT9013	5436702	VTSFT9013	1/4 - 20	3.15	.59	1.18	.255	3	DIN-ANSI	2B
5436705	VTSFT9014	5436704	VTSFT9014	1/4 - 28	3.14	.58	1.17	.255	3	DIN-ANSI	2B
5436707	VTSFT9015	5436706	VTSFT9015	5/16 - 18	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5436709	VTSFT9016		–	5/16 - 24	3.53	.58	1.37	.318	3	DIN-ANSI	2B
5436721	VTSFT9017	5436720	VTSFT9017	3/8 - 16	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5436723	VTSFT9018		–	3/8 - 24	3.92	.73	1.52	.381	3	DIN-ANSI	2B
	–	5436724	VTSFT9019	7/16 - 14	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5436727	VTSFT9020		–	7/16 - 20	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5436729	VTSFT9021	5436728	VTSFT9021	1/2 - 13	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5436733	VTSFT9023	5436732	VTSFT9023	5/8 - 11	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5436735	VTSFT9024		–	5/8 - 18	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5436737	VTSFT9025		–	3/4 - 10	4.92	1.18	2.52	.590	4	DIN-ANSI	2B
	–	5436736	VTSFT9025	3/4 - 10	4.92	1.18	2.52	.590	3	DIN-ANSI	2B

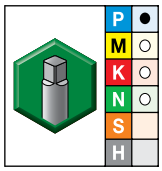
NOTE: Suggested for use in rigid and synchronous holders.

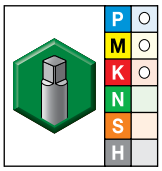
VT-SFT • Form C Semi-Bottoming Chamfer • Metric • ANSI











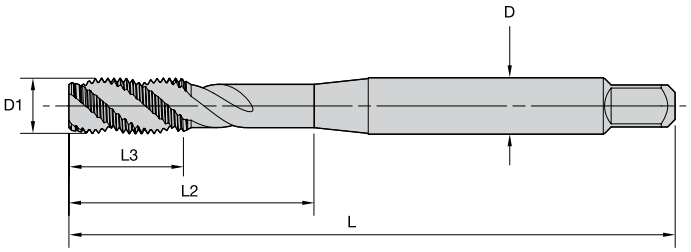
● first choice
○ alternate choice

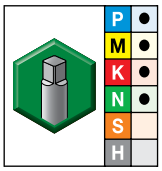
grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide			L		L3		L2		D			
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	mm	in	mm	in	mm	in	mm	in	number of flutes	pitch diameter limit
–		–		5357031	VTSFT5505	M3 X 0,5	49,20	1.94	14,80	.58	19,10	.75	3,581	.141	2	D3
5357039	VTSFT5507	–		5357038	VTSFT5507	M3,5 X 0,6	50,50	1.99	9,70	.38	18,00	.71	3,581	.141	2	D4
–		5357056	VTSFT5509	5357054	VTSFT5509	M4 X 0,7	53,80	2.12	9,70	.38	19,40	.76	4,267	.168	3	D4
–		–		5357060	VTSFT5511	M5 X 0,8	60,30	2.37	12,70	.50	23,20	.91	4,928	.194	3	D4
5357066	VTSFT5512	–		–		M5 X 0,8	60,30	2.37	12,70	.50	23,20	.91	4,928	.194	3	D11
–		5357069	VTSFT5513	5357067	VTSFT5513	M6 X 1	63,50	2.50	16,00	.63	25,50	1.01	6,477	.255	3	D5
5357083	VTSFT5514	–		–		M6 X 1	63,50	2.50	16,00	.63	25,50	1.01	6,477	.255	3	D11
–		–		5357084	VTSFT5515	M7 X 1	69,20	2.73	17,50	.69	29,30	1.15	8,077	.318	3	D5
5357101	VTSFT5517	5357102	VTSFT5517	5357100	VTSFT5517	M8 X 1	68,70	2.71	17,50	.69	28,50	1.12	8,077	.318	3	D5
–		–		5357106	VTSFT5519	M8 X 1,25	68,70	2.71	17,50	.69	28,50	1.12	8,077	.318	3	D5
5357123	VTSFT5520	–		5357121	VTSFT5520	M8 X 1,25	68,70	2.71	17,50	.69	28,50	1.12	8,077	.318	3	D11
5365567	VTSFT5521	–		5365566	VTSFT5521	M10 X 1	74,00	2.91	18,70	.74	31,60	1.24	9,677	.381	3	D5
5365590	VTSFT5522	–		–		M10 X 1	73,90	2.91	18,70	.74	31,60	1.24	9,677	.381	3	D11
5365592	VTSFT5523	–		5365591	VTSFT5523	M10 X 1,25	74,10	2.92	18,90	.74	31,80	1.25	9,677	.381	3	D5
5365598	VTSFT5525	–		5365597	VTSFT5525	M10 X 1,5	74,30	2.92	19,00	.75	31,90	1.26	9,677	.381	3	D6
5365612	VTSFT5526	–		–		M10 X 1,5	74,20	2.92	19,00	.75	31,90	1.25	9,677	.381	3	D11
5365614	VTSFT5527	–		5365613	VTSFT5527	M12 X 1,25	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D5
5365621	VTSFT5529	–		–		M12 X 1,5	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D6
5365624	VTSFT5530	–		–		M12 X 1,5	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D11
–		–		5365625	VTSFT5531	M12 X 1,75	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D6
–		–		5365629	VTSFT5532	M12 X 1,75	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D11
–		–		5365635	VTSFT5535	M14 X 2	91,20	3.59	25,40	1.00	44,20	1.74	10,897	.429	3	D7
–		–		5365637	VTSFT5536	M16 X 1,5	96,80	3.81	27,70	1.09	48,00	1.89	12,192	.480	3	D6
–		–		5365640	VTSFT5537	M16 X 2	96,80	3.81	27,70	1.09	48,00	1.89	12,192	.480	3	D7
5365650	VTSFT5540	–		–		M20 X 1,5	113,50	4.47	31,00	1.22	52,80	2.08	16,561	.652	4	D6
–		–		5365651	VTSFT5541	M20 X 2,5	113,50	4.47	31,00	1.22	52,80	2.08	16,561	.652	4	D7
–		–		5365656	VTSFT5545	M24 X 3	124,70	4.91	34,00	1.34	58,40	2.30	19,304	.760	4	D8
–		–		5365660	VTSFT5549	M30 X 3,5	138,20	5.44	43,50	1.71	65,00	2.56	25,933	1.021	4	D9

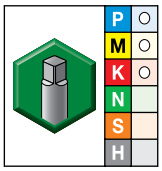
NOTE: Refer to tables on page D128 for the recommended pitch diameter limit for 6H class of fit.
VariTap for 6H class of fit is suitable for MJ aerospace internal threading applications.

VT-SFT • Form C Semi-Bottoming Chamfer • Metric • DIN Length ANSI Shank









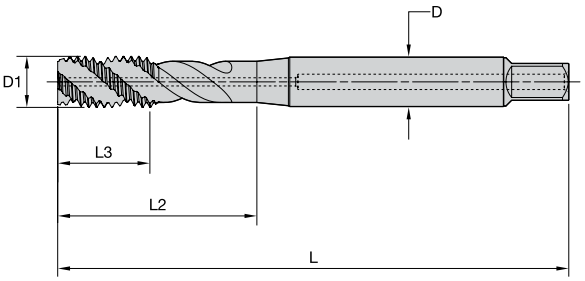
● first choice
○ alternate choice

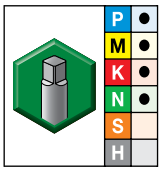
grade WP42EG TiCN		grade WP49EG Oxide									
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5436528	VTSFT9507	5436527	VTSFT9507	M6 X 1	3.15	.47	1.18	.255	3	DIN-ANSI	6H
5436540	VTSFT9508		–	M8 X 1,25	3.54	.58	1.37	.318	3	DIN-ANSI	6H
5436544	VTSFT9510		–	M10 X 1,5	3.94	.71	1.53	.381	3	DIN-ANSI	6H
5436546	VTSFT9511		–	M12 X 1,25	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5436550	VTSFT9513		–	M12 X 1,75	4.33	.83	1.73	.367	3	DIN-ANSI	6H

NOTE: Suggested for use in rigid and synchronous holders.

VT-SFT • Form C Semi-Bottoming Chamfer • Through Coolant • Fractional • DIN Length ANSI Shank







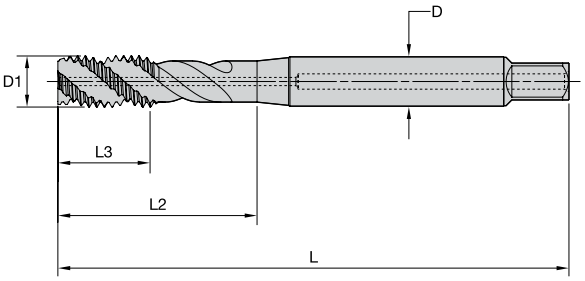
● first choice
○ alternate choice

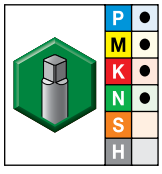
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	dimension standard	class of fit
		grade WP42EG TiCN							
5436357	VTSFT9762	1/4 - 20	3.15	.59	1.18	.255	3	DIN-ANSI	2B
5436359	VTSFT9764	5/16 - 18	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5436461	VTSFT9766	3/8 - 16	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5436462	VTSFT9767	3/8 - 24	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5436463	VTSFT9768	7/16 - 14	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5436465	VTSFT9770	1/2 - 13	3.94	.91	1.85	.367	3	DIN-ANSI	2B
5436468	VTSFT9773	5/8 - 11	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5436473	VTSFT9778	7/8 - 14	5.51	1.34	2.80	.697	4	DIN-ANSI	2B

NOTE: Suggested for use in rigid and synchronous holders.

VT-SFT • Form C Semi-Bottoming Chamfer • Through Coolant • Metric • DIN Length ANSI Shank







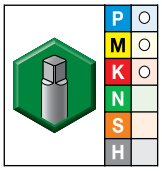
● first choice
○ alternate choice

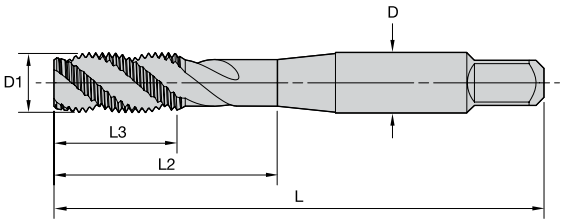
order #	catalog #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
		grade WP42EG TiCN							
5436475	VTSFT9925	M6 X 1	3.15	.47	1.18	.255	3	DIN-ANSI	6H
5436476	VTSFT9926	M8 X 1,25	3.54	.59	1.38	.318	3	DIN-ANSI	6H
5436478	VTSFT9928	M10 X 1,5	3.94	.71	1.53	.381	3	DIN-ANSI	6H
5436481	VTSFT9931	M12 X 1,75	4.33	.83	1.73	.367	3	DIN-ANSI	6H

NOTE: Suggested for use in rigid and synchronous holders.

VT-SFT • Form E Bottoming Chamfer • Machine Screw and Fractional • ANSI







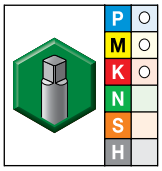
● first choice
○ alternate choice

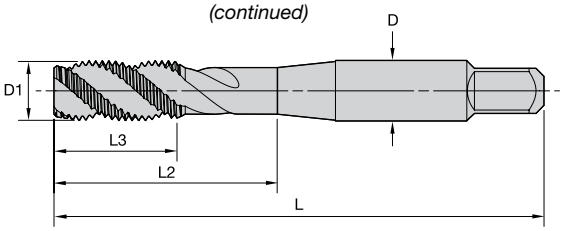
grade WP49EG Oxide								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5356668	VTSFT5001	2 - 56	1.76	.40	.50	.141	2	H2
5356731	VTSFT5002	3 - 48	1.82	.46	.57	.141	2	H2
5356734	VTSFT5003	4 - 40	1.88	.52	.70	.141	2	H2
5356738	VTSFT5004	4 - 40	1.88	.52	.70	.141	2	H3
5356748	VTSFT5008	4 - 48	1.88	.53	.70	.141	2	H2
5356751	VTSFT5009	5 - 40	1.95	.59	.76	.141	2	H2
5356755	VTSFT5010	6 - 32	2.00	.39	.72	.141	2	H2
5356758	VTSFT5011	6 - 32	2.00	.39	.72	.141	2	H3
5356763	VTSFT5013	6 - 32	2.00	.39	.72	.141	2	H5
5356775	VTSFT5017	6 - 40	2.00	.39	.72	.141	2	H3
5357303	VTSFT5018	8 - 32	2.13	.38	.77	.168	3	H2
5357306	VTSFT5019	8 - 32	2.13	.38	.77	.168	3	H3
5357370	VTSFT5020	8 - 32	2.13	.38	.77	.168	3	H4
5357371	VTSFT5021	8 - 32	2.13	.38	.77	.168	3	H5
5357375	VTSFT5023	8 - 32	2.13	.38	.77	.168	3	H7
5357381	VTSFT5025	8 - 36	2.13	.38	.77	.168	3	H3
5357382	VTSFT5026	10 - 24	2.38	.50	.92	.194	3	H2
5357383	VTSFT5027	10 - 24	2.38	.50	.92	.194	3	H3
5357388	VTSFT5029	10 - 24	2.38	.50	.92	.194	3	H5
5357391	VTSFT5030	10 - 24	2.38	.50	.92	.194	3	H7
5357395	VTSFT5032	10 - 32	2.38	.50	.92	.194	3	H2
5357398	VTSFT5033	10 - 32	2.38	.50	.92	.194	3	H3
5357402	VTSFT5034	10 - 32	2.38	.50	.92	.194	3	H4
5357403	VTSFT5035	10 - 32	2.37	.50	.91	.194	3	H5
5357406	VTSFT5036	10 - 32	2.38	.50	.92	.194	3	H6
5357407	VTSFT5037	10 - 32	2.38	.50	.92	.194	3	H7
5364105	VTSFT5039	12 - 24	2.43	.50	.96	.220	3	H3
5364108	VTSFT5040	12 - 28	2.43	.50	.96	.220	3	H3
5364451	VTSFT5041	1/4 - 20	2.50	.63	1.00	.255	3	H3
5364455	VTSFT5042	1/4 - 20	2.50	.63	1.00	.255	3	H5
5364458	VTSFT5043	1/4 - 20	2.50	.63	1.00	.255	3	H7
5364484	VTSFT5045	1/4 - 28	2.49	.62	1.00	.255	3	H3
5364488	VTSFT5046	1/4 - 28	2.49	.62	1.00	.255	3	H4
5364491	VTSFT5047	1/4 - 28	2.49	.62	1.00	.255	3	H5
5364495	VTSFT5049	1/4 - 28	2.49	.62	1.00	.255	3	H7
5364502	VTSFT5051	5/16 - 18	2.72	.69	1.13	.318	3	H3
5364506	VTSFT5052	5/16 - 18	2.72	.69	1.13	.318	3	H5
5364509	VTSFT5053	5/16 - 18	2.72	.69	1.13	.318	3	H7
5364512	VTSFT5054	5/16 - 18	2.72	.69	1.13	.318	3	H11
5364515	VTSFT5055	5/16 - 24	2.71	.68	1.13	.318	3	H3
5364519	VTSFT5056	5/16 - 24	2.71	.68	1.13	.318	3	H4
5364532	VTSFT5057	5/16 - 24	2.71	.68	1.13	.318	3	H5
5364538	VTSFT5059	5/16 - 24	2.71	.68	1.12	.318	3	H7
5364544	VTSFT5061	3/8 - 16	2.94	.75	1.27	.381	3	H3
5364549	VTSFT5062	3/8 - 16	2.94	.75	1.27	.381	3	H5
5364553	VTSFT5063	3/8 - 16	2.94	.75	1.27	.381	3	H7
5364556	VTSFT5064	3/8 - 16	2.93	.75	1.27	.381	3	H11
5364559	VTSFT5065	3/8 - 24	2.92	.74	1.25	.381	3	H3
5364566	VTSFT5067	3/8 - 24	2.92	.74	1.25	.381	3	H5
5364577	VTSFT5071	7/16 - 14	3.16	.88	1.42	.323	3	H3
5364601	VTSFT5072	7/16 - 14	3.16	.88	1.42	.323	3	H5
5364610	VTSFT5075	7/16 - 20	3.16	.88	1.42	.323	3	H3
5364614	VTSFT5076	7/16 - 20	3.16	.88	1.42	.323	3	H5
5364624	VTSFT5080	1/2 - 13	3.38	.94	1.65	.367	3	H3
5364628	VTSFT5081	1/2 - 13	3.38	.94	1.65	.367	3	H5
5364631	VTSFT5082	1/2 - 13	3.38	.94	1.65	.367	3	H7
5364634	VTSFT5083	1/2 - 13	3.38	.94	1.65	.367	3	H11
5364637	VTSFT5084	1/2 - 20	3.38	.94	1.65	.367	3	H3
5364641	VTSFT5085	1/2 - 20	3.38	.94	1.65	.367	3	H5
5364644	VTSFT5086	1/2 - 20	3.38	.94	1.65	.367	3	H6
5364645	VTSFT5087	1/2 - 20	3.38	.94	1.74	.367	3	H7
5364671	VTSFT5089	9/16 - 12	3.59	1.00	1.74	.429	3	H3
5364677	VTSFT5091	9/16 - 18	3.59	1.00	1.74	.429	3	H3
5364681	VTSFT5092	9/16 - 18	3.59	1.00	1.74	.429	3	H5

VT-SFT • Form E Bottoming Chamfer • Machine Screw and Fractional • ANSI

(continued)





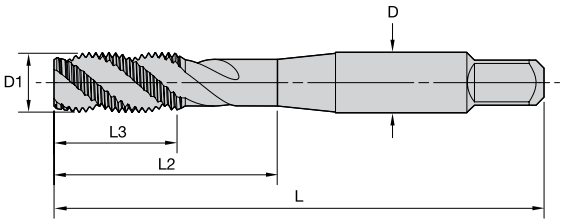


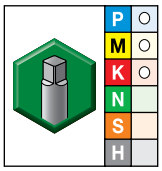
● first choice
○ alternate choice

grade WP49EG Oxide								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5364683	VTSFT5093	5/8 - 11	3.81	2.00	1.89	.480	3	H3
5364687	VTSFT5094	5/8 - 11	3.81	1.09	1.89	.480	3	H5
5364690	VTSFT5095	5/8 - 11	3.81	1.09	1.89	.480	3	H7
5364691	VTSFT5096	5/8 - 18	3.81	1.09	1.89	.480	3	H3
5364695	VTSFT5097	5/8 - 18	3.81	1.09	1.89	.480	3	H5
5364698	VTSFT5099	5/8 - 18	3.81	1.09	1.89	.480	3	H7
5364699	VTSFT5100	3/4 - 10	4.25	1.22	2.08	.590	4	H3
5364703	VTSFT5101	3/4 - 10	4.25	1.22	2.08	.590	4	H5
5364706	VTSFT5102	3/4 - 16	4.25	1.22	2.08	.590	4	H3
5364710	VTSFT5103	3/4 - 16	4.25	1.22	2.08	.590	4	H5
5364713	VTSFT5104	3/4 - 16	4.25	1.22	2.08	.590	4	H7
5364714	VTSFT5105	7/8 - 9	4.69	1.34	2.30	.697	4	H4
5364721	VTSFT5107	7/8 - 14	4.69	1.34	2.30	.697	4	H4
5364726	VTSFT5108	1 - 8	5.13	1.50	2.58	.800	4	H5
5364729	VTSFT5109	1 - 12	5.13	1.50	2.58	.800	4	H4
5364742	VTSFT5110	1 1/8 - 7	5.44	1.71	2.56	.896	4	H6
5364744	VTSFT5111	1 1/8 - 8	5.44	1.71	2.56	.896	4	H6
5364743	VTSFT5112	1 1/8 - 12	5.44	1.71	2.56	.896	4	H5
5364746	VTSFT5113	1 1/4 - 7	5.75	1.71	2.56	1.021	4	H6
5364747	VTSFT5114	1 1/4 - 12	5.75	1.71	2.56	1.021	4	H5
5364748	VTSFT5115	1 1/4 - 8	5.75	1.71	2.56	1.021	4	H6
5364751	VTSFT5118	1 3/8 - 8	6.06	2.00	3.00	1.108	5	H6
5364752	VTSFT5119	1 1/2 - 6	6.38	2.00	3.00	1.233	5	H6
5364754	VTSFT5120	1 1/2 - 8	6.38	2.00	3.00	1.233	5	H6
5364753	VTSFT5121	1 1/2 - 12	6.38	2.00	3.00	1.233	5	H5
5364755	VTSFT5122	1 3/4 - 5	7.00	2.40	3.19	1.429	5	H7
5390146	VTSFT5131	4 - 40	1.88	.51	.69	.141	2	H3
5390148	VTSFT5133	5 - 40	1.94	.58	.75	.141	2	H2
5390220	VTSFT5135	6 - 32	1.99	.38	.71	.141	2	H3
5390223	VTSFT5138	6 - 40	1.99	.37	.71	.141	2	H3
5390224	VTSFT5139	8 - 32	2.12	.38	.76	.168	3	H2
5390225	VTSFT5140	8 - 32	2.12	.38	.76	.168	3	H3
5390226	VTSFT5141	8 - 32	2.12	.38	.76	.168	3	H5
5390227	VTSFT5142	10 - 24	2.37	.50	.91	.194	3	H3
5390228	VTSFT5143	10 - 24	2.37	.50	.91	.194	3	H5
5390229	VTSFT5144	10 - 32	2.36	.49	.91	.194	3	H3
5390230	VTSFT5145	10 - 32	2.36	.49	.91	.194	3	H5
5390231	VTSFT5146	1/4 - 20	2.50	.63	1.00	.255	3	H3
5390232	VTSFT5147	1/4 - 20	2.50	.63	1.00	.255	3	H5
5390233	VTSFT5148	1/4 - 28	2.49	.62	1.00	.255	3	H3
5390234	VTSFT5149	1/4 - 28	2.49	.62	1.00	.255	3	H5
5390235	VTSFT5150	5/16 - 18	2.72	.69	1.13	.318	3	H3
5390236	VTSFT5151	5/16 - 18	2.72	.69	1.13	.318	3	H5
5390237	VTSFT5152	5/16 - 24	2.71	.68	1.13	.318	3	H3
5390238	VTSFT5153	5/16 - 24	2.71	.68	1.12	.318	3	H5
5390239	VTSFT5154	3/8 - 16	2.94	.75	1.27	.381	3	H5
5390240	VTSFT5155	3/8 - 16	2.94	.75	1.27	.381	3	H3
5390241	VTSFT5156	3/8 - 24	2.92	.74	1.25	.381	3	H3
5390243	VTSFT5158	3/8 - 24	2.92	.74	1.25	.381	3	H5
5390244	VTSFT5159	7/16 - 14	3.16	.88	1.49	.323	3	H3
5390245	VTSFT5160	7/16 - 14	3.16	.88	1.49	.323	3	H5
5390246	VTSFT5161	7/16 - 20	3.16	.88	1.49	.323	3	H3
5390247	VTSFT5162	7/16 - 20	3.16	.88	1.49	.323	3	H5
5390248	VTSFT5163	1/2 - 13	3.38	.94	1.74	.367	3	H3
5390249	VTSFT5164	1/2 - 13	3.38	.94	1.74	.367	3	H5
5390260	VTSFT5165	1/2 - 20	3.38	.94	1.74	.367	3	H3
5390262	VTSFT5167	9/16 - 18	3.59	1.00	1.74	.429	3	H3
5390263	VTSFT5168	5/8 - 11	3.81	1.09	1.89	.480	3	H3
5390264	VTSFT5169	5/8 - 11	3.81	1.09	1.89	.480	3	H5
5390265	VTSFT5170	5/8 - 18	3.81	1.09	1.89	.480	3	H3
5390266	VTSFT5171	5/8 - 18	3.81	1.09	1.89	.480	3	H5
5390267	VTSFT5172	3/4 - 10	4.25	1.22	2.08	.590	4	H3
5390268	VTSFT5173	3/4 - 16	4.25	1.22	2.08	.590	4	H3

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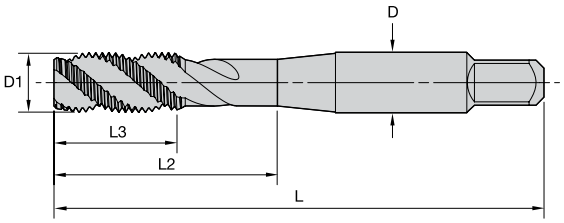
● first choice
○ alternate choice

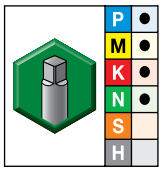
order #	catalog #	grade WP49EG Oxide	D1 size	L	L3	L2	D	number of flutes	pitch diameter limit
5400155	VTSFT5550		M3 X 0,5	1.94	.58	.75	.141	2	D3
5400157	VTSFT5552		M4 X 0,7	2.13	.38	.76	.168	3	D4
5400158	VTSFT5553		M5 X 0,8	2.38	.50	.91	.194	3	D4
5400159	VTSFT5554		M6 X 1	2.50	.63	1.00	.255	3	D5
5400231	VTSFT5556		M8 X 1,25	2.72	.69	1.12	.318	3	D5
5400233	VTSFT5558		M10 X 1,5	2.94	.75	1.26	.381	3	D6
5400235	VTSFT5560		M12 X 1,75	3.38	.94	1.74	.367	3	D6
5400239	VTSFT5564		M14 X 1,5	3.59	1.00	1.74	.429	3	D6
5400241	VTSFT5566		M16 X 1,5	3.81	1.09	1.89	.480	3	D6
5400240	VTSFT5565		M16 X 2	3.81	1.09	1.89	.480	3	D7

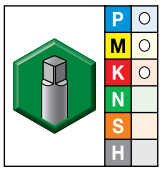
NOTE: Refer to tables on page D128 for the recommended pitch diameter limit for 6H class of fit.
VariTap for 6H class of fit is suitable for MJ aerospace internal threading applications.

VT-SFT TC • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • ANSI • Tension/Compression Holders









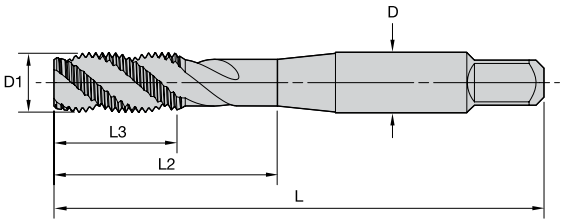
● first choice
○ alternate choice

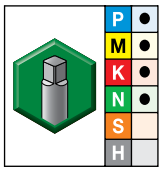
grade WP42EG TiCN		grade WP49EG Oxide								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
6140248	VTSFT-TC5001	6140249	VTSFT-TC5001	2 - 56	1.76	.39	.50	.141	2	H2
6140250	VTSFT-TC5002	6140271	VTSFT-TC5002	3 - 48	1.82	.46	.57	.141	2	H2
6140272	VTSFT-TC5003	6140273	VTSFT-TC5003	4 - 40	1.88	.52	.70	.141	2	H2
6140274	VTSFT-TC5004	6140275	VTSFT-TC5004	4 - 40	1.88	.52	.70	.141	2	H3
–		6140279	VTSFT-TC5006	4 - 40	1.88	.52	.70	.141	2	H5
–		6140280	VTSFT-TC5007	4 - 40	1.88	.52	.70	.141	2	H6
–		6140282	VTSFT-TC5008	4 - 48	1.88	.53	.70	.141	2	H2
6140283	VTSFT-TC5009	6140284	VTSFT-TC5009	5 - 40	1.95	.59	.76	.141	2	H2
6140285	VTSFT-TC5010	6140286	VTSFT-TC5010	6 - 32	2.00	.39	.72	.141	2	H2
5886705	VTSFT-TC5011	5886704	VTSFT-TC5011	6 - 32	2.00	.38	.72	.141	3	H3
–		6140287	VTSFT-TC5012	6 - 32	2.00	.39	.72	.141	2	H4
6140288	VTSFT-TC5013	–		6 - 32	2.00	.38	.71	.141	2	H5
–		5886706	VTSFT-TC5013	6 - 32	2.00	.38	.71	.141	3	H5
–		6140292	VTSFT-TC5015	6 - 32	2.00	.39	.72	.141	2	H11
6140293	VTSFT-TC5016	6140294	VTSFT-TC5016	6 - 40	2.00	.39	.72	.141	2	H2
–		6140295	VTSFT-TC5017	6 - 40	2.00	.39	.72	.141	2	H3
6140296	VTSFT-TC5018	6140297	VTSFT-TC5018	8 - 32	2.13	.38	.77	.168	3	H2
5886708	VTSFT-TC5019	5886707	VTSFT-TC5019	8 - 32	2.13	.38	.77	.168	3	H3
–		6140298	VTSFT-TC5020	8 - 32	2.13	.38	.77	.168	3	H4
6140299	VTSFT-TC5021	5886709	VTSFT-TC5021	8 - 32	2.13	.38	.77	.168	3	H5
–		6140302	VTSFT-TC5023	8 - 32	2.13	.38	.77	.168	3	H7
–		6140305	VTSFT-TC5025	8 - 36	2.13	.38	.77	.168	3	H3
–		6140306	VTSFT-TC5026	10 - 24	2.38	.50	.92	.194	3	H2
5887031	VTSFT-TC5027	5886710	VTSFT-TC5027	10 - 24	2.38	.50	.92	.194	3	H3
–		6140307	VTSFT-TC5028	10 - 24	2.38	.50	.92	.194	3	H4
–		5887032	VTSFT-TC5029	10 - 24	2.38	.50	.92	.194	3	H5
–		6140309	VTSFT-TC5030	10 - 24	2.38	.50	.92	.194	3	H7
6140310	VTSFT-TC5031	–		10 - 24	2.38	.50	.92	.194	3	H11
6140312	VTSFT-TC5032	6140313	VTSFT-TC5032	10 - 32	2.38	.50	.92	.194	3	H2
5887034	VTSFT-TC5033	5887033	VTSFT-TC5033	10 - 32	2.38	.50	.92	.194	3	H3
–		6140314	VTSFT-TC5034	10 - 32	2.38	.50	.92	.194	3	H4
6140315	VTSFT-TC5035	–		10 - 32	2.38	.50	.91	.194	3	H5
–		5887035	VTSFT-TC5035	10 - 32	2.37	.50	.91	.194	3	H5
–		6140316	VTSFT-TC5036	10 - 32	2.38	.50	.92	.194	3	H6
–		6140318	VTSFT-TC5037	10 - 32	2.38	.50	.92	.194	3	H7
5887037	VTSFT-TC5039	5887036	VTSFT-TC5039	12 - 24	2.43	.50	.96	.220	3	H3
6140321	VTSFT-TC5040	6140322	VTSFT-TC5040	12 - 28	2.43	.50	.96	.220	3	H3
5887039	VTSFT-TC5041	5887038	VTSFT-TC5041	1/4 - 20	2.50	.63	1.00	.255	3	H3
6140183	VTSFT-TC5042	5887040	VTSFT-TC5042	1/4 - 20	2.50	.63	1.00	.255	3	H5
6140184	VTSFT-TC5043	6140185	VTSFT-TC5043	1/4 - 20	2.50	.63	1.00	.255	3	H7
6140186	VTSFT-TC5044	6140187	VTSFT-TC5044	1/4 - 20	2.50	.63	1.00	.255	3	H11
5887042	VTSFT-TC5045	5887041	VTSFT-TC5045	1/4 - 28	2.49	.62	1.00	.255	3	H3
6140188	VTSFT-TC5046	6140190	VTSFT-TC5046	1/4 - 28	2.50	.63	1.00	.255	3	H4
6140191	VTSFT-TC5047	–		1/4 - 28	2.50	.63	1.00	.255	3	H5
–		5887043	VTSFT-TC5047	1/4 - 28	2.49	.62	1.00	.255	3	H5
–		6140192	VTSFT-TC5048	1/4 - 28	2.50	.63	1.00	.255	3	H6
6140193	VTSFT-TC5049	6140195	VTSFT-TC5049	1/4 - 28	2.50	.63	1.00	.255	3	H7
5887045	VTSFT-TC5051	5887044	VTSFT-TC5051	5/16 - 18	2.72	.69	1.13	.318	3	H3
6140198	VTSFT-TC5052	5887046	VTSFT-TC5052	5/16 - 18	2.72	.69	1.13	.318	3	H5
6140200	VTSFT-TC5053	6140201	VTSFT-TC5053	5/16 - 18	2.72	.69	1.13	.318	3	H7
6140202	VTSFT-TC5054	6140203	VTSFT-TC5054	5/16 - 18	2.72	.69	1.13	.318	3	H11
5887048	VTSFT-TC5055	5887047	VTSFT-TC5055	5/16 - 24	2.71	.68	1.13	.318	3	H3
–		5887049	VTSFT-TC5057	5/16 - 24	2.71	.68	1.12	.318	3	H5
–		6140216	VTSFT-TC5058	5/16 - 24	2.72	.69	1.12	.318	3	H6
–		6140219	VTSFT-TC5059	5/16 - 24	2.72	.69	1.12	.318	3	H7
5887051	VTSFT-TC5061	5887050	VTSFT-TC5061	3/8 - 16	2.94	.75	1.27	.381	3	H3

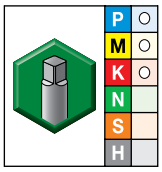
VT-SFT TC • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • ANSI • Tension/Compression Holders

(continued)







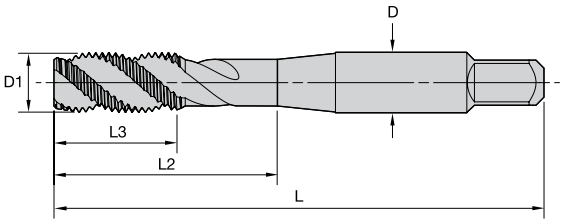


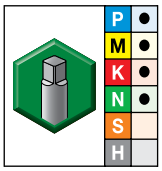
● first choice
○ alternate choice

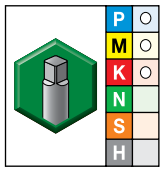
grade WP42EG TiCN		grade WP49EG Oxide								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
6140222	VTSFT-TC5062	5887052	VTSFT-TC5062	3/8 - 16	2.94	.75	1.27	.381	3	H5
–		6140224	VTSFT-TC5063	3/8 - 16	2.94	.75	1.27	.381	3	H7
–		6140226	VTSFT-TC5064	3/8 - 16	2.93	.75	1.27	.381	3	H11
5887054	VTSFT-TC5065	5887053	VTSFT-TC5065	3/8 - 24	2.92	.74	1.25	.381	3	H3
6140227	VTSFT-TC5066	6140228	VTSFT-TC5066	3/8 - 24	2.94	.75	1.27	.381	3	H4
6140229	VTSFT-TC5067	–		3/8 - 24	2.94	.75	1.27	.381	3	H5
–		5887055	VTSFT-TC5067	3/8 - 24	2.92	.74	1.25	.381	3	H5
–		6140230	VTSFT-TC5068	3/8 - 24	2.94	.75	1.27	.381	3	H6
6140233	VTSFT-TC5070	–		3/8 - 24	2.94	.75	1.27	.381	3	H11
5887057	VTSFT-TC5071	5887056	VTSFT-TC5071	7/16 - 14	3.16	.88	1.49	.323	3	H3
6140235	VTSFT-TC5072	5887058	VTSFT-TC5072	7/16 - 14	3.16	.88	1.49	.323	3	H5
–		6140237	VTSFT-TC5073	7/16 - 14	3.16	.88	1.49	.323	3	H7
5887061	VTSFT-TC5075	5887059	VTSFT-TC5075	7/16 - 20	3.16	.88	1.49	.323	3	H3
6140240	VTSFT-TC5076	5887062	VTSFT-TC5076	7/16 - 20	3.16	.88	1.49	.323	3	H5
–		6140243	VTSFT-TC5078	7/16 - 20	3.16	.88	1.49	.323	3	H7
–		6140245	VTSFT-TC5079	7/16 - 20	3.16	.88	1.49	.323	3	H11
5887064	VTSFT-TC5080	5887063	VTSFT-TC5080	1/2 - 13	3.38	.94	1.74	.367	3	H3
6140422	VTSFT-TC5081	5887065	VTSFT-TC5081	1/2 - 13	3.38	.94	1.74	.367	3	H5
–		6140424	VTSFT-TC5082	1/2 - 13	3.38	.94	1.74	.367	3	H7
6140425	VTSFT-TC5083	6140426	VTSFT-TC5083	1/2 - 13	3.38	.94	1.74	.367	3	H11
5887068	VTSFT-TC5084	5887067	VTSFT-TC5084	1/2 - 20	3.38	.94	1.74	.367	3	H3
6140427	VTSFT-TC5085	5887069	VTSFT-TC5085	1/2 - 20	3.38	.94	1.74	.367	3	H5
–		6140430	VTSFT-TC5087	1/2 - 20	3.38	.94	1.74	.367	3	H7
–		6140432	VTSFT-TC5088	1/2 - 20	3.38	.94	1.74	.367	3	H11
6140434	VTSFT-TC5089	6140436	VTSFT-TC5089	9/16 - 12	3.59	1.00	1.74	.429	3	H3
6140440	VTSFT-TC5091	6140452	VTSFT-TC5091	9/16 - 18	3.59	1.00	1.74	.429	3	H3
–		6140454	VTSFT-TC5092	9/16 - 18	3.59	1.00	1.74	.429	3	H5
5887071	VTSFT-TC5093	5887070	VTSFT-TC5093	5/8 - 11	3.81	1.09	1.89	.480	3	H3
6140456	VTSFT-TC5094	5887072	VTSFT-TC5094	5/8 - 11	3.81	1.09	1.89	.480	3	H5
–		6140458	VTSFT-TC5095	5/8 - 11	3.81	1.09	1.89	.480	3	H7
5887074	VTSFT-TC5096	5887073	VTSFT-TC5096	5/8 - 18	3.81	1.09	1.89	.480	3	H3
–		5887075	VTSFT-TC5097	5/8 - 18	3.81	1.09	1.89	.480	3	H5
–		6140460	VTSFT-TC5098	5/8 - 18	3.81	1.09	1.89	.480	3	H6
5887077	VTSFT-TC5100	5887076	VTSFT-TC5100	3/4 - 10	4.25	1.22	2.08	.590	4	H3
6140465	VTSFT-TC5101	5887078	VTSFT-TC5101	3/4 - 10	4.25	1.22	2.08	.590	4	H5
5887080	VTSFT-TC5102	5887079	VTSFT-TC5102	3/4 - 16	4.25	1.22	2.08	.590	4	H3
6140467	VTSFT-TC5103	5887081	VTSFT-TC5103	3/4 - 16	4.25	1.22	2.08	.590	4	H5
–		6140469	VTSFT-TC5104	3/4 - 16	4.25	1.22	2.08	.590	4	H7
–		5887082	VTSFT-TC5105	7/8 - 9	4.69	1.34	2.30	.697	4	H4
6140471	VTSFT-TC5106	6140473	VTSFT-TC5106	7/8 - 9	4.69	1.34	2.30	.697	4	H5
6140475	VTSFT-TC5107	6140477	VTSFT-TC5107	7/8 - 14	4.69	1.34	2.30	.697	4	H4
–		5887083	VTSFT-TC5108	1 - 8	5.13	1.50	2.58	.800	4	H5
6140479	VTSFT-TC5109	6140481	VTSFT-TC5109	1 - 12	5.13	1.50	2.58	.800	4	H4
–		6140483	VTSFT-TC5110	1 1/8 - 7	5.44	1.71	2.56	.896	4	H6
–		6140484	VTSFT-TC5111	1 1/8 - 8	5.44	1.71	2.56	.896	4	H6
–		6140486	VTSFT-TC5112	1 1/8 - 12	5.44	1.71	2.56	.896	4	H5
–		6140488	VTSFT-TC5113	1 1/4 - 7	5.75	1.71	2.56	1.021	4	H6
–		6140490	VTSFT-TC5114	1 1/4 - 12	5.75	1.71	2.56	1.021	4	H5
–		6140492	VTSFT-TC5115	1 1/4 - 8	5.75	1.71	2.56	1.021	4	H6
–		6140494	VTSFT-TC5116	1 3/8 - 6	6.06	2.00	3.00	1.108	5	H6
–		6140496	VTSFT-TC5117	1 3/8 - 12	6.06	2.00	3.00	1.108	5	H5
–		6140498	VTSFT-TC5118	1 3/8 - 8	6.06	2.00	3.00	1.108	5	H6
–		6140500	VTSFT-TC5119	1 1/2 - 6	6.38	2.00	3.00	1.233	5	H6
–		6140502	VTSFT-TC5120	1 1/2 - 8	6.38	2.00	3.00	1.233	5	H6
–		6140504	VTSFT-TC5121	1 1/2 - 12	6.38	2.00	3.00	1.258	5	H5
–		6140506	VTSFT-TC5122	1 3/4 - 5	7.00	2.40	3.19	1.430	5	H7

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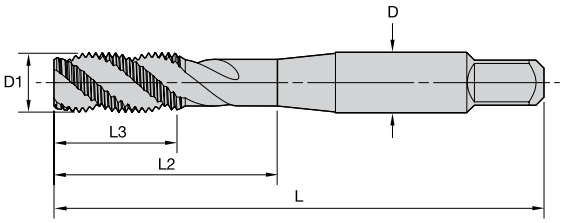


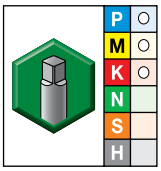
● first choice
○ alternate choice

grade WP42EG TiCN		grade WP49EG Oxide			L		L3		L2		D			
order #	catalog #	order #	catalog #	D1 TPI	mm	in	mm	in	mm	in	mm	in	number of flutes	pitch diameter limit
5887085	VTSFT-TC5505	5887084	VTSFT-TC5505	M3 X 0,5	49,40	1.94	14,80	.58	19,30	.76	3,581	.141	3	D3
6141630	VTSFT-TC5507	6141781	VTSFT-TC5507	M3,5 X 0,6	50,50	1.99	9,70	.38	18,00	.71	3,582	.141	2	D4
5887087	VTSFT-TC5509	5887086	VTSFT-TC5509	M4 X 0,7	53,80	2.12	9,70	.38	19,40	.76	4,267	.168	3	D4
5887089	VTSFT-TC5511	5887088	VTSFT-TC5511	M5 X 0,8	60,30	2.37	12,70	.50	23,20	.91	4,928	.194	3	D4
5887091	VTSFT-TC5513	5887090	VTSFT-TC5513	M6 X 1	63,50	2.50	16,00	.63	25,50	1.01	6,477	.255	3	D5
–		6141790	VTSFT-TC5514	M6 X 1	63,50	2.50	16,00	.63	25,50	1.00	6,477	.255	3	D11
–		6141792	VTSFT-TC5515	M7 X 1	69,20	2.73	17,50	.69	29,30	1.15	8,077	.318	3	D5
6141796	VTSFT-TC5517	6141797	VTSFT-TC5517	M8 X 1	68,70	2.71	17,50	.69	28,50	1.12	8,077	.318	3	D5
–		6141799	VTSFT-TC5518	M8 X 1	68,70	2.71	17,50	.69	28,50	1.12	8,077	.318	3	D11
5887093	VTSFT-TC5519	5887092	VTSFT-TC5519	M8 X 1,25	68,70	2.71	17,50	.69	28,50	1.12	8,077	.318	3	D5
–		6141801	VTSFT-TC5520	M8 X 1,25	68,70	2.71	17,50	.69	28,50	1.12	8,077	.318	3	D11
–		6141803	VTSFT-TC5522	M10 X 1	73,90	2.91	18,70	.74	31,60	1.24	9,678	.381	3	D11
–		6141805	VTSFT-TC5523	M10 X 1,25	74,10	2.92	18,90	.74	31,80	1.25	9,678	.381	3	D5
6141808	VTSFT-TC5525	6141809	VTSFT-TC5525	M10 X 1,5	74,30	2.92	19,00	.75	31,90	1.26	9,678	.381	3	D6
–		6141811	VTSFT-TC5526	M10 X 1,5	74,20	2.92	19,00	.75	31,60	1.24	9,678	.381	3	D11
–		6140508	VTSFT-TC5527	M12 X 1,25	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D5
–		6140512	VTSFT-TC5529	M12 X 1,5	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D6
5887097	VTSFT-TC5531	5887096	VTSFT-TC5531	M12 X 1,75	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D6
6140515	VTSFT-TC5532	6140516	VTSFT-TC5532	M12 X 1,75	85,90	3.38	23,90	.94	44,20	1.74	9,322	.367	3	D11
–		6140518	VTSFT-TC5533	M14 X 1,5	91,20	3.59	25,40	1.00	44,20	1.74	10,897	.429	3	D6
–		6140520	VTSFT-TC5535	M14 X 2	91,20	3.59	25,40	1.00	44,20	1.74	10,897	.429	3	D7
6140521	VTSFT-TC5536	6140522	VTSFT-TC5536	M16 X 1,5	96,80	3.81	27,70	1.09	48,00	1.89	12,192	.480	3	D6
5887099	VTSFT-TC5537	5887098	VTSFT-TC5537	M16 X 2	96,80	3.81	27,70	1.09	48,00	1.89	12,192	.480	3	D7
6140523	VTSFT-TC5538	6140524	VTSFT-TC5538	M18 X 1,5	102,40	4.03	27,70	1.09	48,00	1.89	13,767	.542	4	D6
6140525	VTSFT-TC5539	6140526	VTSFT-TC5539	M18 X 2,5	102,40	4.03	31,00	1.22	48,00	1.89	13,767	.542	4	D7
6140527	VTSFT-TC5540	6140528	VTSFT-TC5540	M20 X 1,5	113,50	4.47	31,00	1.22	52,80	2.08	16,561	.652	4	D6
6140529	VTSFT-TC5541	6140530	VTSFT-TC5541	M20 X 2,5	113,50	4.47	34,00	1.34	58,40	2.30	16,561	.652	4	D7
–		6140531	VTSFT-TC5542	M22 X 1,5	119,10	4.69	34,00	1.34	58,40	2.30	17,704	.697	4	D6
–		6140532	VTSFT-TC5543	M22 X 2,5	119,10	4.69	34,00	1.34	58,40	2.30	17,704	.697	4	D7
–		6140533	VTSFT-TC5544	M24 X 1,5	124,70	4.91	34,00	1.34	58,40	2.30	19,304	.760	4	D6
–		6140534	VTSFT-TC5545	M24 X 3	124,70	4.91	34,00	1.34	58,40	2.30	19,304	.760	4	D8
–		6140535	VTSFT-TC5546	M27 X 1,5	130,30	5.13	38,10	1.50	63,50	2.50	22,758	.896	4	D7
–		6140536	VTSFT-TC5547	M27 X 3	130,30	5.13	38,10	1.50	63,50	2.50	22,758	.896	4	D8
–		6140537	VTSFT-TC5548	M30 X 1,5	138,20	5.44	43,50	1.71	65,00	2.56	25,933	1.021	4	D6
–		6140538	VTSFT-TC5549	M30 X 3,5	138,20	5.44	43,50	1.71	65,00	2.56	25,933	1.021	4	D9

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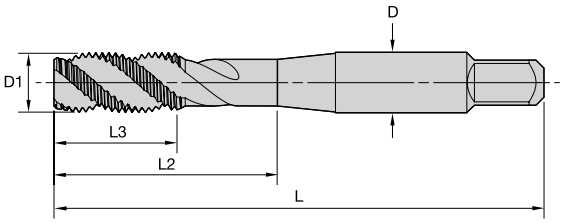


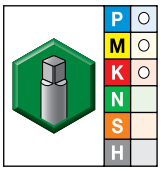
● first choice
○ alternate choice

grade WP49EG Oxide								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
6140539	VTSFT-TC5130	4 - 40	1.88	.51	.69	.141	2	H2
6140540	VTSFT-TC5131	4 - 40	1.88	.51	.69	.141	2	H3
6140541	VTSFT-TC5132	4 - 40	1.88	.51	.69	.141	2	H5
6140543	VTSFT-TC5134	6 - 32	1.99	.38	.71	.141	2	H2
6140544	VTSFT-TC5135	6 - 32	1.99	.38	.71	.141	2	H3
6140545	VTSFT-TC5136	6 - 32	1.99	.38	.71	.141	2	H5
6140546	VTSFT-TC5137	6 - 40	2.00	.38	.71	.141	2	H2
6140547	VTSFT-TC5138	6 - 40	2.00	.38	.71	.141	2	H3
6140548	VTSFT-TC5139	8 - 32	2.12	.38	.76	.168	3	H2
6140549	VTSFT-TC5140	8 - 32	2.12	.38	.76	.168	3	H3
6140550	VTSFT-TC5141	8 - 32	2.12	.38	.76	.168	3	H5
6140561	VTSFT-TC5142	10 - 24	2.37	.50	.91	.194	3	H3
6140562	VTSFT-TC5143	10 - 24	2.37	.50	.91	.194	3	H5
6140563	VTSFT-TC5144	10 - 32	2.38	.50	.91	.194	3	H3
6140564	VTSFT-TC5145	10 - 32	2.38	.50	.91	.194	3	H5
6140565	VTSFT-TC5146	1/4 - 20	2.50	.63	1.00	.255	3	H3
6140566	VTSFT-TC5147	1/4 - 20	2.50	.63	1.00	.255	3	H5
6140567	VTSFT-TC5148	1/4 - 28	2.50	.63	1.00	.255	3	H3
6140568	VTSFT-TC5149	1/4 - 28	2.50	.63	1.00	.255	3	H5
6140569	VTSFT-TC5150	5/16 - 18	2.72	.69	1.13	.318	3	H3
6140570	VTSFT-TC5151	5/16 - 18	2.72	.69	1.13	.318	3	H5
6140571	VTSFT-TC5152	5/16 - 24	2.72	.69	1.13	.318	3	H3
6140572	VTSFT-TC5153	5/16 - 24	2.72	.69	1.12	.318	3	H5
6140573	VTSFT-TC5154	3/8 - 16	2.94	.75	1.27	.381	3	H5
6140574	VTSFT-TC5155	3/8 - 16	2.94	.75	1.27	.381	3	H3
6140579	VTSFT-TC5156	3/8 - 24	2.94	.75	1.27	.381	3	H3
6140580	VTSFT-TC5157	3/8 - 24	2.94	.75	1.27	.381	3	H4
6140581	VTSFT-TC5158	3/8 - 24	2.94	.75	1.27	.381	3	H5
6140582	VTSFT-TC5159	7/16 - 14	3.16	.88	1.49	.323	3	H3
6140583	VTSFT-TC5160	7/16 - 14	3.16	.88	1.49	.323	3	H5
6140584	VTSFT-TC5161	7/16 - 20	3.16	.88	1.49	.323	3	H3
6140585	VTSFT-TC5162	7/16 - 20	3.16	.88	1.49	.323	3	H5
6140586	VTSFT-TC5163	1/2 - 13	3.38	.94	1.74	.367	3	H3
6140587	VTSFT-TC5164	1/2 - 13	3.38	.94	1.74	.367	3	H5
6140588	VTSFT-TC5165	1/2 - 20	3.38	.94	1.74	.367	3	H3
6140589	VTSFT-TC5166	9/16 - 12	3.59	1.00	1.74	.429	3	H3
6140590	VTSFT-TC5167	9/16 - 18	3.59	1.00	1.74	.429	3	H3
6140591	VTSFT-TC5168	5/8 - 11	3.81	1.09	1.89	.480	3	H3
6140592	VTSFT-TC5169	5/8 - 11	3.81	1.09	1.89	.480	3	H5
6140593	VTSFT-TC5170	5/8 - 18	3.81	1.09	1.89	.480	3	H3
6140595	VTSFT-TC5171	5/8 - 18	3.81	1.09	1.89	.480	3	H5
6140597	VTSFT-TC5172	3/4 - 10	4.25	1.22	2.08	.590	4	H3
6140599	VTSFT-TC5173	3/4 - 16	4.25	1.22	2.08	.590	4	H3

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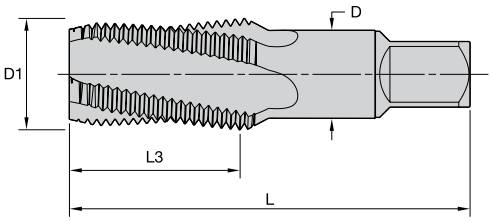


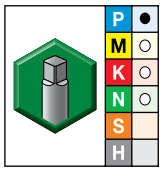
● first choice
○ alternate choice

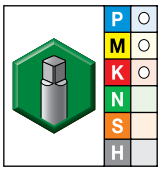
grade WP49EG Oxide			L		L3		L2		D			
order #	catalog #	D1 TPI	mm	in	mm	in	mm	in	mm	in	number of flutes	pitch diameter limit
6140343	VTSFT-TC5550	M3 X 0,5	49,30	1.94	14,80	—	19,10	.75	3,582	0.141	2	D3
6140344	VTSFT-TC5551	M3,5 X 0,6	50,80	2.00	9,70	.38	—	.71	3,582	0.141	2	D4
6140345	VTSFT-TC5552	M4 X 0,7	54,10	2.13	9,70	.38	19,40	.76	4,267	0.168	3	D4
6140346	VTSFT-TC5553	M5 X 0,8	60,50	2.38	12,70	.50	23,20	.91	4,928	0.194	3	D4
6140347	VTSFT-TC5554	M6 X 1	63,50	2.50	16,00	.63	25,50	1.00	6,477	0.255	3	D5
6140348	VTSFT-TC5555	M7 X 1	69,10	2.72	17,50	.69	—	1.15	8,077	0.318	3	D5
6140349	VTSFT-TC5556	M8 X 1,25	69,10	2.72	17,50	.69	28,50	1.12	8,077	0.318	3	D5
6140350	VTSFT-TC5557	M8 X 1	69,10	2.72	17,50	.69	28,50	1.12	8,077	0.318	3	D5
6140391	VTSFT-TC5558	M10 X 1,5	74,70	2.94	19,10	.75	31,90	1.26	9,678	0.381	3	D6
6140392	VTSFT-TC5559	M10 X 1,25	74,70	2.94	19,10	.75	31,90	1.26	9,677	0.381	3	D5
6140393	VTSFT-TC5560	M12 X 1,75	85,90	3.38	23,90	.94	—	1.74	9,322	0.367	3	D6
6140394	VTSFT-TC5561	M12 X 1,5	85,90	3.38	23,90	.94	44,20	1.74	9,322	0.367	3	D5
6140395	VTSFT-TC5562	M12 X 1,25	85,90	3.38	23,90	.94	44,20	1.74	9,322	0.367	3	D5
6140396	VTSFT-TC5563	M14 X 2	91,20	3.59	25,40	1.00	44,20	1.74	10,897	0.429	3	D7
6140397	VTSFT-TC5564	M14 X 1,5	91,20	3.59	25,40	1.00	44,20	1.74	10,897	0.429	3	D6
6140398	VTSFT-TC5565	M16 X 2	96,80	3.81	27,70	1.09	48,00	1.89	12,192	0.480	3	D7
6140399	VTSFT-TC5566	M16 X 1,5	96,80	3.81	27,70	1.09	48,00	1.89	12,192	0.480	3	D6

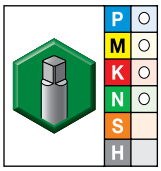
VT-SFT • Standard Chamfer • Pipe Taps









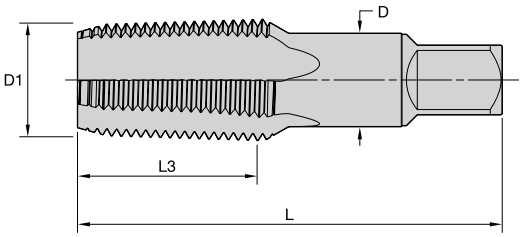


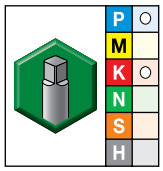
● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright							
order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	D	number of flutes	thread type
5629600	VTSFT8001	5629359	VTSFT8001		–	1/16 - 27	2.13	.69	.313	4	NPT
5629603	VTSFT8002	5629602	VTSFT8002	5629604	VTSFT8002	1/8 - 27	2.13	.75	.313	4	NPT
5629621	VTSFT8502	5629620	VTSFT8502		–	1/8 - 27	2.13	.75	.313	4	NPTF
5629606	VTSFT8003	5629605	VTSFT8003		–	1/8 - 27	2.13	.75	.438	4	NPT
5629624	VTSFT8503	5629623	VTSFT8503		–	1/8 - 27	2.13	.75	.438	4	NPTF
5629609	VTSFT8004	5629608	VTSFT8004	5629610	VTSFT8004	1/4 - 18	2.44	1.03	.563	4	NPT
5629627	VTSFT8504	5629626	VTSFT8504	5629628	VTSFT8504	1/4 - 18	2.44	1.03	.563	4	NPTF
5629612	VTSFT8005	5629611	VTSFT8005		–	3/8 - 18	2.56	1.03	.700	4	NPT
5629640	VTSFT8505		–		–	3/8 - 18	2.56	1.03	.700	4	NPTF
5629615	VTSFT8006	5629614	VTSFT8006		–	1/2 - 14	3.13	1.38	.688	4	NPT
5629643	VTSFT8506	5629642	VTSFT8506		–	1/2 - 14	3.13	1.38	.688	4	NPTF
5629836	VTSFT8007	5629835	VTSFT8007		–	3/4 - 14	3.25	1.38	.906	4	NPT
5629871	VTSFT8507	5629861	VTSFT8507		–	3/4 - 14	3.25	1.38	.906	4	NPTF
5629839	VTSFT8008		–		–	1 - 11 1/2	3.75	1.75	1.125	4	NPT
5629890	VTSFT8508	5629889	VTSFT8508		–	1 - 11 1/2	3.75	1.75	1.125	4	NPTF

VT-STR • NPT • Standard Chamfer • Pipe Taps







● first choice
○ alternate choice

grade WU40EG Bright							
order #	catalog #	D1 TPI	L	L3	D	number of flutes	thread type
5629646	VTSTR8001	1/8 - 27	2.13	.75	.313	4	NPT
5629647	VTSTR8002	1/4 - 18	2.44	1.03	.563	4	NPT
5629648	VTSTR8003	3/8 - 18	2.56	1.03	.700	4	NPT
5629649	VTSTR8004	1/2 - 14	3.13	1.38	.688	4	NPT
5629904	VTSTR8005	3/4 - 14	3.25	1.38	.906	5	NPT

Application Data • VariTap • HSS-E • Inch

Material Group		Through Holes					Blind Holes				
				Range — SFM					Range — SFM		
		Tap Style	Grade	min	Starting Value	max	Tap Style	Grade	min	Starting Value	max
P	1	VT-SPO	WP42EG, WU41EG	70	**90**	110	VT-SFT	WP42EG, WU41EG	40	**60**	90
		VT-SPO	WP49EG, WU40EG	30	**45**	60	VT-SFT	WP49EG, WU40EG	20	**30**	40
	2,3,4,5	VT-SPO	WP42EG, WU41EG	50	**70**	90	VT-SFT	WP42EG, WU41EG	40	**50**	70
		VT-SPO	WP49EG, WU40EG	30	**35**	40	VT-SFT	WP49EG, WU40EG	10	**20**	30
	6,7,8,10	VT-SPO	WP42EG, WU41EG	30	**40**	50	VT-SFT	WP42EG, WU41EG	20	**30**	40
		VT-SPO	WP49EG, WU40EG	20	**20**	30	VT-SFT	WP49EG, WU40EG	10	**10**	10
		VT-STR NPT	WU41EG	20	**20**	30	VT-STR NPT	WU41EG	20	**20**	30
		VT-STR NPT	WU40EG	10	**10**	10	VT-STR NPT	WU40EG	10	**10**	10
M	14.1, 14.3	VT-SPO	WP42EG, WU41EG	30	**40**	50	VT-SFT	WP42EG, WU41EG	20	**30**	40
		VT-SPO	WP49EG, WU40EG	20	**20**	30	VT-SFT	WP49EG, WU40EG	10	**10**	10
		VT-SFT NPT	WU41EG	20	**20**	30	VT-SFT NPT	WU41EG	20	**20**	30
		VT-SFT NPT	WP49EG, WU40EG	10	**10**	10	VT-SFT NPT	WP49EG, WU40EG	10	**10**	10
	14.2	VT-SPO	WP42EG, WU41EG	20	**30**	40	VT-SFT	WP42EG, WU41EG	10	**20**	30
		VT-SPO	WP49EG, WU40EG	10	**15**	20	VT-SFT	WP49EG, WU40EG	7	**10**	10
K	15,16	VT-STR NPT	WU41EG	30	**45**	60	VT-STR NPT	WU41EG	30	**45**	60
		VT-STR NPT	WU40EG	20	**25**	30	VT-STR NPT	WU40EG	20	**25**	30
	17,18,19	VT-SPO	WP42EG, WU41EG	70	**90**	110	VT-SFT	WP42EG, WU41EG	40	**60**	90
		VT-SPO	WP49EG, WU40EG	30	**45**	60	VT-SFT	WP49EG, WU40EG	20	**30**	40
N	21,22	VT-SPO	WP42EG, WU41EG	110	**150**	190	VT-SFT	WP42EG, WU41EG	80	**110**	160
		VT-SPO	WU40EG	60	**75**	90	VT-SFT	WU40EG	40	**50**	72
	23,24	VT-SPO	WP42EG, WU41EG	100	**130**	160	VT-SFT	WP42EG, WU41EG	60	**90**	130
		VT-SPO	WU40EG	50	**65**	80	VT-SFT	WU40EG	40	**50**	70
	26,27,28	VT-SPO	WP42EG, WU41EG	23	**30**	40	VT-SFT	WP42EG, WU41EG	10	**20**	30
		VT-SPO	WU40EG	10	**15**	20	VT-SFT	WU40EG	10	**10**	10

** Grades: WP42EG = TiCN*
WU41EG = TiN
WP49EG = oxide
WU40EG = bright

Application Data • VariTap • HSS-E • Metric

Material Group		Through Holes					Blind Holes				
				Range — m/min					Range — m/min		
		Tap Style	Grade	min	Starting Value	max	Tap Style	Grade	min	Starting Value	max
P	P1	VT-SPO	WP42EG, WU41EG	21	**27**	34	VT-SFT	WP42EG, WU41EG	13	**18**	26
		VT-SPO	WP49EG	10	**14**	17	VT-SFT	WP49EG	6	**9**	13
	P2	VT-SPO	WP42EG, WU41EG	16	**21**	27	VT-SFT	WP42EG, WU41EG	11	**15**	22
		VT-SPO	WP49EG	8	**11**	13	VT-SFT	WP49EG	4	**6**	9
	P3	VT-SPO	WP42EG, WU41EG	9	**12**	15	VT-SFT	WP42EG, WU41EG	6	**9**	13
		VT-SPO	WP49EG	5	**6**	8	VT-SFT	WP49EG	2	**3**	4
		VT-STR NPT	WU41EG	5	**6**	8	VT-STR NPT	WU41EG	5	**6**	8
M	M1	VT-SPO	WP42EG, WU41EG	9	**12**	15	VT-SFT	WP42EG, WU41EG	6	**9**	13
		VT-SPO	WP49EG	5	**6**	8	VT-SFT	WP49EG	2	**3**	4
		VT-SFT NPT	WU41EG	5	**6**	8	VT-SFT NPT	WU41EG	5	**6**	8
		VT-SFT NPT	WP49EG	2	**3**	4	VT-SFT NPT	WP49EG	2	**3**	4
	M3	VT-SPO	WP42EG, WU41EG	7	**9**	11	VT-SFT	WP42EG, WU41EG	4	**6**	9
		VT-SPO	WP49EG	3	**5**	6	VT-SFT	WP49EG	2	**3**	4
K	K1	VT-STR NPT	WU41EG	10	**14**	17	VT-STR NPT	WU41EG	10	**14**	17
	K2	VT-SPO	WP42EG, WU41EG	21	**27**	34	VT-SFT	WP42EG, WU41EG	13	**18**	26
		VT-SPO	WP49EG	10	**14**	17	VT-SFT	WP49EG	6	**9**	13
N	N1	VT-SPO	WP42EG, WU41EG	34	**46**	57	VT-SFT	WP42EG, WU41EG	23	**34**	48
	N2	VT-SPO	WP42EG, WU41EG	30	**40**	50	VT-SFT	WP42EG, WU41EG	19	**27**	39
	N4	VT-SPO	WP42EG, WU41EG	7	**9**	11	VT-SFT	WP42EG, WU41EG	4	**6**	9

** Grades: WP42EG = TiCN*
WU41EG = TiN
WP49EG = oxide

1872
Wiley & Russell started to produce taps

1912
Greenfiield Tap & Die (GTD) is formed

1915
GTD GUN™ tap patented

1982
Launched first PVD TiN coated taps (VTD)

1991
Greenfield acquires VTD and Lyndonville plant

1993
EM series tap launched

2005
Launched new generation HP carbide tap line (GX series)

2009
GTD brand becomes part of WIDIA™ Products Group

2011
WIDIA-GTD launches the new GT series of HP HSS-E-PM taps

2013
New VariTap™ series launched

2015
Launched new generation HPP HSS-E-PM taps for Ni, Ti, & Al (GT series)

2016
VariTap line expands (VTSFT-TC)



PRIMED FOR PRODUCTIVITY

THE MOST POWERFUL TAPS IN THE BUSINESS PROUDLY BEAR OUR NAME.

WIDIA-GTD™ delivers a complete range of solid carbide, high performance, multipurpose, and general purpose tapping solutions for short-run to high-volume production needs. And with over 145 years of hands-on experience, consistent quality, and relentless innovation, you can count on WIDIA-GTD to deliver a fast, competitive tap solution for each customer, every time.

Speed, power, and precision: there's never been a better time to put WIDIA-GTD taps to the test.

WIDIA™ GTD™

VT-AFT

Aerospace Fastener Taps

The VT-AFT tap will face solution-treated high-temp alloys like A286, 300 series stainless steel, and titanium aerospace fastener applications.

TiiN CrC/C coating
for the reduction of galling and prevention of built-up edge

Spiral-point geometry for low cutting force while pushing the chip forward

Precision-ground spiral geometry
designed to allow tapping of solution-treated A286, 300 series stainless steel, and titanium

High vanadium for higher wear resistance

Increased chamfer length
to reduce chip load



VT-AFT taps are designed using a high-vanadium HSS-E material for greater wear resistance combined with a precision-ground spiral geometry to push chips forward and reduce galling.

GRADES

WN44EG TiN+CrC/C	
	P O
	M ●
	K
	N
	S ●
	H

HIGH-PERFORMANCE TAPS FOR AEROSPACE FASTENERS

WIDIA GTD

PRODUCT

Form B

VTAFT

DIAMETER RANGE

Thread Size
4-40 to 1/2-20

INDUSTRY

AEROSPACE

MATERIALS

P M S

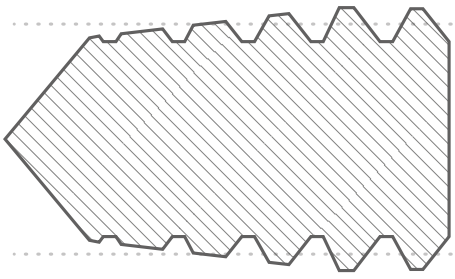
APPLICATIONS



TAPPING:
THROUGH
HOLE

TAP PITCH DIAMETER LIMIT

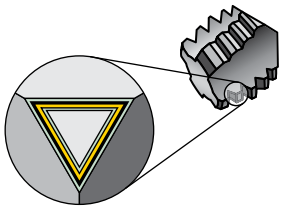
H3 - H9



+.0015	+.0020	+.0025	+.0030	+.0035	+.0040	+.0045
H3	H4	H5	H6	H7	H8	H9
+.0015	+.0020	+.0025	+.0030	+.0035	+.0040	+.0045



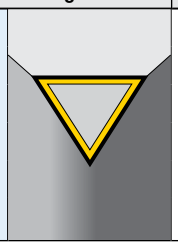
Grades and Grade Descriptions



Coatings are designed for optimized tapping performance in specific materials.

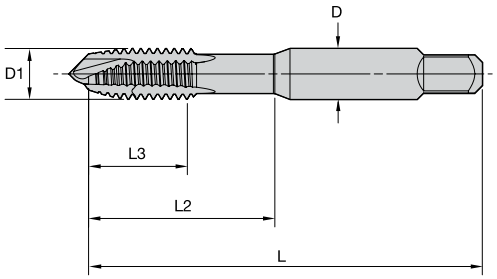
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

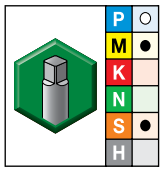
Grade

Coating	Grade Description		wear resistance ← → toughness								
			05	10	15	20	25	30	35	40	45
WN44EG 	High vanadium HSS-E substrate with a coating consists of low friction CrC/C over wear-resistant TiN base layer. Use for tapping stainless steel, high-temp alloys and steels.	P									
		M									
		S									

VT-AFT • Inch







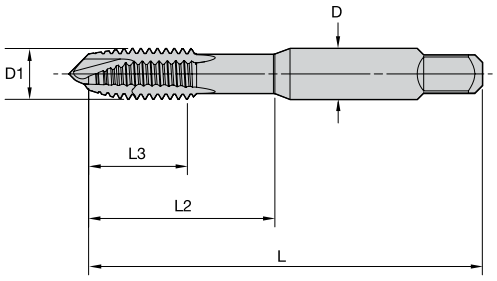
● first choice
○ alternate choice

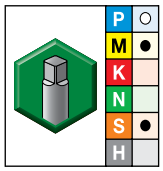
grade WN44EG TiN+CrC/C								
order #	catalog #	D1 size	L	L3	L2	D	number of flutes	pitch diameter limit
6474960	VTAFT5040	4 - 40	1.88	.51	.69	0.141	3	H3
6474971	VTAFT5041	4 - 40	1.88	.51	.69	0.141	3	H4
6474972	VTAFT5042	4 - 40	1.88	.51	.69	0.141	3	H5
6474973	VTAFT5043	4 - 40	1.88	.51	.69	0.141	3	H6
6474974	VTAFT5044	4 - 40	1.88	.51	.69	0.141	3	H7
6474975	VTAFT5050	4 - 48	1.88	.51	.69	0.141	3	H3
6474976	VTAFT5051	4 - 48	1.88	.51	.69	0.141	3	H4
6474977	VTAFT5052	4 - 48	1.88	.51	.69	0.141	3	H5
6474978	VTAFT5053	4 - 48	1.88	.51	.69	0.141	3	H6
6474979	VTAFT5054	4 - 48	1.88	.51	.69	0.141	3	H7
6474986	VTAFT5072	6 - 40	2.02	.38	.71	0.141	3	H5
6474987	VTAFT5073	6 - 40	2.02	.38	.71	0.141	3	H6
6474988	VTAFT5074	6 - 40	2.02	.38	.71	0.141	3	H7
6474983	VTAFT5063	6 - 32	2.03	.38	.71	0.141	3	H6
6474984	VTAFT5064	6 - 32	2.03	.38	.71	0.141	3	H7
6474985	VTAFT5065	6 - 32	2.03	.38	.71	0.141	3	H8
6474980	VTAFT5060	6 - 32	2.03	.38	.71	0.141	3	H3
6474981	VTAFT5061	6 - 32	2.03	.38	.71	0.141	3	H4
6474982	VTAFT5062	6 - 32	2.03	.38	.71	0.141	3	H5
6274214	VTAFT5081	8 - 32	2.12	.38	.76	0.168	3	H4
6274215	VTAFT5082	8 - 32	2.12	.38	.76	0.168	3	H5
6274216	VTAFT5083	8 - 32	2.12	.38	.76	0.168	3	H6
6474989	VTAFT5080	8 - 32	2.16	.38	.76	0.168	3	H3
6474990	VTAFT5084	8 - 32	2.16	.38	.76	0.168	3	H7
6474991	VTAFT5085	8 - 32	2.16	.38	.76	0.168	3	H8
6474992	VTAFT5092	8 - 36	2.16	.38	.76	0.168	3	H5
6474993	VTAFT5093	8 - 36	2.16	.38	.76	0.168	3	H6
6474994	VTAFT5094	8 - 36	2.16	.38	.76	0.168	3	H7
6087704	VTAFT5110	10 - 32	2.36	.50	.91	0.194	3	H4
6087705	VTAFT5111	10 - 32	2.36	.50	.91	0.194	3	H5
6496038	VTAFT5109	10 - 32	2.41	.50	.91	0.194	3	H3
6496039	VTAFT5112	10 - 32	2.41	.50	.91	0.194	3	H6
6496040	VTAFT5113	10 - 32	2.41	.50	.91	0.194	3	H7
6496081	VTAFT5114	10 - 32	2.41	.50	.91	0.194	3	H8
6496033	VTAFT5100	10 - 24	2.42	.50	.91	0.194	3	H3
6496034	VTAFT5101	10 - 24	2.42	.50	.91	0.194	3	H4
6496036	VTAFT5103	10 - 24	2.42	.50	.91	0.194	3	H6
6496037	VTAFT5104	10 - 24	2.42	.50	.91	0.194	3	H7
6496035	VTAFT5102	10 - 24	2.42	.50	.91	0.194	3	H5
6496089	VTAFT5140	1/4 - 28	2.49	.62	1.00	0.255	3	H3
6496090	VTAFT5141	1/4 - 28	2.49	.62	1.00	0.255	3	H4
6496091	VTAFT5142	1/4 - 28	2.49	.62	1.00	0.255	3	H5
6496092	VTAFT5143	1/4 - 28	2.49	.62	1.00	0.255	3	H6
6496093	VTAFT5144	1/4 - 28	2.49	.62	1.00	0.255	3	H7
6496095	VTAFT5145	1/4 - 28	2.49	.62	1.00	0.255	3	H8
6496096	VTAFT5146	1/4 - 28	2.49	.62	1.00	0.255	3	H9
6496083	VTAFT5131	1/4 - 20	2.50	.63	1.00	0.255	3	H4
6496084	VTAFT5132	1/4 - 20	2.50	.63	1.00	0.255	3	H5

VT-AFT • Inch

(continued)







● first choice
○ alternate choice

grade WN44EG TiN+CrC/C								
order #	catalog #	D1 size	L	L3	L2	D	number of flutes	pitch diameter limit
6496086	VTAFT5133	1/4 - 20	2.50	.63	1.00	0.255	3	H6
6496087	VTAFT5134	1/4 - 20	2.50	.63	1.00	0.255	3	H7
6496088	VTAFT5135	1/4 - 20	2.50	.63	1.00	0.255	3	H8
6496082	VTAFT5130	1/4 - 20	2.50	.63	1.00	0.255	3	H3
6496097	VTAFT5160	5/16 - 24	2.71	.69	1.12	0.318	3	H3
6496098	VTAFT5161	5/16 - 24	2.71	.69	1.12	0.318	3	H4
6496099	VTAFT5162	5/16 - 24	2.71	.69	1.12	0.318	3	H5
6496100	VTAFT5163	5/16 - 24	2.71	.69	1.12	0.318	3	H6
6496111	VTAFT5164	5/16 - 24	2.71	.69	1.12	0.318	3	H7
6496112	VTAFT5165	5/16 - 24	2.71	.69	1.12	0.318	3	H8
6496113	VTAFT5166	5/16 - 24	2.71	.69	1.12	0.318	3	H9
6496114	VTAFT5180	3/8 - 24	2.92	.75	1.25	0.381	3	H3
6496115	VTAFT5181	3/8 - 24	2.92	.75	1.25	0.381	3	H4
6496116	VTAFT5183	3/8 - 24	2.92	.75	1.25	0.381	3	H6
6496117	VTAFT5185	3/8 - 24	2.92	.75	1.25	0.381	3	H8
6496118	VTAFT5186	3/8 - 24	2.92	.75	1.25	0.381	3	H9
6445486	VTAFT5182	3/8 - 24	2.94	.75	1.27	0.381	3	H5
6445487	VTAFT5184	3/8 - 24	2.94	.75	1.27	0.381	3	H7
6496119	VTAFT5222	1/2 - 20	3.38	.94	1.74	0.367	3	H5
6496120	VTAFT5223	1/2 - 20	3.38	.94	1.74	0.367	3	H6
6439284	VTAFT5224	1/2 - 20	3.38	.94	1.74	0.367	3	H7
6439283	VTAFT5225	1/2 - 20	3.38	.94	1.74	0.367	3	H8
6496121	VTAFT5226	1/2 - 20	3.38	.94	1.74	0.367	3	H9

Application Data • VT-AFT • Inch



Material Group		Aerospace Fastener Taps VT-AFT Cutting Speed — Vc SFM Range min	Starting Value	max
P	1	30	40	50
	2	25	30	40
	3	20	30	35
M	1	30	**40**	50
	2	13	**16**	23
S	1	20	**26**	40
	4	13	**16**	20

Victory™ Tap

HSS-E-PM • VICTORY TAPS

Victory HSS-E-PM Taps feature material-specific geometries and grades capable of working in a wider application range than solid carbide taps.

Optimized flute designs
Better chip evacuation

Application-specific coatings
Extremely high wear resistance, longer tool life

HSS-E-PM powder metallurgy substrate
Improved wear characteristics, longer tool life



Optimum choice for customers seeking consistency and optimal performance in a wide variety of applications and materials.

GRADES

		WP31MG	WS32MG	WN35MG	WU32MG	WS34MG	WH36MG	WS39MG	WN48MG	WN44EG
	P	●			●		●			○
	M				○	●				●
	K				●					
	N				●	○			●	●
	S	○	●	●	●	●	○	●		
	H		●							

RELIABLE AND CONSISTENT

WIDIA GTD

PRODUCT

Victory™ HSS-E-PM Taps deliver reliability and consistent performance on a wide range of applications

INDUSTRY

ENERGY

GENERAL ENGINEERING

TRANSPORTATION

MATERIALS

P M K N S

APPLICATIONS

BLIND HOLE

THROUGH HOLE

HSS-E-PM

DIN 371

DIN 374

DIN 376

ANSI

FLOOD COOLANT: TAPPING

THROUGH COOLANT: RADIAL: TAPPING

THROUGH COOLANT: AXIAL: TAPPING

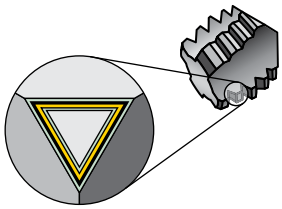
SERIES	SIZE RANGE	DIMENSIONS
GT00, GT14, GT16	M and MF: M3 to M12	DIN
GT02, GT04, GT10, GT12, GT80	M and MF: M3 to M20	DIN
GT06	M and MF: M6 to M16	DIN
GT2X	M and MF: M3 to M42	ANSI & DIN
	UNC and UNF: #2 to 3/4"	ANSI
	UNC and UNF: #6 to 1/2"	DIN/ANSI
GT3X	M and MF: M3 to M42	ANSI & DIN
	UNC and UNF: #2 to 1"	ANSI
	UNC and UNF: #6 to 1/2"	DIN/ANSI
GT4X	M and MF: M4 to M22	DIN
	UNC and UNF: #10 to 3/4"	ANSI
	UNC and UNF: #6 to 1/2"	DIN/ANSI
GT5X	M: M24 to M42	DIN
GT6X	M and MF: M2.5 to M12	ANSI
	UNC and UNF: #2 to 1"	ANSI
GT9X	M and MF: M2.5 to M12	ANSI
	UNC and UNF: #2 to 3/4"	ANSI
GT70	M and MF: M3 to M16	DIN/ANSI
GT7X & GT8X	M and MF: M3 to M12	DIN/ANSI
	UNC and UNF: #2 to 1/2"	DIN/ANSI



Shank Style

ANSI, DIN, JIS & DIN/ANSI precision ground

Grades and Grade Descriptions



Coatings are designed for optimized tapping performance in specific materials.

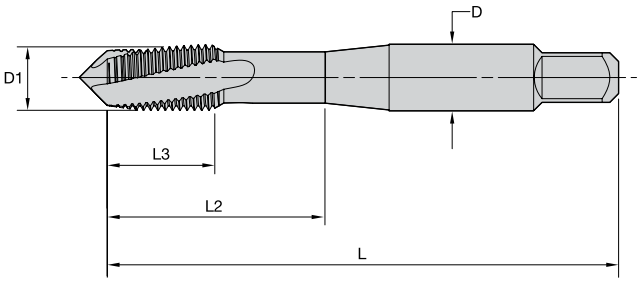
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

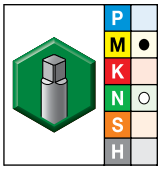
Grade

Coating	Grade Description	wear resistance ← → toughness	05	10	15	20	25	30	35	40	45
WU32MG	Coated HSS-E-PM, PVD heat- and wear-resistant high-vanadium cobalt powder metal. HSS substrate coated with wear-resistant TiCN base layer. Use in steel, cast iron, cast aluminum with silicon and super alloys.	P		■	■						
		K			■	■	■				
		S			■	■	■				
WS34MG	Coated HSS-E-PM, PVD heat and wear-resistant high-vanadium, high-cobalt powder metal HSS-E-PM substrate. Coating consists of low-friction CrC/C over wear-resistant TiN base layer. Used for tapping titanium, titanium alloys, stainless steel, and non-ferrous materials.	M				■	■	■			
		N					■	■	■		
		S					■	■	■		
WS39MG	Surface-treated HSS-E-PM powder metal HSS-E substrate with oxide/nitride surface treatment that provides wear resistance in nickel alloys.	S							■	■	■
WN44EG	High-vanadium HSS-E substrate with a coating consists of low-friction CrC/C over wear-resistant TiN base layer. Use for tapping stainless steel and non-ferrous materials.	N							■	■	■

GT20 • Machine Screw and Fractional • Form B Plug Chamfer • Steel and Stainless Steel





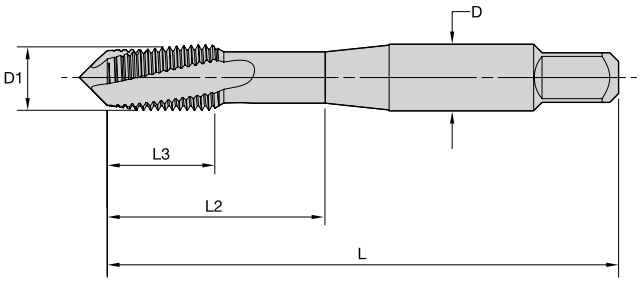


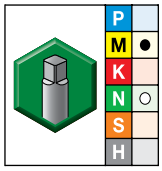
● first choice
○ alternate choice

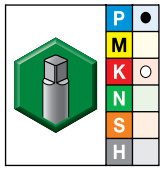
grade WS34MG TiN+CrC/C							
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes
3955273	GT205001	2 - 56	1.75	.44	.49	.141	2
3955274	GT205002	2 - 56	1.75	.44	.49	.141	2
3955275	GT205003	4 - 40	1.88	.56	.68	.141	2
3955276	GT205004	4 - 40	1.88	.56	.68	.141	2
3955278	GT205006	6 - 32	2.00	.36	.71	.141	2
3955280	GT205008	8 - 32	2.13	.31	.76	.168	2
3955281	GT205009	8 - 32	2.13	.31	.76	.168	2
3955294	GT205022	8 - 36	2.13	.31	.76	.168	2
3955282	GT205010	10 - 24	2.38	.47	.91	.194	3
3955295	GT205023	10 - 32	2.38	.47	.91	.194	3
3955296	GT205024	10 - 32	2.38	.47	.91	.194	3
3955284	GT205012	1/4 - 20	2.50	.44	1.00	.255	3
3955285	GT205013	1/4 - 20	2.50	.44	1.00	.255	3
3955298	GT205026	1/4 - 28	2.50	.44	1.00	.255	3
3955287	GT205015	5/16 - 18	2.72	.49	1.13	.318	3
3955286	GT205014	5/16 - 18	2.72	.49	1.13	.318	3
3955299	GT205027	5/16 - 24	2.72	.49	1.13	.318	3
3955288	GT205016	3/8 - 16	2.94	.60	1.27	.381	3
3955289	GT205017	3/8 - 16	2.94	.60	1.27	.381	3
3955291	GT205019	1/2 - 13	3.38	.77	1.74	.367	3
3955292	GT205020	5/8 - 11	3.81	.91	1.89	.480	4
3955293	GT205021	3/4 - 10	4.25	1.00	2.08	.590	4

GT20 • Metric ANSI • Form D Plug Chamfer • Steel and Stainless Steel







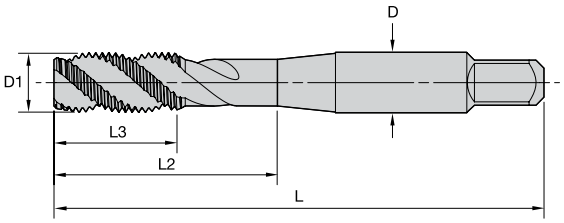


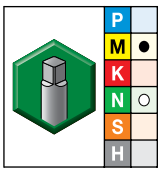
● first choice
○ alternate choice

WS34MG		WU32MG								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	class of fit
3955010	GT205061	3955018	GT205069	M3 X 0,5	1.94	.63	.75	.141	2	6HX
3955011	GT205062	–		M4 X 0,7	2.13	.32	.76	.168	2	6HX
–		3955019	GT205070	M4 X 0,7	2.12	.32	.76	.168	2	6HX
3955012	GT205063	3955020	GT205071	M5 X 0,8	2.38	.47	.91	.194	2	6HX
3955013	GT205064	3955021	GT205072	M6 X 1	2.50	.46	1.01	.255	3	6HX
3955014	GT205065	–		M8 X 1	2.72	.48	1.12	.318	3	6HX
3955015	GT205066	–		M8 X 1,25	2.72	.48	1.12	.318	3	6HX
–		3955044	GT205074	M8 X 1,25	2.71	.48	1.13	.318	3	6HX
3955016	GT205067	–		M10 X 1,5	2.94	.53	1.26	.381	3	6HX
–		3955045	GT205075	M10 X 1,5	2.92	.53	1.26	.381	3	6HX
3955017	GT205068	–		M12 X 1,75	3.38	.77	1.74	.367	3	6HX

GT30 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • Stainless Steel







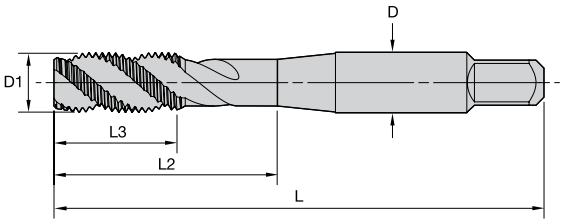
WS34MG

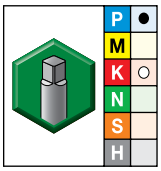
● first choice
○ alternate choice

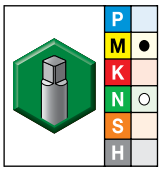
order #	catalog #	D1 size	L	L3	L2	D	number of flutes
3955131	GT305001	2 - 56	1.75	.44	.49	.141	2
3955132	GT305002	4 - 40	1.88	.56	.68	.141	2
3955133	GT305003	4 - 40	1.88	.56	.68	.141	2
3955134	GT305004	6 - 32	1.99	.36	.71	.141	3
3955135	GT305005	6 - 32	1.99	.36	.71	.141	3
3955136	GT305006	8 - 32	2.12	.31	.76	.168	3
3955137	GT305007	10 - 24	2.37	.47	.91	.194	3
3955152	GT305022	10 - 32	2.37	.47	.91	.194	3
3955153	GT305023	10 - 32	2.37	.47	.91	.194	3
3955138	GT305008	1/4 - 20	2.50	.44	1.01	.255	3
3955139	GT305009	1/4 - 20	2.50	.44	1.01	.255	3
3955154	GT305024	1/4 - 28	2.50	.44	1.00	.255	3
3955155	GT305025	1/4 - 28	2.50	.44	1.00	.255	3
3955140	GT305010	5/16 - 18	2.72	.49	1.13	.318	3
3955141	GT305011	5/16 - 18	2.72	.49	1.13	.318	3
3955156	GT305026	5/16 - 24	2.72	.49	1.13	.318	3
3955157	GT305027	5/16 - 24	2.72	.49	1.13	.318	3
3955142	GT305012	3/8 - 16	2.94	.60	1.27	.381	3
3955143	GT305013	3/8 - 16	2.94	.60	1.27	.381	3
3955158	GT305028	3/8 - 24	2.93	.59	1.26	.381	3
3955144	GT305014	7/16 - 14	3.16	.71	1.49	.323	5
3955159	GT305029	7/16 - 20	3.16	.71	1.49	.323	4
3955146	GT305016	1/2 - 13	3.38	.77	1.74	.367	4
3955145	GT305015	1/2 - 13	3.38	.77	1.74	.367	4
3955160	GT305030	1/2 - 20	3.38	.77	1.74	.367	4
3955147	GT305017	5/8 - 11	3.81	.91	1.89	.480	4
3955148	GT305018	5/8 - 11	3.81	.91	1.89	.480	4
3955149	GT305019	3/4 - 10	4.25	1.00	2.08	.590	4
3955150	GT305020	3/4 - 10	4.25	1.00	2.08	.590	4

GT30 • Metric ANSI • Form C Semi-Bottoming Chamfer • Steel and Stainless Steel







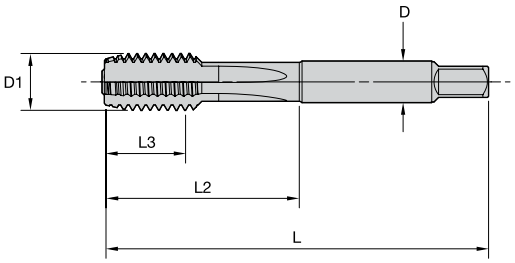


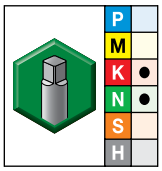
● first choice
○ alternate choice

WS34MG		WU32MG								
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	number of flutes	class of fit
3955060	GT305061		–	M3 X 0,5	1.94	.63	.75	.141	2	6HX
3955061	GT305062		–	M4 X 0,7	2.12	.32	.76	.168	3	6HX
3955062	GT305063		–	M5 X 0,8	2.37	.47	.91	.194	3	6HX
3955063	GT305064	3955072	GT305073	M6 X 1	2.50	.46	1.01	.255	3	6HX
3955064	GT305065	3955093	GT305074	M8 X 1,25	2.71	.48	1.12	.318	3	6HX
3955065	GT305066		–	M10 X 1,5	2.92	.53	1.26	.381	3	6HX
3955066	GT305067		–	M12 X 1,75	3.38	.77	1.74	.367	5	6HX
3955067	GT305068		–	M14 X 2	3.59	.83	1.74	.429	5	6HX
3955068	GT305069		–	M16 X 2	3.81	.91	1.89	.480	5	6HX

GT40 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • ANSI • Blind Hole Applications • Cast Iron and Cast Aluminum







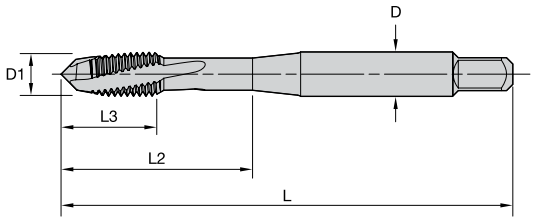
● first choice
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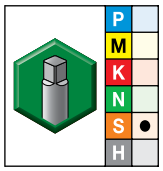
WU32MG

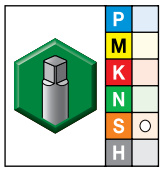
order #	catalog #	D1 size	L	L3	L2	D	number of flutes	class of fit
4035535	GT405012	10 - 24	2.37	.47	.91	.194	4	3BX
4035536	GT405013	10 - 32	2.36	.47	.91	.194	4	3BX
4035537	GT405014	1/4 - 20	2.50	.44	1.01	.255	4	2BX
4035541	GT405018	5/16 - 18	2.72	.49	1.13	.318	4	2BX
4035563	GT405020	5/16 - 24	2.71	.48	1.13	.318	4	3BX
4035564	GT405021	3/8 - 16	2.94	.60	1.27	.381	4	2BX
4035566	GT405023	3/8 - 24	2.92	.58	1.25	.381	4	3BX
4035567	GT405024	7/16 - 14	3.16	.71	1.49	.323	4	3BX
4035569	GT405026	1/2 - 13	3.38	.77	1.74	.367	4	3BX
4035571	GT405028	5/8 - 11	3.81	.91	1.89	.480	4	3BX
4035572	GT405029	3/4 - 10	4.25	1.00	2.08	.590	4	3BX

GT60 • Form B Plug Chamfer • Metric ANSI • Titanium and Titanium Alloys







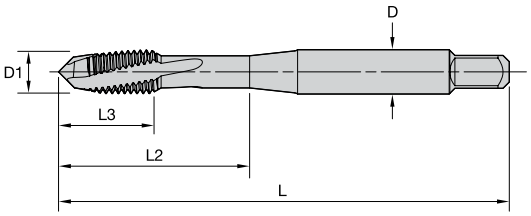


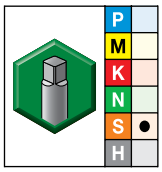
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○ alternate choice

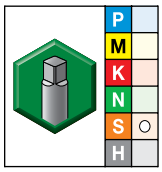
grade WS34MG TiN+CrC/C		grade WS30MG Nitride								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
–		5563021	GT605503	M2,5 X 0,45	1.81	.49	.56	.141	3	D3
–		5563023	GT605505	M3 X 0,5	1.94	.63	.75	.141	3	D3
–		5563025	GT605507	M4 X 0,7	2.12	.32	.76	.168	3	D4
–		5563027	GT605509	M5 X 0,8	2.37	.47	.91	.194	3	D4
–		5563029	GT605511	M6 X 1	2.50	.16	1.00	.255	3	D5
5563042	GT605514	–		M7 X 1	2.73	.52	1.15	.318	3	D5
5563044	GT605516	–		M8 X 1,25	2.71	.48	1.12	.318	3	D5

GT60 • Machine Screw and Fractional • Form B Plug Chamfer • Titanium and Titanium Alloys







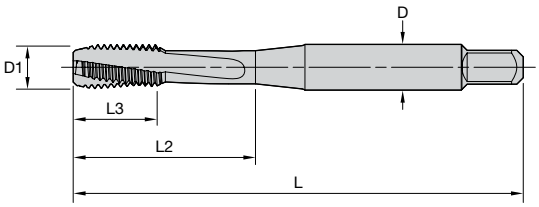


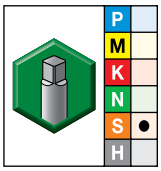
● first choice
○ alternate choice

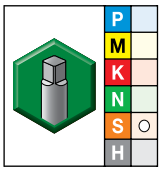
grade WS34MG TiN+CrC/C		grade WS30MG Nitride								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5562739	GT605006	–		2 - 56	1.75	.44	.50	.141	2	H2
5562941	GT605008	–		4 - 40	1.88	.56	.69	.141	3	H2
5562943	GT605010	–		6 - 32	1.99	.36	.71	.141	3	H2
5562945	GT605012	5562944	GT605011	6 - 32	1.99	.36	.71	.141	3	H3
5562947	GT605014	–		6 - 40	1.99	.36	.71	.141	3	H2
5562949	GT605016	–		8 - 32	2.12	.31	.76	.168	3	H2
5562951	GT605018	–		8 - 32	2.12	.31	.76	.168	3	H3
5562953	GT605020	–		8 - 36	2.12	.31	.76	.168	3	H2
5562955	GT605022	–		10 - 24	2.37	.47	.91	.194	3	H3
5562957	GT605024	–		10 - 32	2.37	.47	.91	.194	3	H2
5562959	GT605026	–		10 - 32	2.37	.47	.91	.194	3	H3
5562961	GT605028	–		1/4 - 20	2.50	.44	1.00	.255	3	H3
5562963	GT605030	–		1/4 - 20	2.50	.44	1.00	.255	3	H5
5562965	GT605032	–		1/4 - 28	2.50	.44	1.00	.255	3	H3
5562969	GT605036	–		5/16 - 18	2.72	.49	1.13	.318	3	H3
5562983	GT605040	–		5/16 - 24	2.72	.49	1.13	.318	3	H3
5562987	GT605044	–		3/8 - 16	2.93	.59	1.26	.381	3	H3
5562991	GT605048	–		3/8 - 24	2.93	.59	1.26	.381	3	H3
5562995	GT605052	–		7/16 - 14	3.16	.71	1.49	.323	3	H3
5562997	GT605054	–		7/16 - 20	3.16	.71	1.49	.323	3	H3
5562999	GT605056	–		1/2 - 13	3.38	.77	1.74	.367	3	H3
5563011	GT605058	–		1/2 - 20	3.38	.77	1.74	.367	3	H3
5563012	GT605059	–		9/16 - 18	3.59	.83	1.74	.429	4	H3
5563014	GT605061	–		5/8 - 11	3.81	.91	1.89	.480	4	H3
5563015	GT605062	–		5/8 - 18	3.81	.91	1.89	.480	4	H3
5563017	GT605064	–		3/4 - 10	4.25	1.00	2.08	.590	4	H5
5563018	GT605065	–		3/4 - 16	4.25	1.00	2.08	.590	4	H3
5563020	GT605067	–		1 - 8	5.13	1.25	2.58	.800	5	H5

GT62 • Form C Semi-Bottoming Chamfer • Metric ANSI • Titanium and Titanium Alloys







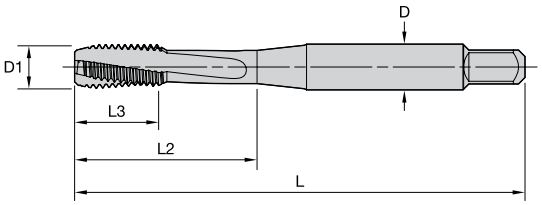


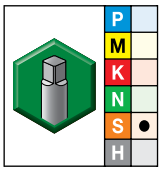
● first choice
○ alternate choice

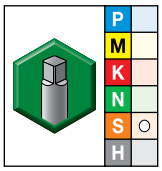
grade WS34MG TiN+CrC/C		grade WS30MG Nitride								
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D	number of flutes	pitch diameter limit
5565220	GT625504		–	M2,5 X 0,45	1.81	.50	.56	.141	3	D3
5565222	GT625506		–	M3 X 0,5	1.94	.63	.75	.141	3	D3
5565224	GT625508		–	M4 X 0,7	2.12	.32	.76	.168	3	D4
5565226	GT625510		–	M5 X 0,8	2.37	.46	.91	.194	3	D4
5565228	GT625512	5565227	GT625511	M6 X 1	2.50	.46	1.00	.255	3	D5
5565230	GT625514		–	M7 X 1	2.72	.52	1.15	.318	3	D5
5565232	GT625516	5565231	GT625515	M8 X 1,25	2.70	.48	1.12	.318	3	D5
5565234	GT625518		–	M10 X 1,25	2.93	.53	1.26	.381	3	D5
5565236	GT625520		–	M10 X 1,5	2.93	.53	1.26	.381	3	D6
5565238	GT625522		–	M12 X 1,75	3.38	.77	1.74	.367	3	D6

GT62 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • Titanium and Titanium Alloys







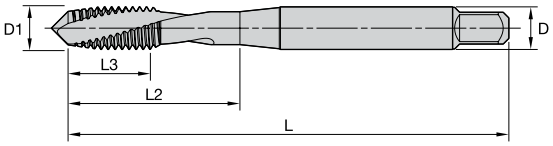


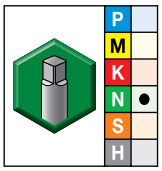
● first choice
○ alternate choice

grade WS34MG TiN+CrC/C		grade WS30MG Nitride								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5565064	GT625006	–		2 - 56	1.75	.44	.50	.141	3	H2
5565067	GT625008	–		4 - 40	1.88	.56	.69	.142	3	H2
5565069	GT625010	–		6 - 32	1.99	.36	.71	.141	3	H2
5565133	GT625014	–		6 - 40	1.99	.36	.71	.141	3	H2
5565138	GT625018	–		8 - 32	2.12	.31	.77	.168	3	H3
5565140	GT625020	–		8 - 36	2.12	.31	.77	.168	3	H2
5565142	GT625022	–		10 - 24	2.37	.47	.92	.194	3	H3
5565146	GT625026	–		10 - 32	2.37	.47	.91	.194	3	H3
5565148	GT625028	5565147	GT625027	1/4 - 20	2.50	.44	1.01	.255	3	H3
5565152	GT625032	5565151	GT625031	1/4 - 28	2.50	.44	1.01	.255	3	H3
5565158	GT625038	–		5/16 - 18	2.72	.49	1.13	.318	3	H3
5565163	GT625042	–		5/16 - 24	2.72	.49	1.13	.318	3	H3
5565167	GT625046	–		3/8 - 16	2.93	.59	1.26	.381	3	H3
5565191	GT625050	–		3/8 - 24	2.93	.59	1.26	.381	3	H3
5565195	GT625054	–		7/16 - 14	3.16	.71	1.49	.323	3	H3
5565199	GT625058	–		7/16 - 20	3.16	.71	1.49	.323	3	H3
5565203	GT625062	–		1/2 - 13	3.38	.77	1.74	.367	3	H3
5565207	GT625066	–		1/2 - 20	3.38	.77	1.74	.367	3	H3
5565210	GT625069	–		9/16 - 18	3.59	.83	1.74	.429	4	H3
5565212	GT625071	–		5/8 - 11	3.81	.91	1.89	.480	4	H3
5565213	GT625072	–		5/8 - 18	3.81	.91	1.89	.480	4	H3
5565215	GT625074	–		3/4 - 10	4.25	1.00	2.08	.590	4	H5
5565216	GT625075	–		3/4 - 16	4.25	1.00	2.08	.590	4	H3
5565218	GT625077	–		1 - 8	5.12	1.25	2.58	.800	4	H5

GT72 • Form B Plug Chamfer • Metric • DIN Length ANSI Shank • Wrought and Cast Aluminum





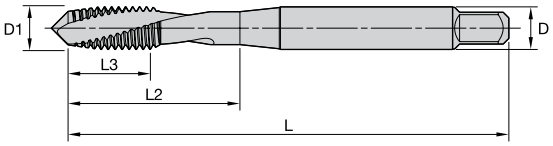


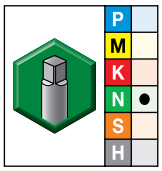
● first choice
○ alternate choice

grade WN44EG TiN+CrC/C								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5690933	GT725037	M3 X 0,5	2.20	.31	.71	.141	2	D3
5690934	GT725038	M3,5 X 0,6	2.20	.35	.79	.141	2	D4
5690935	GT725039	M4 X 0,7	2.48	.43	.83	.168	2	D4
5690936	GT725040	M5 X 0,8	2.76	.47	.98	.194	2	D4
5690937	GT725041	M6 X 1	3.15	.47	1.18	.255	2	D5
5690938	GT725042	M7 X 1	3.54	.59	1.38	.318	2	D5
5690940	GT725044	M8 X 1,25	3.54	.59	1.38	.318	2	D5
5690941	GT725045	M10 X 1,25	3.94	.71	1.54	.381	2	D5
5690942	GT725046	M10 X 1,5	3.94	.71	1.54	.381	2	D6
5690943	GT725047	M12 X 1,25	4.33	.83	1.73	.367	3	D6
5690944	GT725048	M12 X 1,5	4.33	.83	1.73	.367	3	D6
5690945	GT725049	M12 X 1,75	4.33	.83	1.73	.367	3	D6

GT72 • Machine Screw and Fractional • Form B Plug Chamfer • DIN Length ANSI Shank • Wrought and Cast Aluminum





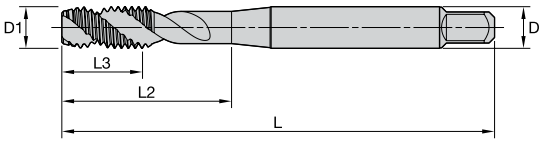


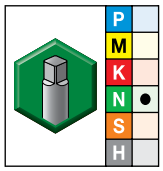
● first choice
○ alternate choice

grade WN44EG TiN+CrC/C								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5690893	GT725010	2 - 56	1.77	.31	.71	.141	2	H2
5690894	GT725011	4 - 40	2.20	.31	.71	.141	2	H2
5690896	GT725012	5 - 40	2.20	.31	.71	.141	2	H2
5690897	GT725013	6 - 32	2.20	.35	.79	.141	2	H3
5690898	GT725014	8 - 32	2.48	.43	.83	.168	2	H3
5690899	GT725015	10 - 24	2.76	.47	.98	.194	2	H3
5690910	GT725016	10 - 32	2.76	.47	.98	.194	2	H3
5690911	GT725017	1/4 - 20	3.15	.59	1.18	.255	2	H3
5690913	GT725019	1/4 - 28	3.15	.59	1.18	.255	2	H3
5690915	GT725021	5/16 - 18	3.54	.59	1.38	.318	2	H3
5690918	GT725023	5/16 - 24	3.54	.59	1.38	.318	2	H3
5690920	GT725025	3/8 - 16	3.94	.75	1.54	.381	2	H3
5690924	GT725029	7/16 - 14	3.94	.71	1.61	.323	3	H3
5690926	GT725031	7/16 - 20	3.94	.71	1.61	.323	3	H3
5690928	GT725033	1/2 - 13	4.33	.91	1.85	.367	3	H4
5690930	GT725035	1/2 - 20	4.33	.91	1.85	.367	3	H3

GT82 • Form C Semi-Bottom Chamfer • Metric • DIN Length ANSI Shank • Wrought and Cast Aluminum





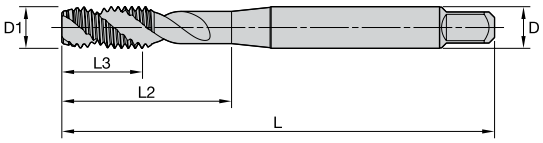


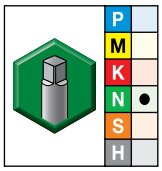
● first choice
○ alternate choice

grade WN44EG TiN+CrC/C								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5690801	GT825037	M3 X 0,5	2.20	.31	.71	.141	2	D3
5690803	GT825039	M4 X 0,7	2.48	.43	.83	.168	2	D4
5690804	GT825040	M5 X 0,8	2.76	.47	.98	.194	2	D4
5690805	GT825041	M6 X 1	3.15	.47	1.18	.255	2	D5
5690808	GT825044	M8 X 1,25	3.54	.59	1.38	.318	2	D5
5690810	GT825046	M10 X 1,5	3.94	.71	1.54	.381	2	D6
5690811	GT825047	M12 X 1,25	4.33	.83	1.73	.367	3	D6
5690813	GT825049	M12 X 1,75	4.33	.83	1.73	.367	3	D6

GT82 • Machine Screw and Fractional • Form C Semi-Bottom Chamfer • DIN Length ANSI Shank • Wrought and Cast Aluminum





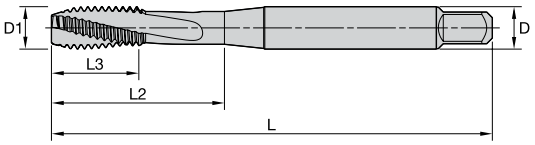


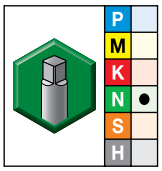
● first choice
○ alternate choice

grade WN44EG TiN+CrC/C								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5690761	GT825010	2 - 56	1.77	.31	.71	.141	2	H2
5690762	GT825011	4 - 40	2.20	.31	.71	.141	2	H2
5690765	GT825012	5 - 40	2.20	.31	.71	.141	2	H2
5690766	GT825013	6 - 32	2.20	.35	.79	.141	2	H3
5690767	GT825014	8 - 32	2.48	.43	.83	.168	2	H3
5690768	GT825015	10 - 24	2.76	.47	.98	.194	2	H3
5690769	GT825016	10 - 32	2.76	.47	.98	.194	2	H3
5690780	GT825017	1/4 - 20	3.15	.59	1.18	.255	2	H3
5690781	GT825018	1/4 - 20	3.15	.59	1.18	.255	2	H5
5690782	GT825019	1/4 - 28	3.15	.59	1.18	.255	2	H3
5690784	GT825021	5/16 - 18	3.54	.59	1.38	.318	2	H3
5690785	GT825022	5/16 - 18	3.54	.59	1.38	.318	2	H5
5690786	GT825023	5/16 - 24	3.54	.59	1.38	.318	2	H3
5690788	GT825025	3/8 - 16	3.94	.75	1.54	.381	2	H3
5690789	GT825026	3/8 - 16	3.94	.75	1.54	.381	2	H5
5690792	GT825029	7/16 - 14	3.94	.71	1.61	.323	3	H3
5690795	GT825031	7/16 - 20	3.94	.71	1.61	.323	3	H3
5690797	GT825033	1/2 - 13	4.33	.91	1.85	.367	3	H4
5690798	GT825034	1/2 - 13	4.33	.91	1.85	.367	3	H5
5690799	GT825035	1/2 - 20	4.33	.91	1.85	.367	3	H3

GT86 • Form C Semi-Bottom Chamfer • Metric • DIN Length ANSI Shank • Wrought and Cast Aluminum





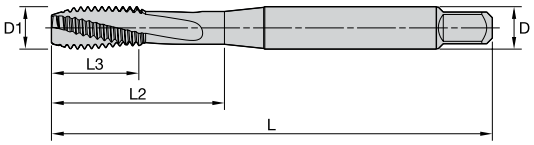


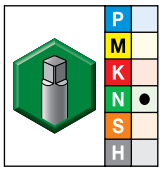
● first choice
○ alternate choice

grade WN44EG TiN+CrC/C								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5690865	GT865037	M3 X 0,5	2.20	.31	.71	.141	3	D3
5690867	GT865039	M4 X 0,7	2.48	.43	.83	.168	3	D4
5690868	GT865040	M5 X 0,8	2.76	.47	.98	.194	3	D4
5690869	GT865041	M6 X 1	3.15	.47	1.18	.255	3	D5
5690882	GT865044	M8 X 1,25	3.54	.59	1.38	.318	3	D5
5690884	GT865046	M10 X 1,5	3.94	.71	1.54	.381	3	D6
5690886	GT865048	M12 X 1,5	4.33	.83	1.73	.367	3	D6
5690887	GT865049	M12 X 1,75	4.33	.83	1.73	.367	3	D6

GT86 • Machine Screw and Fractional • Form C Semi-Bottom Chamfer • DIN Length ANSI Shank • Wrought and Cast Aluminum





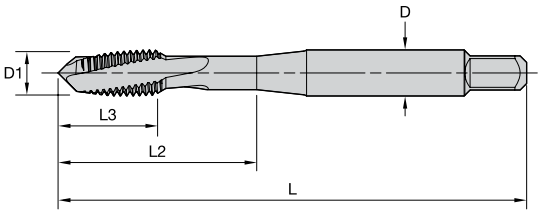


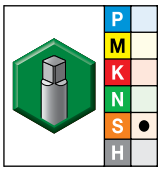
● first choice
○ alternate choice

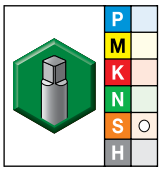
grade WN44EG TiN+CrC/C								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5690817	GT865010	2 - 56	1.77	.31	.71	.141	3	H2
5690818	GT865011	4 - 40	2.20	.31	.71	.141	3	H2
5690819	GT865012	5 - 40	2.20	.31	.71	.141	3	H2
5690840	GT865013	6 - 32	2.20	.35	.79	.141	3	H3
5690841	GT865014	8 - 32	2.48	.43	.83	.168	3	H3
5690842	GT865015	10 - 24	2.76	.47	.98	.194	3	H3
5690843	GT865016	10 - 32	2.76	.47	.98	.194	3	H3
5690844	GT865017	1/4 - 20	3.15	.59	1.18	.255	3	H3
5690846	GT865019	1/4 - 28	3.15	.59	1.18	.255	3	H3
5690847	GT865020	1/4 - 28	3.15	.59	1.18	.255	3	H4
5690849	GT865021	5/16 - 18	3.54	.59	1.38	.318	3	H3
5690853	GT865025	3/8 - 16	3.94	.75	1.54	.381	3	H3
5690854	GT865026	3/8 - 16	3.94	.75	1.54	.381	3	H5
5690861	GT865033	1/2 - 13	4.33	.91	1.85	.367	3	H4

GT90 • Form D Plug Chamfer • Metric ANSI • Nickel- and Cobalt-Based Alloys







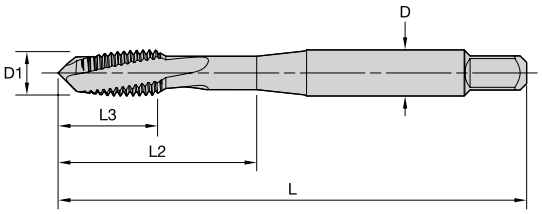


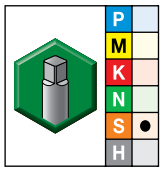
● first choice
○ alternate choice

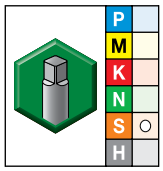
grade WU32MG TiCN		grade WS39MG Nitride/Oxide								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5705660	GT905146	5705073	GT905133	M2,5 X 0,45	1.81	.50	.56	.141	2	D3
5705071	GT905147	5705662	GT905134	M3 X 0,5	1.94	.63	.75	.141	3	D3
–		5705072	GT905135	M3,5 X 0,6	1.99	.36	.72	.141	3	D4
–		5705663	GT905136	M4 X 0,7	2.12	.32	.77	.168	3	D4
5705070	GT905149	–		M4 X 0,7	2.12	.36	.77	.168	3	D4
–		5705069	GT905137	M5 X 0,8	2.38	.47	.92	.194	3	D4
5705067	GT905151	5705664	GT905138	M6 X 1	2.51	.46	1.01	.255	3	D5
–		5705665	GT905139	M7 X 1	2.73	.52	1.16	.318	3	D5
–		5705666	GT905140	M8 X 1	2.72	.48	1.14	.318	3	D5
5705066	GT905154	5705668	GT905141	M8 X 1,25	2.72	.48	1.14	.318	3	D5
–		5705653	GT905142	M10 X 1,25	2.94	.53	1.27	.381	3	D5
–		5705656	GT905143	M10 X 1,5	2.94	.53	1.27	.381	3	D6
–		5705657	GT905144	M12 X 1,25	3.38	.77	1.74	.367	3	D5
–		5705659	GT905145	M12 X 1,75	3.38	.77	1.74	.367	3	D6

GT90 • Machine Screw and Fractional • Form D Plug Chamfer • Nickel- and Cobalt-Based Alloys







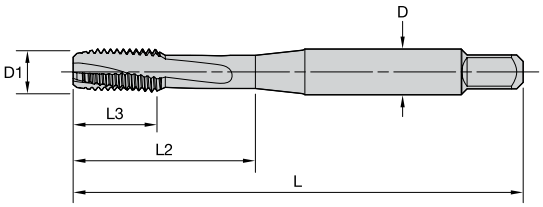


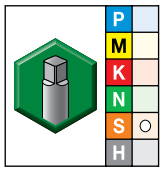
● first choice
○ alternate choice

grade WU32MG TiCN		grade WS39MG Nitride/Oxide								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
–		5705546	GT905001	2 - 56	1.75	.44	.50	.141	2	H2
–		5705549	GT905003	4 - 40	1.88	.56	.69	.141	2	H3
–		5705553	GT905005	4 - 48	1.88	.56	.69	.141	2	H2
–		5705555	GT905006	5 - 40	1.94	.63	.75	.141	3	H2
5705025	GT905074	5705559	GT905008	6 - 32	2.00	.36	.72	.141	3	H3
–		5705564	GT905012	6 - 40	2.00	.36	.72	.141	3	H2
5705024	GT905080	5705568	GT905014	8 - 32	2.13	.31	.77	.168	3	H3
5705572	GT905082	–		8 - 32	2.13	.31	.77	.168	3	H5
5705501	GT905085	5705059	GT905019	10 - 24	2.38	.47	.92	.194	3	H3
–		5705540	GT905025	10 - 32	2.38	.47	.92	.194	3	H5
–		5705542	GT905026	10 - 32	2.38	.47	.92	.194	3	H6
5705058	GT905089	5705507	GT905023	10 - 32	2.38	.47	.92	.194	3	H3
5705062	GT905094	5705584	GT905028	1/4 - 20	2.51	.44	1.02	.255	3	H3
–		5705060	GT905031	1/4 - 28	2.51	.44	1.02	.255	3	H3
–		5705629	GT905036	5/16 - 18	2.73	.49	1.15	.318	3	H3
–		5705634	GT905039	5/16- 24	2.73	.49	1.15	.318	3	H3
5705615	GT905110	5705057	GT905044	3/8 - 16	2.95	.60	1.28	.381	3	H3
–		5705620	GT905047	3/8 - 24	2.95	.60	1.28	.381	3	H3
–		5705646	GT905052	7/16 - 14	3.16	.71	1.49	.323	3	H3
–		5705649	GT905054	7/16 - 20	3.16	.71	1.49	.323	3	H3
–		5705575	GT905056	1/2 - 13	3.38	.77	1.74	.367	3	H3
–		5705580	GT905059	1/2 - 20	3.38	.77	1.74	.367	3	H3
–		5705026	GT905062	5/8 - 11	3.81	.91	1.89	.480	3	H3
–		5705644	GT905063	5/8 - 18	3.81	.91	1.89	.480	3	H3
–		5705599	GT905064	3/4 - 10	4.25	1.00	2.08	.590	3	H3
–		5705613	GT905066	3/4 - 16	4.25	1.00	2.08	.590	3	H3

GT92 • 3-4 Pitches Chamfer • Metric ANSI • Nickel- and Cobalt-Based Alloys





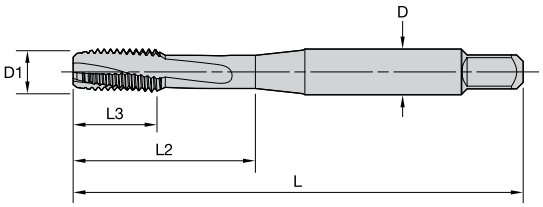


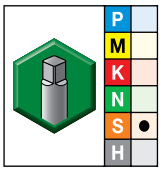
● first choice
○ alternate choice

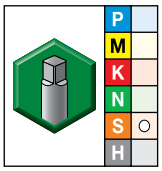
grade WS39MG Nitride/Oxide								
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5708329	GT925137	M2,5 X 0,45	1.81	.50	.56	.141	3	D3
5708335	GT925138	M3 X 0,5	1.94	.63	.75	.141	3	D3
5708333	GT925139	M3,5 X 0,6	1.99	.36	.71	.141	3	D4
5708337	GT925140	M4 X 0,7	2.12	.32	.76	.168	3	D4
5708339	GT925141	M5 X 0,8	2.37	.47	.91	.194	3	D4
5708341	GT925142	M6 X 1	2.50	.46	1.00	.255	3	D5
5708343	GT925143	M7 X 1	2.72	.52	1.15	.318	3	D5
5708347	GT925144	M8 X 1	2.70	.48	1.12	.318	3	D5
5708349	GT925145	M8 X 1,25	2.70	.48	1.12	.318	3	D5
5708319	GT925146	M10 X 1,25	2.92	.53	1.26	.381	3	D5
5708323	GT925147	M10 X 1,5	2.92	.53	1.26	.381	3	D6
5708325	GT925148	M12 X 1,25	3.38	.77	1.74	.367	3	D5
5708327	GT925149	M12 X 1,75	3.38	.77	1.74	.367	3	D6

GT92 • Machine Screw and Fractional • 3-4 Pitches Chamfer • Nickel- and Cobalt-Based Alloys







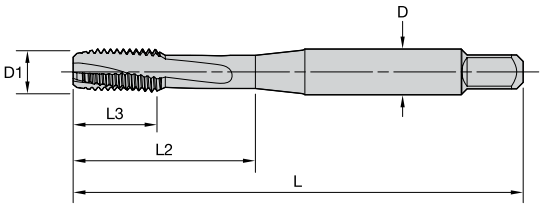


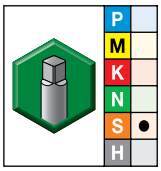
● first choice
○ alternate choice

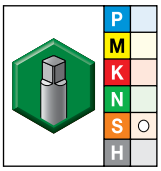
grade WU32MG TiCN		grade WS39MG Nitride/Oxide								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
–		5708144	GT925001	2 - 56	1.75	.44	.50	.141	3	H2
–		5708148	GT925003	4 - 40	1.88	.56	.69	.141	3	H2
–		5705219	GT925004	4 - 40	1.88	.56	.69	.141	3	H3
–		5708161	GT925006	4 - 48	1.88	.56	.69	.141	3	H2
–		5708163	GT925007	5 - 40	1.95	.63	.76	.141	3	H2
–		5708166	GT925009	6 - 32	1.99	.36	.71	.141	3	H3
–		5708172	GT925013	6 - 40	2.03	.36	.71	.141	3	H2
–		5708175	GT925015	8 - 32	2.12	.31	.76	.168	3	H3
–		5708178	GT925018	8 - 32	2.16	.31	.76	.168	3	H6
5705277	GT925088	5708014	GT925020	10 - 24	2.37	.47	.91	.194	3	H3
5705276	GT925091	5708018	GT925023	10 - 32	2.37	.47	.91	.194	3	H3
5705275	GT925096	5708201	GT925028	1/4 - 20	2.50	.44	1.00	.255	3	H3
5705274	GT925099	5708209	GT925031	1/4 - 28	2.50	.44	1.00	.255	3	H3
5705273	GT925104	5708261	GT925036	5/16 - 18	2.72	.49	1.13	.318	3	H3
–		5708269	GT925039	5/16 - 24	2.72	.49	1.13	.318	3	H3
–		5708273	GT925040	5/16 - 24	2.72	.49	1.13	.318	3	H4
5705272	GT925112	5708227	GT925044	3/8 - 16	2.94	.60	1.27	.381	3	H3
–		5708229	GT925045	3/8 - 16	2.94	.60	1.27	.381	3	H5
–		5705218	GT925047	3/8 - 24	2.40	.60	1.27	.381	3	H3
5708253	GT925117	–		3/8 - 24	2.94	.60	1.27	.381	3	H5
–		5708305	GT925052	7/16 - 14	3.16	.71	1.49	.323	3	H3
–		5708315	GT925055	7/16 - 20	3.16	.71	1.49	.323	3	H5
–		5708311	GT925054	7/16 - 20	3.16	.71	1.49	.323	3	H3
5705282	GT925124	5708190	GT925056	1/2 - 13	3.38	.77	1.74	.367	3	H3
–		5708194	GT925059	1/2 - 20	3.38	.77	1.74	.367	3	H3
–		5708283	GT925062	5/8 - 11	3.81	.91	1.89	.480	3	H3
–		5708301	GT925064	5/8 - 18	3.81	1.31	1.89	.480	3	H3
–		5708217	GT925065	3/4 - 10	4.25	1.59	2.08	.590	3	H3
–		5708223	GT925067	3/4 - 16	4.25	1.00	2.08	.590	3	H3

GT94 • Machine Screw and Fractional • Form E Bottoming Chamfer • Nickel- and Cobalt-Based Alloys







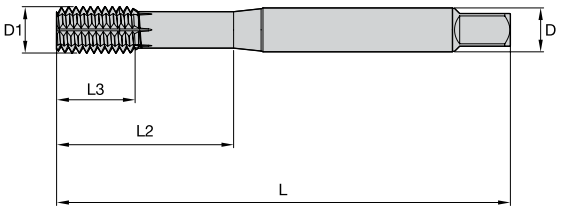


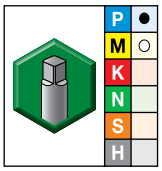
● first choice
○ alternate choice

grade WU32MG TiCN		grade WS39MG Nitride/Oxide								
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	pitch diameter limit
5705981	GT945038	–		4 - 40	1.88	.56	.69	.141	3	H3
–		5705982	GT945003	5 - 40	1.95	.63	.76	.141	3	H2
–		5705984	GT945005	6 - 32	1.99	.36	.71	.141	3	H3
5705989	GT945044	–		8 - 32	2.12	.31	.76	.168	3	H3
–		5705932	GT945010	10 - 24	2.42	.47	.91	.194	3	H3
–		5705935	GT945012	10 - 32	2.37	.47	.91	.194	3	H3
–		5705995	GT945014	1/4 - 20	2.50	.44	1.00	.255	3	H3
–		5703871	GT945016	1/4 - 28	2.50	.44	1.00	.255	3	H3
5706020	GT945055	–		5/16 - 18	2.72	.49	1.13	.318	3	H3
–		5706023	GT945021	5/16 - 24	2.72	.49	1.13	.318	3	H3
5706013	GT945060	5706012	GT945024	3/8 - 16	2.94	.60	1.27	.381	3	H3
–		5706014	GT945025	3/8 - 16	2.94	.60	1.27	.381	3	H5
–		5706016	GT945026	3/8 - 24	2.94	.60	1.27	.381	3	H3
–		5706034	GT945028	7/16 - 14	3.16	.71	1.49	.323	3	H3
–		5706036	GT945030	7/16 - 20	3.16	.71	1.49	.323	3	H3
–		5705993	GT945032	1/2 - 13	3.38	.77	1.74	.367	3	H5
–		5705994	GT945033	1/2 - 20	3.38	.77	1.74	.367	3	H3
–		5706032	GT945036	5/8 - 18	3.81	.91	1.89	.480	3	H3

GT24 • DIN Length ANSI Shank • Form C Semi-Bottoming Entry Taper • Machine Screw and Fractional • Roll Form Taps • Steel and Stainless Steel





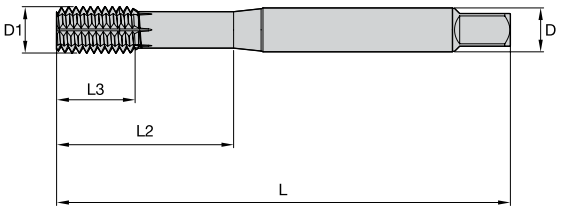


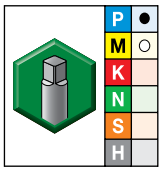
● first choice
○ alternate choice

grade WU32MG TiCN								
order #	catalog #	D1 TPI	L	L3	L2	D	number of lube grooves	pitch diameter limit
5944876	GT245001	6 - 32	2.22	.41	.81	.141	2	H3
5944878	GT245003	8 - 32	2.48	.39	.83	.168	4	H3
5944880	GT245005	10 - 24	2.78	.39	1.01	.194	4	H4
5944972	GT245007	10 - 32	2.77	.39	1.00	.194	4	H4
5944974	GT245009	1/4 - 20	3.18	.51	1.22	.255	4	H4
5944975	GT245010	1/4 - 20	3.18	.51	1.21	.255	4	H6
5944976	GT245011	1/4 - 28	3.16	.51	1.20	.255	4	H4
5944978	GT245013	5/16 - 18	3.58	.55	1.42	.318	4	H5
5944980	GT245015	5/16 - 24	3.56	.55	1.40	.318	4	H5
5944982	GT245017	3/8 - 16	3.98	.63	1.54	.381	6	H5
5944984	GT245019	3/8 - 24	3.95	.63	1.54	.381	6	H5
5944990	GT245025	1/2 - 13	4.33	.79	1.85	.367	6	H5
5945002	GT245027	1/2 - 20	4.33	.79	1.85	.367	6	H5

GT24 • Metric • DIN Length ANSI Shank • Form C Semi-Bottoming Entry Taper • Roll Form Taps • Steel and Stainless Steel





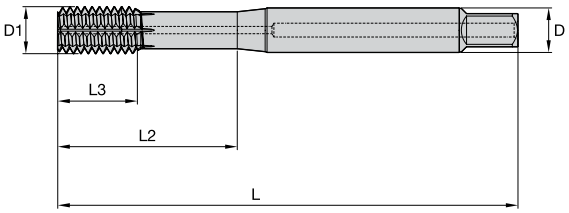


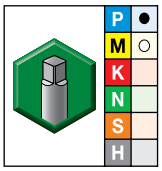
● first choice
○ alternate choice

order #	catalog #	grade WU32MG TiCN D1 TPI	L	L3	L2	D	number of lube grooves	pitch diameter limit
5945012	GT245037	M3 X 0,5	2.20	.39	.79	.141	2	D5
5945014	GT245039	M4 X 0,7	2.48	.39	.83	.168	4	D6
5945015	GT245040	M5 X 0,8	2.76	.39	.98	.194	4	D7
5945016	GT245041	M6 X 1	3.15	.51	1.18	.255	4	D8
5945019	GT245044	M8 X 1,25	3.54	.55	1.38	.318	6	D9
5945020	GT245045	M10 X 1,25	3.94	.63	1.53	.381	6	D9
5945021	GT245046	M10 X 1,5	3.94	.63	1.54	.381	6	D10
5945023	GT245048	M12 X 1,5	4.33	.71	1.73	.367	6	D9
5945024	GT245049	M12 X 1,75	4.33	.71	1.73	.367	6	D11

GT25 • DIN Length ANSI Shank • Form C Semi-Bottoming Entry Taper • Through Coolant • Fractional • Roll Form Taps • Steel and Stainless Steel





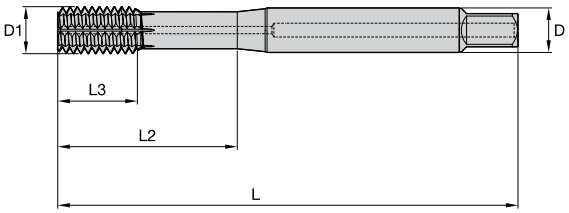


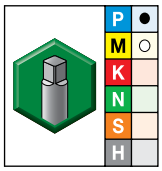
● first choice
○ alternate choice

grade WU32MG TiCN								
order #	catalog #	D1 TPI	L	L3	L2	D	number of lube grooves	pitch diameter limit
5945029	GT255001	1/4 - 20	3.15	.51	1.18	.255	4	H4
5945033	GT255005	5/16 - 18	3.54	.55	1.38	.318	6	H5
5945037	GT255009	3/8 - 16	3.94	.63	1.54	.381	6	H5
5945038	GT255010	3/8 - 16	3.94	.63	1.54	.381	6	H7
5945039	GT255011	3/8 - 24	3.94	.63	1.54	.381	6	H5
5945045	GT255017	1/2 - 13	4.33	.79	1.85	.367	6	H5
5945047	GT255019	1/2 - 20	4.33	.79	1.85	.367	6	H5
5945049	GT255021	5/8 - 11	4.33	.79	2.01	.480	6	H7

GT25 • Metric • DIN Length ANSI Shank • Form C Semi-Bottoming Entry Taper • Through Coolant • Roll Form Taps • Steel and Stainless Steel





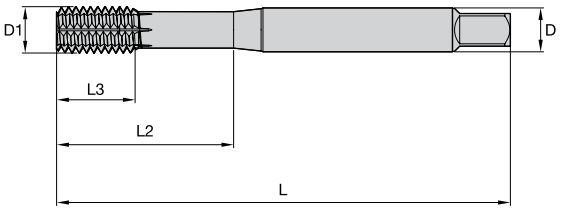


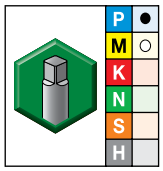
● first choice
○ alternate choice

order #	catalog #	grade WU32MG TiCN D1 TPI	L	L3	L2	D	number of lube grooves	pitch diameter limit
5945057	GT255029	M6 X 1	3.15	.51	1.18	.255	4	D8
5945060	GT255032	M8 X 1,25	3.54	.55	1.38	.318	6	D9
5945072	GT255034	M10 X 1,5	3.94	.63	1.54	.381	6	D10
5945078	GT255040	M16 X 1,5	4.33	.79	2.01	.480	6	D11
5945079	GT255041	M16 X 2	4.33	.79	2.01	.480	6	D12

GT26 • DIN Length ANSI Shank • Form E Bottoming Entry Taper • Machine Screw and Fractional • Roll Form Taps • Steel and Stainless Steel





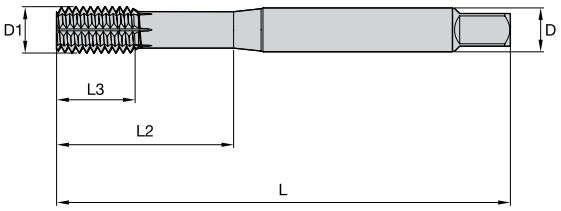


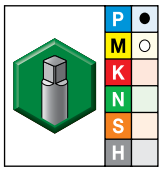
● first choice
○ alternate choice

grade WU32MG TiCN								
order #	catalog #	D1 TPI	L	L3	L2	D	number of lube grooves	pitch diameter limit
5945091	GT265002	2 - 56	1.75	.44	.50	.141	0	H3
5945094	GT265005	4 - 40	2.20	.39	.71	.141	0	H3
5945095	GT265006	4 - 40	2.20	.39	.71	.141	0	H5
5945098	GT265009	5 - 40	2.20	.39	.79	.141	2	H5
5945099	GT265010	6 - 32	2.21	.39	.79	.141	2	H3
5945100	GT265011	6 - 32	2.21	.39	.79	.141	2	H5
5945101	GT265012	8 - 32	2.48	.39	.83	.168	4	H3
5945103	GT265014	10 - 24	2.76	.39	.98	.194	4	H4
5945105	GT265016	10 - 32	2.76	.39	.98	.194	4	H4
5945106	GT265017	10 - 32	2.76	.39	.98	.194	4	H6
5945107	GT265018	1/4 - 20	3.15	.51	1.18	.255	4	H4
5945108	GT265019	1/4 - 20	3.15	.51	1.18	.255	4	H6
5945109	GT265020	1/4 - 28	3.15	.51	1.18	.255	4	H4
5945111	GT265022	5/16 - 18	3.54	.55	1.38	.318	6	H5
5945113	GT265024	5/16 - 24	3.54	.55	1.38	.318	6	H5
5945114	GT265025	5/16 - 24	3.54	.55	1.38	.318	6	H7
5945115	GT265026	3/8 - 16	3.94	.63	1.54	.381	6	H5
5945117	GT265028	3/8 - 24	3.94	.63	1.54	.381	6	H5
5945123	GT265034	1/2 - 13	4.33	.79	1.85	.367	6	H5
5945129	GT265040	5/8 - 18	4.33	.79	2.01	.480	6	H7
5945133	GT265044	3/4 - 16	4.92	.98	2.52	.590	6	H7

GT26 • Metric • DIN Length ANSI Shank • Form E Bottoming Entry Taper • Roll Form Taps • Steel and Stainless Steel







● first choice
○ alternate choice

order #	catalog #	grade WU32MG TiCN D1 TPI	L	L3	L2	D	number of lube grooves	pitch diameter limit
5945135	GT265046	M3 X 0,5	2.20	.39	.79	.141	2	D5
5945137	GT265048	M4 X 0,7	2.48	.39	.83	.168	4	D6
5945138	GT265049	M5 X 0,8	2.76	.39	.98	.194	4	D7
5945139	GT265050	M6 X 1	3.15	.51	1.18	.255	4	D8
5945142	GT265053	M8 X 1,25	3.54	.55	1.38	.318	6	D9
5945143	GT265054	M10 X 1,25	3.94	.63	1.53	.381	6	D9
5945144	GT265055	M10 X 1,5	3.94	.63	1.54	.381	6	D10
5945145	GT265056	M12 X 1,25	4.33	.71	1.73	.367	6	D9

Application Data • High-Performance Carbide Taps • Metric

Material Group		Through Holes					Blind Holes				
				Range — m/min					Range — m/min		
		Tap Style	Grade	min	Starting Value	max	Tap Style	Grade	min	Starting Value	max
P	P0	GX32, GX38	WP35MG	60	**100**	130	GX33, GX39	WP35MG	50	**70**	90
	P1	GX32, GX38	WP35MG	60	**90**	120	GX33, GX39	WP35MG	40	**60**	80
	P2	GX32, GX38	WP35MG	50	**85**	110	GX33, GX39	WP35MG	40	**60**	80
	P3	GX32, GX38	WP35MG	50	**80**	100	GX33, GX39	WP35MG	40	**60**	80
K	K1	GX34, GX50	WK12PG	70	**105**	140	GX35, GX50	WK12PG	50	**70**	90
	K2	GX34, GX50	WK12PG	60	**100**	130	GX35, GX50	WK12PG	50	**70**	90
	K3	GX34, GX50	WK12PG	60	**90**	120	GX35, GX50	WK12PG	40	**60**	80
N	N2	GX46, GX48	WN14PG	80	**120**	160	GX47, GX49	WN14PG	60	**80**	100
	N3	GX46, GX48	WN14PG	60	**100**	130	GX47, GX49	WN14PG	50	**70**	90
	N4	GX46, GX48	WN14PG	60	**90**	120	GX47, GX49	WN14PG	40	**60**	80
H	H3	GX10	WH16PG	1,2	**1,5**	2,0	GX10	WH16PG	0,8	**1,1**	1,4
	H4	GX10	WH16PG	0,6	**0,8**	1,0	GX10	WH16PG	0,4	**0,5**	0,7

Application Data • High-Performance Carbide Taps • Inch

Material Group		Through Holes					Blind Holes				
				Range — SFM					Range — SFM		
		Tap Style	Grade	min	Starting Value	max	Tap Style	Grade	min	Starting Value	max
P	P0	GX32, GX38	WP35MG	200	**330**	430	GX33, GX39	WP35MG	160	**230**	300
	P1	GX32, GX38	WP35MG	200	**300**	390	GX33, GX39	WP35MG	130	**200**	260
	P2	GX32, GX38	WP35MG	160	**280**	360	GX33, GX39	WP35MG	130	**200**	260
	P3	GX32, GX38	WP35MG	160	**260**	330	GX33, GX39	WP35MG	130	**200**	260
K	K1	GX34, GX50	WK12PG	230	**340**	460	GX35, GX50	WK12PG	160	**230**	300
	K2	GX34, GX50	WK12PG	200	**330**	430	GX35, GX50	WK12PG	160	**230**	300
	K3	GX34, GX50	WK12PG	200	**300**	390	GX35, GX50	WK12PG	130	**200**	260
N	N2	GX46, GX48	WN14PG	260	**390**	520	GX47, GX49	WN14PG	200	**260**	330
	N3	GX46, GX48	WN14PG	200	**330**	430	GX47, GX49	WN14PG	160	**230**	300
	N4	GX46, GX48	WN14PG	200	**300**	390	GX47, GX49	WN14PG	130	**200**	260
H	H3	GX10	WH16PG	3.8	**4.9**	6.4	GX10	WH16PG	2.6	**3.4**	4.5
	H4	GX10	WH16PG	1.9	**2.5**	3.2	GX10	WH16PG	1.3	**1.7**	2.2

Application Data • HSS-E-PM Taps • Metric

Material Group		Through Holes					Blind Holes				
				Range — m/min					Range — m/min		
		Tap Style	Grade	min	Starting Value	max	Tap Style	Grade	min	Starting Value	max
P	P1	GT20	WU32MG	20	**30**	45	GT30, GT32, GT50	WU32MG	14	**21**	32
		GT24	WU32MG	20	**30**	45	GT24, GT26	WU32MG	14	**21**	32
	P2	GT20	WU32MG	17	**25**	38	GT30, GT32, GT50	WU32MG	12	**18**	26
		GT24	WU32MG	17	**25**	38	GT24, GT26	WU32MG	12	**18**	26
	P3	GT20	WU32MG	12	**15**	20	GT30, GT32, GT50	WU32MG	8	**11**	14
	P4	GT00	WP31MG	5	**6**	8	GT02, GT04	WP31MG	3	**4**	5
	P5	GT20	WU32MG	12	**15**	20	GT30, GT32, GT50	WU32MG	8	**11**	14
	P6	GT00	WP31MG	6	**8**	10	GT02, GT04	WP31MG	4	**6**	7
M	M1	GT20	WS34MG	12	**15**	20	GT30, GT32, GT50	WS34MG	8	**11**	14
		GT24	WU32MG	5	**8**	12	GT24, GT26	WU32MG	4	**6**	8
	M2	GT20	WS34MG	9	**12**	16	GT30, GT32, GT50	WS34MG	6	**8**	11
	M3	GT00	WP31MG	4	**5**	7	GT02, GT04	WP31MG	3	**4**	5
K	K1	GT40	WU32MG	27	**35**	46	GT40, GT42	WU32MG	19	**25**	32
	K2	GT40	WU32MG	23	**30**	39	GT40, GT42	WU32MG	16	**21**	27
N	N1	GT72	WN44EG	33	**50**	65	GT82, GT86	WN44EG	23	**35**	46
		GT22	WN48EG	37	**55**	72	GT22	WN48EG	26	**39**	50
	N2	GT40	WU32MG	30	**45**	59	GT40, GT42	WU32MG	21	**32**	41
		GT72	WN44EG	30	**45**	59	GT82, GT86	WN44EG	21	**32**	41
		GT22	WN38MG	33	**50**	65	GT22	WN38MG	23	**35**	46
	N4	GT40	WU32MG	7	**10**	15	GT40, GT42	WU32MG	5	**7**	11
S	S1	GT20	WU32MG	8	**12**	18	GT30, GT32	WU32MG	6	**8**	13
	S2,	GT90	WU32MG	3,3	**5,0**	7,5	GT92, GT94	WU32MG	2,3	**3,5**	5,3
	S3	GT90	WS39MG	1,7	**2,5**	3,8	GT92, GT94	WS39MG	1,2	**1,8**	2,6
	S4	GT60	WS34MG	2,7	**4,0**	6,0	GT62	WS34MG	1,9	**2,8**	4,2
H	H1	GT06	WN35MG	1,3	**2,0**	3,0	GT06	WN35MG	0,9	**1,4**	2,1
	H2	GT06	WN35MG	1,0	**1,5**	2,3	GT06	WN35MG	0,7	**1,1**	1,6

NOTE: Increase speed by up to 25% when using coolant taps (GT21, GT23, GT31, GT33 GT41, GT43, and GT51). Use grade GP6505™ in steels. Use 50% of the recommended speed listed for grade GP6520™.

Application Data • HSS-E-PM Taps • Inch

Material Group		Through Holes					Blind Holes				
				Range — SFM					Range — SFM		
		Tap Style	Grade	min	Starting Value	max	Tap Style	Grade	min	Starting Value	max
P	P1	GT20	WU32MG	70	**100**	150	GT30, GT32, GT50	WU32MG	50	**70**	100
		GT24	WU32MG	70	**100**	150	GT24, GT26	WU32MG	50	**70**	100
	P2	GT20	WU32MG	50	**80**	120	GT30, GT32, GT50	WU32MG	40	**60**	90
		GT24	WU32MG	50	**80**	120	GT24, GT26	WU32MG	40	**60**	90
	P3	GT20	WU32MG	40	**50**	60	GT30, GT32, GT50	WU32MG	30	**30**	40
	P4	GT00	WP31MG	15	**20**	26	GT02, GT04	WP31MG	11	**14**	18
	P5	GT20	WU32MG	40	**50**	60	GT30, GT32, GT50	WU32MG	30	**30**	40
	P6	GT00	WP31MG	20	**30**	30	GT02, GT04	WP31MG	10	**20**	20
M	M1	GT20	WS34MG	40	**50**	60	GT30, GT32, GT50	WS34MG	30	**30**	40
		GT24	WU32MG	20	**30**	40	GT24, GT26	WU32MG	10	**20**	30
	M2	GT20	WS34MG	30	**40**	50	GT30, GT32, GT50	WS34MG	20	**30**	40
	M3	GT00	WP31MG	10	**20**	20	GT02, GT04	WP31MG	10	**10**	10
K	K1	GT40	WU32MG	90	**110**	150	GT40, GT42	WU32MG	60	**80**	100
	K2	GT40	WU32MG	80	**100**	130	GT40, GT42	WU32MG	50	**70**	90
N	N1	GT72	WN44EG	110	**160**	210	GT82, GT86	WN44EG	80	**110**	150
		GT22	WN48EG	120	**180**	230	GT22	WN48EG	80	**130**	160
	N2	GT40	WU32MG	100	**150**	190	GT40, GT42	WU32MG	70	**100**	130
		GT72	WN44EG	100	**150**	190	GT82, GT86	WN44EG	70	**100**	130
		GT22	WN38MG	110	**160**	210	GT22	WN38MG	80	**110**	150
	N4	GT40	WU32MG	22	**30**	49	GT40, GT42	WU32MG	15	**23**	34
S	S1	GT20	WU32MG	30	**40**	60	GT30, GT32	WU32MG	18	**28**	41
	S2,	GT90	WU32MG	11	**16**	25	GT92, GT94	WU32MG	8	**11**	17
	S3	GT90	WS39MG	5	**10**	12	GT92, GT94	WS39MG	4	**6**	9
	S4	GT60	WS34MG	9	**13**	20	GT62	WS34MG	6	**9**	14
H	H1	GT06	WN35MG	4.4	**6.6**	9.8	GT06	WN35MG	3.1	**4.6**	6.9
	H2	GT06	WN35MG	3.3	**4.9**	7.4	GT06	WN35MG	2.3	**3.4**	5.2

NOTE: Increase speed by up to 25% when using coolant taps (GT21, GT23, GT31, GT33, GT41, GT43, and GT51). Use grade GP6505™ in steels. Use 50% of the recommended speed listed for grade GP6520™.

Tap Recommendations for Classes 2B and 3B

Unified Inch Screw Threads

thread size/pitch	recommended tap limits[1] class 2B	recommended tap limits[1] class 3B	internal thread pitch diameter limits min all classes (Basic)	internal thread pitch diameter limits max class 2B	internal thread pitch diameter limits max class 3B
0 - 80	H2	H2	0.0519	0.0542	0.0536
1 - 64	H2	H2	0.0629	0.0655	0.0648
1 - 72	H2	H2	0.0640	0.0665	0.0659
2 - 56	H2	H2	0.0744	0.0772	0.0765
2 - 64	H2	H2	0.0759	0.0786	0.0779
3 - 48	H3	H2	0.0855	0.0885	0.0877
3 - 56	H2	H2	0.0874	0.0902	0.0895
4 - 40	H3	H2	0.0958	0.0991	0.0982
4 - 48	H3	H2	0.0985	0.1016	0.1008
5 - 40	H3	H2	0.1088	0.1121	0.1113
5 - 44	H3	H2	0.1102	0.1134	0.1126
6 - 32	H3	H2	0.1177	0.1214	0.1204
6 - 40	H3	H2	0.1218	0.1252	0.1243
8 - 32	H3	H3	0.1437	0.1475	0.1465
8 - 36	H3	H3	0.1460	0.1496	0.1487
10 - 24	H3	H3	0.1629	0.1672	0.1661
10 - 32	H3	H3	0.1697	0.1736	0.1726
12 - 24	H3	H3	0.1889	0.1933	0.1922
12 - 28	H3	H3	0.1928	0.1970	0.1959
1/4 - 20	H5	H3	0.2175	0.2224	0.2211
1/4 - 28	H4	H3	0.2268	0.2311	0.2300
5/16 - 18	H5	H3	0.2764	0.2817	0.2803
5/16 - 24	H4	H3	0.2854	0.2902	0.2890
3/8 - 16	H5	H3	0.3344	0.3401	0.3387
3/8 - 24	H4	H3	0.3479	0.3528	0.3516
7/16 - 14	H5	H3	0.3911	0.3972	0.3957
7/16 - 20	H5	H3	0.4050	0.4104	0.4091
1/2 - 13	H5	H4	0.4500	0.4565	0.4548
1/2 - 20	H5	H3	0.4675	0.4731	0.4717
9/16 - 12	H5	H4	0.5084	0.5152	0.5135
9/16 - 18	H5	H3	0.5264	0.5323	0.5308
5/8 - 11	H5	H4	0.5660	0.5732	0.5714
5/8 - 18	H5	H3	0.5889	0.5949	0.5934
3/4 - 10	H5	H4	0.6850	0.6927	0.6907

[1]Tap H limit selected for 3B will also produce thread to 2B.

NOTE: The above recommended taps normally produce the class of thread indicated in average materials when used with reasonable care. However, if the specified tap does not provide a satisfactory gage fit, choose an alternate tap limit.

Tap Recommendations for Classes 2B and 3B

Unified Inch Screw Threads

thread size/pitch	recommended tap limits[1] class 2B	recommended tap limits[1] class 3B	internal thread pitch diameter limits min all classes (Basic)	internal thread pitch diameter limits max class 2B	internal thread pitch diameter limits max class 3B
3/4 - 16	H5	H4	0.7094	0.7159	0.7143
7/8 - 9	H6	H4	0.8028	0.8110	0.8089
7/8 - 14	H6	H4	0.8286	0.8356	0.8339
1" - 8	H6	H5	0.9188	0.9276	0.9254
1" - 12	H6	H4	0.9459	0.9535	0.9516
1-1/8 - 7	H8	H6	1.0322	1.0416	1.0393
1-1/8 - 8	H8	H6	1.0438	1.0528	1.0505
1-1/8 - 12	H6	H5	1.0709	1.0787	1.0768
1-1/4 - 7	H8	H6	1.1572	1.1668	1.1644
1-1/4 - 8	H8	H6	1.1688	1.1780	1.1757
1-1/4 - 12	H6	H5	1.1959	1.2039	1.2019
1-3/8 - 6	H8	H6	1.2667	1.2771	1.2745
1-3/8 - 8	H8	H6	1.2938	1.3031	1.3008
1-3/8 - 12	H6	H5	1.3209	1.3291	1.3270
1-1/2 - 6	H8	H6	1.3917	1.4022	1.3996
1-1/2 - 8	H8	H6	1.4188	1.4283	1.4259
1-1/2 - 12	H6	H5	1.4459	1.4542	1.4522
1-3/4 - 5	H8	H7	1.6201	1.6317	1.6288
2 - 4 1/2	H8	H7	1.8557	1.8681	1.8650

[1]*Tap H limit selected for 3B will also produce thread to 2B.*

Tap Recommendations for Class 6H Metric Screw Threads

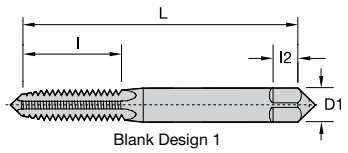
thread size nominal diameter (mm)	thread size pitch (mm)	recommended tap limit number	internal thread product limits — class 6H pitch diameter (mm) min	pitch diameter (mm) max	pitch diameter (in) min	pitch diameter (in) max
1,6	0,35	D3	1,373	1,458	.05406	.05740
2	0,4	D3	1,740	1,830	.06850	.07205
2,5	0,45	D3	2,208	2,303	.08693	.09067
3	0,5	D3	2,675	2,775	.10531	.10925
3,5	0,6	D4	3,110	3,222	.12244	.12685
4	0,7	D4	3,545	3,663	.13957	.14421
4,5	0,75	D4	4,013	4,131	.15789	.16264
5	0,8	D4	4,480	4,605	.17638	.18130
6	1	D5	5,350	5,500	.21063	.21654
7	1	D5	6,350	6,500	.25000	.25591
8	1,25	D5	7,188	7,348	.28299	.28929
10	1,5	D6	9,026	9,206	.35535	.36244
12	1,75	D6	10,863	11,063	.42768	.43555
14	2	D7	12,701	12,913	.50004	.50839
16	2	D7	14,701	14,913	.57878	.58713
20	2,5	D7	18,376	18,600	.72346	.73228
24	3	D8	22,051	22,316	.86815	.87858
30	3,5	D9	27,727	28,007	1.09161	1.10264
36	4	D9	33,402	33,702	1.31504	1.32685

Decimal Equivalents

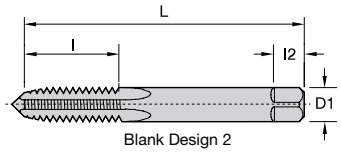
drill size	decimal (in)	drill size	decimal (in)	drill size	decimal (in)	drill size	decimal (in)	drill size	decimal (in)	drill size	decimal (in)
0,30mm	.0118	54	.0550	3,10mm	.1220	5,50mm	.2165	8,50mm	.3346	9/16	.5625
0,32mm	.0126	1,40mm	.0551	1/18	.1250	7/32	.2188	8,60mm	.3386	14,50mm	.5709
80	.0135	1,45mm	.0571	3,20mm	.1260	5,60mm	.2205	R	.3390	37/64	.5781
0,35mm	.0138	1,50mm	.0591	30	.1285	2	.2210	8,70mm	.3425	14,75mm	.5807
79	.0145	53	.0595	3,30mm	.1299	5,70mm	.2244	11/32	.3438	15,00mm	.5906
0,38mm	.0150	1,55mm	.0610	3,40mm	.1339	1	.2280	8,80mm	.3465	19/32	.5938
1/64	.0156	1/16	.0625	29	.1360	5,80mm	.2283	S	.3480	15,25mm	.6004
0,40mm	.0157	1,60mm	.0630	3,50mm	.1378	5,90mm	.2323	8,90mm	.3504	39/64	.6094
78	.0160	52	.0635	28	.1405	A	.2340	9,00mm	.3543	15,50mm	.6102
0,42mm	.0165	1,65mm	.0650	9/64	.1406	15/64	.2344	T	.3580	15,75mm	.6201
0,45mm	.0177	1,70mm	.0669	3,60mm	.1417	6,00mm	.2362	9,10mm	.3583	5/8	.6250
77	.0180	51	.0670	27	.1440	B	.2380	23/64	.3594	16,00mm	.6299
0,48mm	.0189	1,75mm	.0689	3,70mm	.1457	6,10mm	.2402	9,20mm	.3622	16,25mm	.6398
0,50mm	.0197	50	.0700	26	.1470	C	.2420	9,30mm	.3661	41/64	.6406
76	.0200	1,80mm	.0709	25	.1495	6,20mm	.2441	U	.3680	16,50mm	.6496
75	.0210	1,85mm	.0728	3,80mm	.1496	D	.2460	9,40mm	.3701	21/32	.6562
0,55mm	.0217	49	.0730	24	.1520	6,30mm	.2480	9,50mm	.3740	16,75mm	.6594
74	.0225	1,90mm	.0748	3,90mm	.1535	1/4, E	.2500	3/8	.3750	17,00mm	.6693
0,60mm	.0236	48	.0760	23	.1540	6,40mm	.2520	V	.3770	43/64	.6719
73	.0240	1,95mm	.0768	5/32	.1562	6,50mm	.2559	9,60mm	.3780	17,25mm	.6791
0,62mm	.0244	5/64	.0781	22	.1570	F	.2570	9,70mm	.3819	11/16	.6875
72	.0250	47	.0785	4,00mm	.1575	6,60mm	.2598	9,80mm	.3858	17,50mm	.6890
0,65mm	.0256	2,00mm	.0787	21	.1590	G	.2610	W	.3860	45/64	.7031
71	.0260	2,05mm	.0807	20	.1610	6,70mm	.2638	9,90mm	.3898	18,00mm	.7087
0,70mm	.0276	46	.0810	4,10mm	.1614	17/64	.2656	25/64	.3906	23/32	.7188
70	.0280	45	.0820	4,20mm	.1654	H	.2660	10,00mm	.3937	18,50mm	.7283
69	.0292	2,10mm	.0827	19	.1660	6,80mm	.2677	X	.3970	47/64	.7344
0,75mm	.0295	2,15mm	.0846	4,30mm	.1693	6,90mm	.2717	10,20mm	.4016	19,00mm	.7480
68	.0310	44	.0860	18	.1695	I	.2720	Y	.4040	3/4	.7500
1/32	.0312	2,20mm	.0866	11/64	.1719	7,00mm	.2756	13/32	.4062	49/64	.7656
0,80mm	.0315	2,25mm	.0886	17	.1730	J	.2770	Z	.4130	19,50mm	.7677
67	.0320	43	.0890	4,40mm	.1732	7,10mm	.2795	10,50mm	.4134	25/32	.7812
66	.0330	2,30mm	.0906	16	.1770	K	.2810	27/64	.4219	20,00mm	.7874
0,85mm	.0335	2,35mm	.0925	4,50mm	.1772	9/32	.2812	10,80mm	.4252	51/64	.7969
65	.0350	42	.0935	15	.1800	7,20mm	.2835	11,00mm	.4331	20,50mm	.8071
0,90mm	.0354	3/32	.0938	4,60mm	.1811	7,30mm	.2874	7/16	.4375	13/16	.8125
64	.0360	2,40mm	.0945	14	.1820	L	.2900	11,20mm	.4409	21,00mm	.8268
63	.0370	41	.0960	4,70mm, 13	.1850	7,40mm	.2913	11,50mm	.4528	53/64	.8281
0,95mm	.0374	2,45mm	.0965	3/16	.1875	M	.2950	29/64	.4531	27/32	.8438
62	.0380	40	.0980	4,80mm, 12	.1890	7,50mm	.2953	11,80mm	.4646	21,50mm	.8465
61	.0390	2,50mm	.0984	11	.1910	19/64	.2969	15/32	.4688	55/64	.8594
1,00mm	.0394	39	.0995	4,90mm	.1929	7,60mm	.2992	12,00mm	.4724	22,00mm	.8661
60	.0400	38	.1015	10	.1935	N	.3020	12,20mm	.4803	7/8	.8750
59	.0410	2,60mm	.1024	9	.1960	7,70mm	.3031	31/64	.4844	22,50mm	.8858
1,05mm	.0413	37	.1040	5,00mm	.1969	7,80mm	.3071	12,50mm	.4921	57/64	.8906
58	.0420	2,70mm	.1063	8	.1990	7,90mm	.3110	1/2	.5000	23,00mm	.9055
57	.0430	36	.1065	5,10mm	.2008	5/16	.3125	12,80mm	.5039	29/32	.9062
1,10mm	.0433	7/64	.1094	7	.2010	8,00mm	.3150	13,00mm	.5118	59/64	.9219
1,15mm	.0453	35	.1100	13/64	.2031	O	.3160	33/64	.5156	23,50mm	.9252
56	.0465	2,80mm	.1102	6	.2040	8,10mm	.3189	13,20mm	.5197	15/16	.9375
3/64	.0469	34	.1110	5,20mm	.2047	8,20mm	.3228	17/32	.5312	24,00mm	.9449
1,20mm	.0472	33	.1130	5	.2055	P	.3230	13,50mm	.5315	61/64	.9531
1,25mm	.0492	2,90mm	.1142	5,30mm	.2087	8,30mm	.3268	13,80mm	.5433	24,50mm	.9646
1,30mm	.0512	32	.1160	4	.2090	21/64	.3281	35/64	.5469	31/32	.9688
55	.0520	3,00mm	.1181	5,40mm	.2126	8,40mm	.3307	14,00mm	.5512	25,00mm	.9843
1,35mm	.0531	31	.1200	3	.2130	Q	.3320	14,25mm	.5610	63/64	.9844
–	–	–	–	–	–	–	–	–	–	1"	1.0000

Metric Fractional Wire gage Letter size

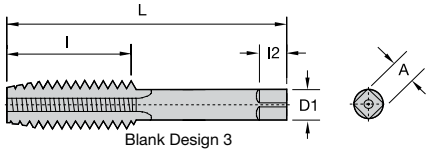
Standard Tap Dimensions • Ground Thread • Reference USCTI Table 302



Blank Design 1



Blank Design 2

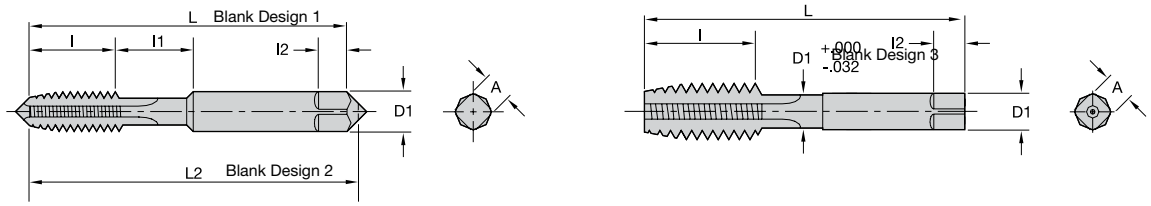


Blank Design 3

nominal diameter range (in)	machine screw size number	(in)	nominal fractional diameter	(in)	nominal metric diameter mm	(in)	blank design number	overall length L	thread length l	square length l2	shank diameter D1	square size A
.052–.065	0	(.0600)	–		M1.6	(.0630)	1	1.63	.31	.19	.1410	.110
.065–.078	1	(.0730)	–		M1.8	(.0709)	1	1.69	.38	.19	.1410	.110
.078–.091	2	(.0860)	–		M2 (0787),	M2.2 (.0866)	1	1.75	.44	.19	.1410	.110
.091–.104	3	(.0990)	–		M2.5	(.0984)	1	1.81	.50	.19	.1410	.110
.104–.117	4	(.1120)	–		–	–	1	1.88	.56	.19	.1410	.110
.117–.130	5	(.1250)	–		M3	(.1181)	1	1.94	.63	.19	.1410	.110
.130–.145	6	(.1380)	–		M3.5	(.1378)	1	2.00	.69	.19	.1410	.110
.145–.171	8	(.1640)	–		M4	(.1575)	1	2.13	.75	.25	.1680	.131
.171–.197	10	(.1900)	–		M4.5 (.1772),	M5 (.1969)	1	2.38	.88	.25	.1940	.152
.197–.223	12	(.2160)	–		–	–	1	2.38	.94	.28	.2200	.165
.223–.260	–		1/4	(.2500)	M6	(.2362)	2	2.50	1.00	.31	.2550	.191
.260–.323	–		5/16	(.3125)	M7 (.2756),	M8 (.3150)	2	2.72	1.13	.38	.3180	.238
.323–.395	–		3/8	(.3750)	M10	(.3937)	2	2.94	1.25	.44	.3810	.286
.395–.448	–		7/16	(.4375)	–	–	3	3.16	1.44	.41	.3230	.242
.448–.510	–		1/2	(.5000)	M12	(.4724)	3	3.38	1.66	.44	.3670	.275
.510–.573	–		9/16	(.5625)	M14	(.5512)	3	3.59	1.66	.50	.4290	.322
.573–.635	–		5/8	(.6250)	M16	(.6299)	3	3.81	1.81	.56	.4800	.360
.635–.709	–		11/16	(.6875)	M18	(.7087)	3	4.03	1.81	.63	.5420	.406
.709–.760	–		3/4	(.7500)	–	–	3	4.25	2.00	.69	.5900	.442
.760–.823	–		13/16	(.8125)	M20	(.7874)	3	4.47	2.00	.69	.6520	.489
.823–.885	–		7/8	(.8750)	M22	(.8661)	3	4.69	2.22	.75	.6970	.523
.885–.948	–		15/16	(.9375)	M24	(.9449)	3	4.91	2.22	.75	.7600	.570
.948–1.010	–		1	(1.0000)	M25	(.9843)	3	5.13	2.50	.81	.8000	.600
1.010–1.073	–		1-1/16	(1.0625)	M27	(1.0630)	3	5.13	2.50	.88	.8960	.672
1.073–1.135	–		1-1/8	(1.1250)	–	–	3	5.44	2.56	.88	.8960	.672
1.135–1.198	–		1-3/16	(1.1875)	M30	(1.1811)	3	5.44	2.56	1.00	1.0210	.766
1.198–1.260	–		1-1/4	(1.2500)	–	–	3	5.75	2.56	1.00	1.0210	.766
1.260–1.323	–		1-5/16	(1.3125)	M33	(1.2992)	3	5.75	2.56	1.06	1.1080	.831
1.323–1.385	–		1-3/8	(1.3750)	–	–	3	6.06	3.00	1.06	1.1080	.831
1.358–1.448	–		1-7/16	(1.4375)	M36	(1.4173)	3	6.06	3.00	1.13	1.2330	.925
1.448–1.510	–		1-1/2	(1.5000)	–	–	3	6.38	3.00	1.13	1.2330	.925
1.510–1.635	–		1-5/8	(1.6250)	M39	(1.5354)	3	6.69	3.19	1.13	1.3050	.979
1.635–1.760	–		1-3/4	(1.7500)	M42	(1.6535)	3	7.00	3.19	1.25	1.4300	1.072
1.760–1.885	–		1-7/8	(1.8750)	–	–	3	7.31	3.56	1.25	1.5190	1.139
1.885–2.010	–		2	(2.0000)	M48	(1.8898)	3	7.63	3.56	1.38	1.6440	1.233
2.010–2.135	–		2-1/8	(2.1250)	–	–	3	8.00	3.56	1.38	1.7690	1.327
2.135–2.260	–		2-1/4	(2.2500)	M56	(2.2047)	3	8.25	3.56	1.44	1.8940	1.420
2.260–2.385	–		2-3/8	(2.3750)	–	–	3	8.50	4.00	1.44	2.0190	1.514
2.385–2.510	–		2-1/2	(2.5000)	–	–	3	8.75	4.00	1.50	2.1000	1.575
2.510–2.635	–		2-5/8	(2.6250)	M64	(2.5197)	3	8.75	4.00	1.50	2.2250	1.669
2.635–2.760	–		2-3/4	(2.7500)	–	–	3	9.25	4.00	1.56	2.3500	1.762
2.760–2.885	–		2-7/8	(2.8750)	M72	(2.8346)	3	9.25	4.00	1.56	2.4750	1.856
2.885–3.010	–		3	(3.0000)	–	–	3	9.75	4.56	1.63	2.5430	1.907
3.010–3.135	–		3-1/8	(3.1250)	–	–	3	9.75	4.56	1.63	2.6680	2.001
3.135–3.260	–		3-1/4	(3.2500)	M80	(3.1496)	3	10.00	4.56	1.75	2.7930	2.095
3.260–3.385	–		3-3/8	(3.3750)	–	–	3	10.00	4.56	1.75	2.8830	2.162
3.385–3.510	–		3-1/2	(3.5000)	–	–	3	10.25	4.94	2.00	3.0080	2.256
3.510–3.635	–		3-5/8	(3.6250)	M90	(3.5433)	3	10.25	4.94	2.00	3.1330	2.350
3.635–3.760	–		3-3/4	(3.7500)	–	–	3	10.50	5.31	2.13	3.2170	2.413
3.760–3.885	–		3-7/8	(3.8750)	–	–	3	10.50	5.31	2.13	3.3420	2.506
3.885–4.010	–		4	(4.0000)	M100	(3.9370)	3	10.75	5.31	2.25	3.4670	2.600

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Optional Neck and Shortened Thread Length Dimensions • Reference USCTI Table 302A



General Dimensions

Tap Dimensions — Inches

nominal diameter range (in)		machine screw size number (in)		nominal fractional diameter (in)		nominal metric diameter mm (in)		blank design number	overall length L	thread length l	neck length l1	square length l2	shank diameter D1	square size A
.104	.117	4	(.1120)	—		—	—	1	1.88	.31	.25	.19	.1410	.110
.117	.130	5	(.1250)			M3	(.1181)	1	1.94	.31	.31	.19	.1410	.110
.130	.145	6	(.1380)	—		M3.5	(.1378)	1	2.00	.38	.31	.19	.1410	.110
.145	.171	8	(.1640)			M4	(.1575)	1	2.13	.38	.38	.25	.1680	.131
.171	.197	10	(.1900)	—		M4.5	(.1772)	1	2.38	.50	.38	.25	.1940	.152
—	—	—	—			M5	(.1969)	—	—	—	—	—	—	—
.197	.223	12	(.2160)	—	—	—	—	1	2.38	.50	.44	.28	.2200	.165
.223	.260	—	—	1/4	(.2500)	M6	(.2362)	2	2.50	.63	.38	.31	.2550	.191
.260	.323	—		5/16	(.3125)	M7, M8	(.2756), (.3150)	2	2.72	.69	.44	.38	.3180	.238
.323	.395			3/8	(.3750)	M10	(.3937)	2	2.94	.75	.50	.44	.3810	.286
.395	.448	—		7/16	(.4375)	—	—	3	3.16	.88	–	.41	.3230	.242
.448	.510			1/2	(.5000)	M12	(.4724)	3	3.38	.94	–	.44	.3670	.275
.510	.573	—		9/16	(.5625)	M14	(.5541)	3	3.59	1.00	–	.50	.4290	.322
.573	.635			5/8	(.6250)	M16	(.6299)	3	3.81	1.09	–	.56	.4800	.360
.635	.709	—		11/16	(.6875)	M18	(.7087)	3	4.03	1.09	–	.63	.5420	.406
.709	.760			3/4	(.7500)	—	—	3	4.25	1.22	–	.69	.5900	.442
.760	.823	—		13/16	(.8125)	M20	(.7874)	3	4.47	1.22	–	.69	.6520	.489
.823	.885			7/8	(.8750)	M22	(.8661)	3	4.69	1.34	–	.75	.3670	.523
.885	.948	—		15/16	(.9375)	M24	(.9449)	3	4.91	1.34	–	.75	.7600	.570
.948	1.010			1	(1.0000)	M25	(.9843)	3	5.13	1.50	–	.81	.8000	.600

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NOTE: Thread length l is based on a length of 12 pitches of the UNC thread series. Thread length "l" is a minimum value and has no tolerance. When thread length "l" is added to neck length "l1", the total shall be no less than the minimum USCTI Table 302 thread length "l". Unless otherwise specified, all tolerances are in accordance with USCTI Table 302. For eccentricity tolerances, see USCTI Table 317. Table 302 is provided for reference only. The Kennametal tap dimensions may differ.

Tolerances

element	nominal diameter range (in)	direction	tolerance (in)
length overall — L	.0520–1.0100	plus or minus	.031
	1.0100–4.0100	plus or minus	.063
length of thread — l	.0520–.2230	plus or minus	.047
	.2230–.5100	plus or minus	.063
	.5100–1.5100	plus or minus	.094
	1.5100–4.0100	plus or minus	.125
length of square — l2	.0520–1.0100	plus or minus	.031
	1.0100–4.0100	plus or minus	.063
diameter of shank — d1	.0520–.2230	minus	.0015
	.2230–.6350	minus	.0015
	.6350–1.0100	minus	.0020
	1.0100–1.5100	minus	.0020
	1.5100–2.0100	minus	.0030
	2.0100–4.0100	minus	.0030
size of square — a	.0520–.5100	minus	.004
	.5100–1.0100	minus	.006
	1.0100–2.0100	minus	.008
	2.0100–4.0100	minus	.010

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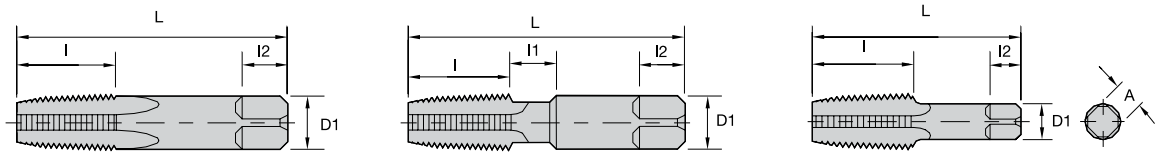
Special Taps

Unless otherwise specified: Special taps over 1.010–1.510" diameter inclusive, having 14 or more threads per inch or 1,75mm pitch and finer, and sizes over 1.510" diameter with 10 or more threads per inch or 2,5mm pitch and finer, are made to general dimensions shown in USCTI Table 303. Special tap thread limits are determined using the formulas shown

in USCTI Table 331 for Unified Inch Screw Threads and USCTI Table 341 for metric m-profile screw threads.

NOTE: Tap sizes .395" and smaller have an external center on the thread end (may be removed on bottoming taps). Sizes .125" and smaller have an external center on the shank end. Sizes .224–.395" have truncated partial cone centers on the shank end (length of cone approximately 1/4 of diameter of shank). Sizes over .395" have internal centers on both the thread and shank ends.
For standard thread limits and tolerances for Unified Inch Screw Threads, see USCTI Table 327, and for metric threads, see USCTI Table 337.
For eccentricity tolerances of tap elements, see USCTI Table 317.

Standard Pipe Tap Dimensions • Straight and Taper • Ground Thread • Reference USCTI Table 311



General Dimensions

dimensions (in)

nominal size (in)	overall length L	thread length l	square length l2	shank diameter D1	square size A	optional neck length l1
1/16	2.13	.69	.38	.3125	.234	.375
1/8	2.13	.75	.38	.3125	.234	–
1/8	2.13	.75	.38	.4375	.328	.375
1/4	2.44	1.06	.44	.5625	.421	.375
3/8	2.56	1.06	.50	.7000	.531	.375
1/2	3.13	1.38	.63	.6875	.515	–
3/4	3.25	1.38	.69	.9063	.679	–
1	3.75	1.75	.81	1.1250	.843	–
1-1/4	4.00	1.75	.94	1.3125	.984	–
1-1/2	4.25	1.75	1.00	1.5000	1.125	–
2	4.25	1.75	1.13	1.8750	1.406	–
2-1/2	5.50	2.56	1.25	2.2500	1.687	–
3	6.00	2.63	1.38	2.6250	1.968	–
3-1/2	6.50	2.69	1.50	2.8125	2.108	–
4	6.75	2.75	1.56	3.0000	2.250	–

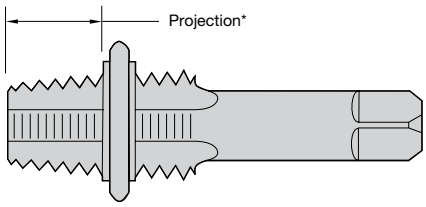
Tolerances

element	range	direction	tolerance
length overall — L	1/16–3/4 inc.	plus/minus	.031
	1–4 inc.	plus/minus	.063
length of thread — l	1/16–3/4 inc.	plus/minus	.063
	1–1-1/4 inc.	plus/minus	.094
	1-1/2–4	plus/minus	.125
length of square — l2	1/16–3/4 inc.	plus/minus	.031
	1–4 inc.	plus/minus	.063
diameter of shank — d1	1/16–1/8	minus	.0015
	1/4–1 inc.	minus	.0020
	1-1/4–4 inc.	minus	.0030
size of square — a	1/16–1/8	minus	.004
	1/4–3/4 inc.	minus	.006
	1–4 inc.	minus	.008

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Taper Pipe Tap Thread Limits • Ground Thread • Reference USCTI Table 338

American National Standard Taper Pipe Thread Form (NPT)
Aeronautical National Taper Pipe Thread Form (ANPT)
Dryseal American National Standard Taper Pipe Thread Form (NPTF)



nominal size (in)	threads per inch	projection* (in)	projection tolerance + / –	taper per foot limits min	taper per foot limits max	length L1	tap drill size** NPT, ANPT, NFTF
1/16	27	.312	.063	.719	.781	.160	C
1/8	27	.312	.063	.719	.781	.1615	Q
1/4	18	.459	.063	.719	.781	.2278	7/16
3/8	18	.454	.063	.719	.781	.240	9/16
1/2	14	.579	.063	.719	.781	.320	45/64
3/4	14	.565	.063	.719	.781	.339	29/32
1	11-1/2	.678	.094	.719	.781	.400	1-9/64
1-1/4	11-1/2	.686	.094	.719	.781	.420	1-31/64
1-1/2	11-1/2	.699	.094	.719	.781	.420	1-23/32
2	11-1/2	.667	.094	.719	.781	.436	2-3/16
2-1/2	8	.925	.094	.734	.781	.682	2-39/64
3	8	.925	.094	.734	.781	.766	3-15/64
3-1/2	8	.938	.125	.734	.781	.821	—
4	8	.950	.125	.734	.781	.844	—

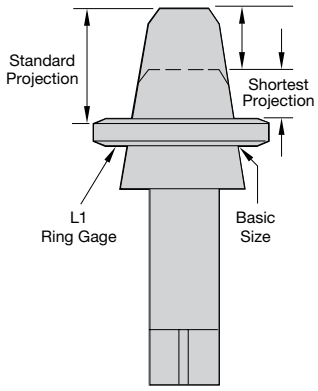
**Distance from small end of tap projects through L1 taper thread ring gage.*
***Recommended size given permits direct tapping without reaming the hole, but only gives a full thread for approximately the L1 length.*
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Pipe Taps

General-purpose pipe taps are appropriate for threading a wide variety of materials, both ferrous and non-ferrous.

Ground thread pipe taps are standard in American Standard Pipe Form (NPT) and American Standard Dryseal Pipe Form (NPFT). NPT threads require the use of a sealer, like Teflon™ tape or pipe compound. Dryseal taps are used to tap fittings, which will give a pressure-tight joint without the use of a sealer.

The nominal size of a pipe tap is that of the pipe fitting to be tapped, not the actual size of the tap. The thread tapers 3/4" per foot. All pipe taps are furnished with 2-1/2–3-1/2 thread chamfer.



Short projection pipe taps are made with a projection shorter than standard for taper pipe tapping where the depth of tapping is limited.

Special short projection taper pipe taps can be furnished with American National Standard Taper Pipe thread (ANPT) or Dryseal American National Standard Taper Pipe thread (NPTF, PTF-SAE Short, or PTF-SPL Extra Short).

For information on short projection pipe taps and hole preparation for NPT, NPTF, and ANPT internal pipe threads, consult Kennametal Technical Bulletins.



widia.com

WIDIA

Turning

External Turning and and Internal Boring E4–E300

High-Performance Inserts • WIDIA Victory E4–E117

High-Performance Inserts for Machining Aluminum E118–E125

Advanced Materials Inserts • CBN, Ceramics and PCD E126–E180

Toolholders for External Turning E182–E204

Toolholders for Internal Boring E206–E222

Cartridges for Internal Boring E224–E233

Railway Wheel Reprofiling/Wheelset Turning/Bar Peeling E234–E243

Small Hole Boring E244–E300

Grooving and Cut-Off E302–E439

WGC E302–E349

WMT E350–E382

TopGroove E384–E434

LG Grooving E436–E439

Threading E440–E520

TopThread E440–E467

Laydown E468–E498

Technical Information E499–E520

The Victory ISO turning portfolio offers a comprehensive range of ISO Turning Inserts with advanced substrates and coating technologies for high productivity, long tool life, and reliability in rough to finish-turning applications. Inserts in this portfolio can be applied across a wide range of applications with effective chip control and smooth surface finish at a strong cost performance ratio.

NEGATIVE INSERTS



- Negative-style inserts are first choice for general machining of materials in medium to large lathes
- Negative-style insets are available in flat-top and chip-control chip breakers in both molded and ground peripheries suitable for all workpiece materials

POSITIVE INSERTS



- Screw-on inserts are the first choice for I.D. turning of all materials and O.D. turning on small to medium lathes suitable for all workpiece materials

PCBN AND PCD INSERTS



- PcBN can be used for machining steels with a hardness higher than 48 HRC
- PcBN inserts can also be used for productivity improvements in machining cast irons and high-temp alloys
- PCD inserts are used to machine non-ferrous materials

CERAMIC INSERTS



- Ceramic inserts are a great choice for productive machining of high-temp alloys
- Negative rake inserts are also recommended for the machining of hardened materials and cast irons available in flat-top chip breakers with molded and ground peripheries

WIDIA VICTORY TURNING INSERTS

VERSATILITY

Specialty engineering substrate with wear-resistant, multi-layer coating makes it suitable for wide range of applications.

STABILITY

Pre- and post-coat treatment along with post-coat grinding improves edge toughness, provides secure seating leading to consistent performance.

PRODUCTIVITY

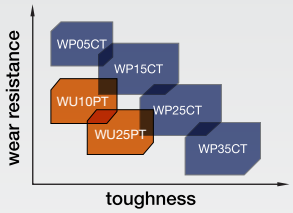
Multi-layer CVD coating with alpha-alumina layer provides higher productivity and tool life with reliability at elevated speeds and feeds.

SIMPLICITY

Outer layer bronze colored for easy wear identification. Easy to select and apply grades and chip breakers for roughing to finishing applications in variety of workpiece materials.

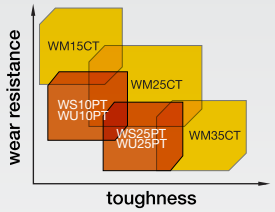
STEEL, STAINLESS STEEL, CAST IRON, AND HIGH-TEMP ALLOY INSERTS

VICTORY™ Turning



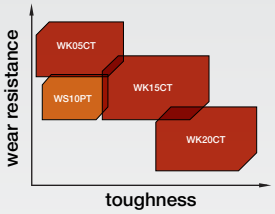
WP GRADES FOR STEEL

- Four grades for use in roughing to finishing operations
- Increase cutting speed and/or feed rate to gain productivity



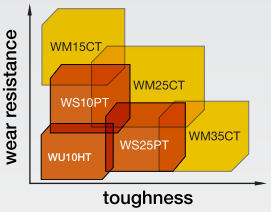
WM GRADES FOR STAINLESS STEEL

- Three grades in suitable chip breakers for use in roughing to finishing operations
- Very good balance of wear resistance and toughness for long, predictable tool life



WK GRADES FOR CAST IRON

- Three grades to cover all of your cast iron turning operations
- Increase cutting speed and/or feed rate by up to 30% over similar competitive grades
- WK15CT is the first choice for cast iron turning



WS GRADES FOR HIGH-TEMP ALLOYS

- Two grades for use in roughing to finishing operations
- Very good wear resistance for longer tool life

INDUSTRY

GENERAL ENGINEERING

TRANSPORTATION

ENERGY

AEROSPACE

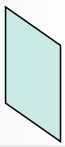
MEDICAL



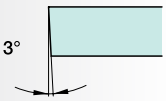
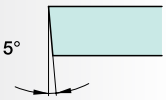
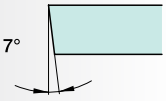
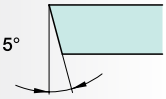
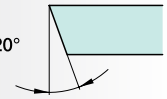
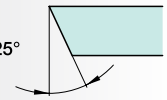
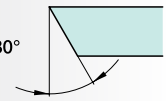
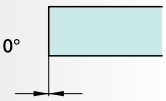
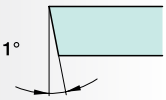
Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

C — Insert Shape

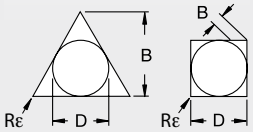
H	Hexagon 120°	
O	Octagon 135°	
P	Pentagon 108°	
R	Round —	
S	Square 90°	
T	Triangular 60°	
C D E M V	Rhomboid 80° 55° 75° 86° 35°	
W	Trigon 80° with enlarged corner angles	
L	Rectangular 90°	
A B N/K	Parallelogram 85° 82° 55°	

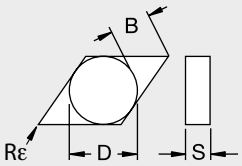
N — Insert Clearance Angle

A	3°	
B	5°	
C	7°	
D	15°	
E	20°	
F	25°	
G	30°	
N	0°	
P	11°	
O	Indicated for other clearance angles requiring descriptions.	

M — Tolerance Class

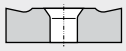
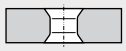
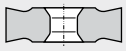
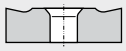
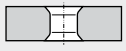
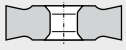
Tolerances apply prior to edge prep and coating





D = Theoretical diameter of the insert inscribed circle
S = Thickness
B = See figures below

G — Insert Features

N	
R	
F	
A	
M	
G	
W	
T	
Q	
U	
B	
H	
C	
J	
X V	Special Design

4 — Size

		Code for inch cutting edge length "L10"						
inch	"D" inch	C	D	R	S	T	V	W
1.2 (5)	5/32	S4	04	03	03	06	—	—
1.5 (6)	3/16	04	05	04	04	08	08	S3
1.8 (7)	7/32	05	06	05	05	09	09	03
—	.236	—	—	06	—	—	—	—
2	1/4	06	07	06	06	11	11	04
2.5	5/16	08	09	07	07	13	13	05
—	.315	—	—	08	—	—	—	—
3	3/8	09	11	09	09	16	16	06
—	.394	—	—	10	—	—	—	—
3.5	7/16	11	13	11	11	19	19	07
—	.472	—	—	12	—	—	—	—
4	1/2	12	15	12	12	22	22	08
4.5	9/16	14	17	14	14	24	24	09
5	5/8	16	19	15	15	27	27	10
—	.630	—	—	16	—	—	—	—
5.5	11/16	17	21	17	17	30	30	11
6	3/4	19	23	19	19	33	33	13
—	.787	—	—	20	—	—	—	—
7	7/8	22	27	22	22	38	38	15
—	.984	—	—	25	—	—	—	—
8	1	25	31	25	25	44	44	17
10	1-1/4	32	38	31	31	54	54	21
—	1.260	—	—	32	—	—	—	—

tolerance class	tolerance on "D"	tolerance on "B"	tolerance on "S"
C	±.0010"	±.0005"	±.001"
H	±.0005"	±.0005"	±.001"
E	±.0010"	±.0010"	±.001"
G	±.0010"	±.0010"	±.005"
M	See tables on next page		±.005"
U	See tables on next page		±.005"

Catalog Numbering System

(continued)

3	2			UR
Thickness S	Corner Radius "Rε"	Hand of Insert *(optional)*	Cutting Edge *(optional)*	Chipbreaker *(optional)*

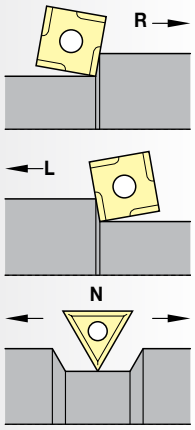
symbol inch	thickness inch
.5 (1)	1/32
.6	.040
1 (2)	1/16
1.2	5.64
1.5	3/32
2	1/8
2.5	5/32
3	3/16
3.5	7/32
4	1/4
5	5/16
6	3/8
7	7/16
18	1/2

symbol inch	corner radius inch
X0	.0015
0	.004
.5	.008
1	1/64
2	1/32
3	3/64
4	1/16
5	5/64
6	3/32
7	7/64
8	1/8
—	round insert
—	

R = Right hand

L = Left hand

N = Neutral



F Sharp

E Rounded

T Chamfered

S Chamfered and Rounded

K Double-Chamfered

P Double-Chamfered and Rounded

"D" inch	± Tolerance on "D" Class M Tolerance Shapes S, T, C, R, & W inch	Shape D inch	Shape V inch	Class U Tolerance Shapes S, T, & C inch
5/32	.002	–	–	–
3/16	.002	–	–	.003
7/32	.002	.002	.002	.003
1/4	.002	.002	.002	.003
5/16	.002	.002	.002	.003
3/8	.002	.002	.002	.003
7/16	.003	.003	.003	.005
1/2	.003	.003	.003	.005
9/16	.003	.003	.003	.005
5/8	.004	.004	.004	.007
11/16	.004	.004	.004	.007
3/4	.004	.004	.004	.007
7/8	.005	–	–	.010
1	.005	–	–	.010
1 1/4	.006	–	–	.010

"D" inch	± Tolerance on "B" Class M Tolerance Shapes S, T, C, R, & W inch	Shape D inch	Shape V inch	Class U Tolerance Shapes S, T, & C inch
5/32	.003	–	–	–
3/16	.003	–	–	.005
7/32	.003	.004	–	.005
1/4	.003	.004	–	.005
5/16	.003	.004	–	.005
3/8	.003	.004	.007	.005
7/16	.005	.006	–	–
1/2	.005	.006	.010	.008
9/16	.005	.006	–	–
5/8	.006	.007	–	.011
11/16	.006	.007	–	.011
3/4	.006	.007	–	.011
7/8	.006	–	–	.015
1	.007	–	–	.015
1 1/4	.008	–	–	.015

13 = Railroad Light

CT = Copy Turning

FF = Fine Finishing

FP = Finish Positive

FW = Finish Wiper

ML = Medium Light

MR = Medium Roughing

MW = Medium Wiper

RH = Roughing Heavy

T = Negative Land

UF = Universal Finishing

UM = Universal Medium

UR = Universal Roughing

.NMP = Sharp Medium

MP = Medium Positive

FS = Finishing High-Temp(S)

MS = Medium High-Temp(S)

MU = Medium Universal

SR = Super Roughing

65 = Heavy Roughing

8 = Heavy Roughing

.NGP = Sharp Medium

Victory Grade Naming System

ISO turning products featured in the All-Star program provide solutions for applications in steel, stainless steel, cast iron, and high-temp alloys. WIDIA™ Victory turning grades and geometries deliver higher productivity through reduced cycle time, long tool life, and improved chip control.

W	P	15	C	T
Brand	Workpiece Material	Application Range	Insert Material	Application
W = WIDIA	**P** = Steel **M** = Stainless Steel **K** = Cast Iron **N** = Non Ferrous **S** = High-Temp Alloys **H** = Hardened Materials **U** = Universal Application	**05** = Fine Finishing **10** = Finishing **15** = Medium to Roughing **20** = Medium to Roughing **25** = Roughing **30** = Roughing **35** = Roughing **40** = Heavy Roughing **45** = Heavy Roughing **50** = Heavy Roughing	**H** = Carbide (Uncoated) **C** = Carbide + CVD **P** = Carbide + PVD **T** = Cermet **Y** = Ceramics **D** = Diamond **B** = PCBN **S** = HSS **E** = HSS-E **M** = HSS-E-PM	**T** = Turning **M** = Milling **H** = Holemaking **D** = Solid Drills **E** = Solid End Mills **G** = Taps **R** = Reamers **V** = Thread Mills

Cutting Speed Recommendation • P • Inch

Low-Carbon (<0.3% C) and Free-Machining Steel — speed — m/min (SFM) — Starting Conditions

material group	grade	135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM
P0/P1	WP05CT							◇			435	1450
	WP15CT							◇			395	1320
	WP25CT					◇					275	925
	WP35CT		◇								210	700
	WS10PT/WU10PT					◇					280	925

Medium- and High-Carbon Steels (>0.3% C) — speed — m/min (SFM) — Starting Conditions

material group	grade	135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM
P2	WP05CT				◇						240	800
	WP15CT				◇						265	880
	WP25CT			◇							195	650
	WP35CT	◇									150	500
	WS10PT/WU10PT			◇							200	650

Alloy Steels and Tool Steels (≤330 HB) (≤35 HRC) — speed — m/min (SFM) — Starting Conditions

material group	grade	135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM
P3	WP05CT			◇							205	680
	WP15CT			◇							190	630
	WP25CT		◇								155	510
	WP35CT	◇									120	400
	WS10PT/WU10PT		◇								155	510

Alloy Steels and Tool Steels (340–450 HB) (36–48 HRC) — speed — m/min (SFM) — Starting Conditions

material group	grade	60 (200)	90 (300)	120 (400)	150 (500)	180 (600)	210 (700)	240 (800)	270 (900)	300 (1000)	m/min	SFM
P4	WP05CT				◇						160	530
	WP15CT				◇						145	480
	WP25CT			◇							105	360
	WP35CT		◇								95	325
	WS10PT/WU10PT			◇							110	360

Ferritic, Martensitic, and PH Stainless Steels (≤330 HB) (≤35 HRC) — speed — m/min (SFM) — Starting Conditions

material group	grade	120 (400)	150 (500)	180 (600)	210 (700)	240 (800)	270 (900)	300 (1000)	330 (1100)	360 (1200)	m/min	SFM
P5	WP05CT					◇					240	800
	WP15CT					◇					215	720
	WP25CT				◇						195	650
	WP35CT		◇								135	450
	WS10PT/WU10PT				◇						200	660

Ferritic, Martensitic, and PH Stainless Steels (340–450 HB) (36–48 HRC) — speed — m/min (SFM) — Starting Conditions

material group	grade	105 (350)	135 (450)	165 (550)	195 (650)	225 (750)	255 (850)	285 (950)	315 (1050)	345 (1150)	m/min	SFM
P6	WP05CT				◇						200	660
	WP15CT				◇						180	600
	WP25CT			◇							150	500
	WP35CT	◇									105	350
	WS10PT/WU10PT			◇							150	500

Cutting Speed Recommendation • M • Inch

Austenitic Stainless Steel — speed — m/min (SFM) — Starting Conditions

material group	grade	90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	360 (1200)	405 (1350)	450 (1500)	m/min	SFM
M1	WM15CT			◁▷							180	600
	WM25CT			◁▷							150	500
	WM35CT		◁▷								120	400
	WS10PT				◁▷						215	700
	WS25PT			◁▷							180	550

Austenitic Stainless Steel — speed — m/min (SFM) — Starting Conditions

material group	grade	90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	360 (1200)	405 (1350)	450 (1500)	m/min	SFM
M2	WM15CT			◁▷							165	550
	WM25CT			◁▷							140	450
	WM35CT		◁▷								105	350
	WS10PT				◁▷						200	650
	WS25PT			◁▷							165	500

Austenitic Stainless Steel: Duplex (Ferritic and Austenitic Mixture) — speed — m/min (SFM) — Starting Conditions

material group	grade	90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	360 (1200)	405 (1350)	450 (1500)	m/min	SFM
M3	WM15CT			◁▷							150	500
	WM25CT		◁▷								120	400
	WM35CT		◁▷								90	300
	WS10PT			◁▷							185	600
	WS10PT/WU25PT			◁▷							150	450

Cutting Speed Recommendation • K • Inch

Gray Cast Iron — speed — m/min (SFM) — Starting Conditions

material group	grade	60 (200)	180 (600)	305 (1000)	430 (1400)	550 (1800)	675 (2200)	800 (2600)	920 (3000)	1040 (3400)	1160 (3800)	m/min	SFM
K1	WK05CT				◁▷							450	1500
	WK15CT			◁▷								360	1200
	WK20CT			◁▷								300	1000

Ductile, Compacted Graphite, and Malleable Cast Irons (<600 MPa tensile strength) — speed — m/min (SFM) — Starting Conditions

material group	grade	90 (300)	135 (450)	180 (600)	225 (750)	275 (900)	320 (1050)	360 (1200)	410 (1350)	460 (1500)	500 (1650)	m/min	SFM
K2	WS10PT/WU10PT				◁▷							200	650
	WK05CT							◁▷				360	1200
	WK15CT					◁▷						270	900
	WK20CT					◁▷						240	800

Ductile, Malleable, and Austempered Cast Irons (>600 MPa tensile strength) — speed — m/min (SFM) — Starting Conditions

material group	grade	90 (300)	135 (450)	180 (600)	225 (750)	275 (900)	320 (1050)	360 (1200)	410 (1350)	460 (1500)	500 (1650)	m/min	SFM
K3	WS10PT/WU10PT			◁▷								150	500
	WK05CT				◁▷							240	800
	WK15CT					◁▷						215	725
	WK20CT				◁▷							210	700

CUTTING SPEED RECOMMENDATION • N • INCH

Low-Silicon Aluminum Alloys (hypoeutectic <12,2% Si) and Magnesium Alloys

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	1250 (4000)	1500 (4800)	1750 (5600)	2000 (6400)	2250 (7200)	2500 (8000)	Starting Conditions m/min	Starting Conditions SFM
N1	WU10HT		◁▷									488	1597

Low-Silicon Aluminum Alloys (hypoeutectic <12,2% Si) and Magnesium Alloys

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	1250 (4000)	1500 (4800)	1750 (5600)	2000 (6400)	2250 (7200)	2500 (8000)	Starting Conditions m/min	Starting Conditions SFM
N2	WU10HT		◁▷									488	1597

High-Silicon Aluminum Alloys (hypereutectic >12,2% Si) and Magnesium Alloys

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	1250 (4000)	1500 (4800)	1750 (5600)	2000 (6400)	2250 (7200)	2500 (8000)	Starting Conditions m/min	Starting Conditions SFM
N3	WU10HT		◁▷									488	1597
	WU05PT		◁▷									550	1800

Copper-, Brass-, Zinc-Based on a Machinability Index Range of 70–100

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions SFM
N4	WU10HT	◁▷				259	847
	WU05PT	◁▷				275	900

Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass, and Glass

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions m/min
N5	WU10HT	◁▷				170	550
	WU05PT	◁▷				170	550

Carbon and Graphite Composites: Brush Alloys, Kevlar, and Graphite (280–400 HB) (30–43 HRC)

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions m/min
N6	WU05PT	◁▷				200	650

MMCs (Aluminum-Based Metal Matrix Composites)

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions SFM
N7	WU10HT	◁▷				180	589

Tin Alloys, Cast: ASTM 823, Alloys 1, 2, 3, 11

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions SFM
N8	WU05PT	◁▷				215	700

Cutting Speed Recommendation • S • Inch

Iron-Based, Heat-Resistant Alloys
(135–320 HB) (≤34 HRC)

material group	grade	speed — m/min (SFM) 15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	290 (950)	310 (1050)	Starting Conditions m/min	SFM
S1	WU10HT		◁▷									30	100
	WS10PT/WU10PT			◁▷								55	180
	WS25PT/WU25PT		◁▷									40	125
	WM15CT			◁▷								55	180
	WM25CT/WM35CT			◁▷								40	125

Cobalt-Based, Heat-Resistant Alloys
(150–425 HB) (≤45 HRC)

material group	grade	speed — m/min (SFM) 15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	290 (950)	310 (1050)	Starting Conditions m/min	SFM
S2	WU10HT		◁▷									35	110
	WS10PT/WU10PT			◁▷								60	195
	WS25PT/WU25PT		◁▷									30	100
	WM15CT			◁▷								60	195
	WM25CT/WM35CT		◁▷									30	100

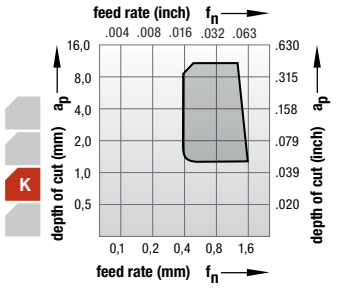
Nickel-Based, Heat-Resistant Alloys
(140–475 HB) (≤48 HRC)

material group	grade	speed — m/min (SFM) 15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	290 (950)	310 (1050)	Starting Conditions m/min	SFM
S3	WU10HT		◁▷									40	125
	WS10PT/WU10PT			◁▷								70	225
	WS25PT/WU25PT		◁▷									40	125
	WM15CT			◁▷								70	225
	WM25CT/WM35CT		◁▷									40	125

Titanium and Titanium Alloys
(110–450 HB) (≤48 HRC)

material group	grade	speed — m/min (SFM) 15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	290 (950)	310 (1050)	Starting Conditions m/min	SFM
S4	WU10HT		◁▷									45	150
	WM15CT			◁▷								70	225
	WM25CT/WM35CT			◁▷								55	175

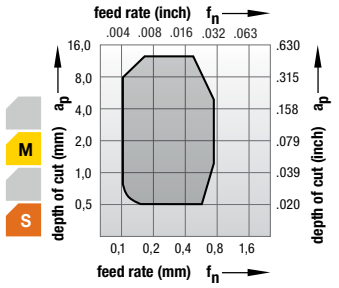
Negative Inserts





..MA

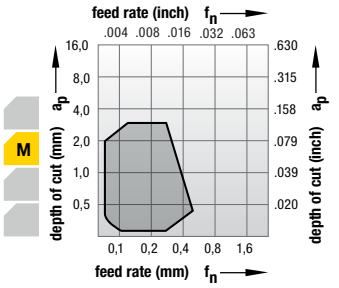
Flat-top geometry for machining cast iron. For finishing to roughing applications.





.NMP

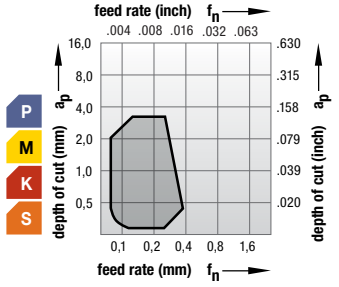
For medium-duty machining of tough work materials, such as chrome- and nickel-based alloys. Minimizes tendency for materials to adhere to insert.





CT

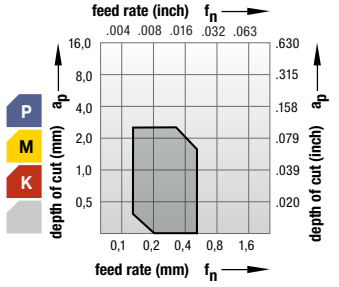
Designed for outward copy turning. Where other geometries produce long chips, the unique distribution of the cut results in good chip control.





FF

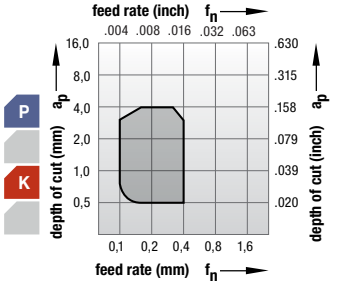
For finish turning, producing smooth, accurate surfaces. Very good chip control, especially at low depths of cut.





FW

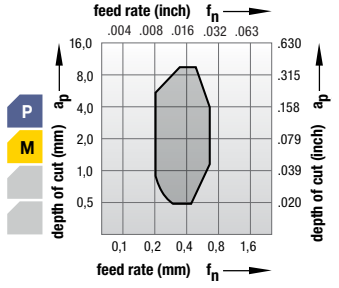
Wiper geometry for finishing when good surface finish is needed using high feed rates. First choice for high-performance finishing.





ML

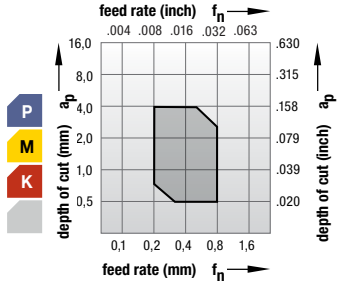
For finishing to medium machining with a negative, stable cutting edge.





MR

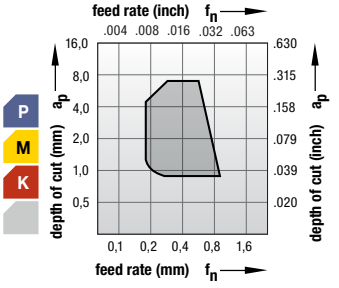
For medium to light roughing of steels, difficult-to-machine high-alloy titanium, and aluminum materials. High strength to deal with heavy chip deformation.





MW

Wiper geometry for light to medium turning with high feed rates. Feed twice as high as with edges with full corner radii to produce same surface finish.

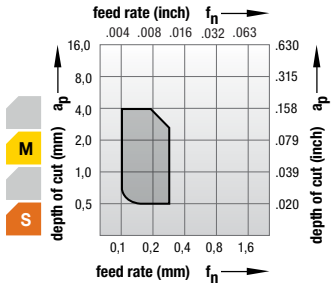




RH

For medium-duty to roughing. Outstanding chip control. High edge strength for interrupted cuts, forging skin, or scale. Preferred for all cast iron, such as gray, malleable, and nodular.

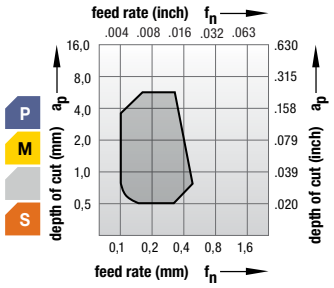
Negative Inserts





UF

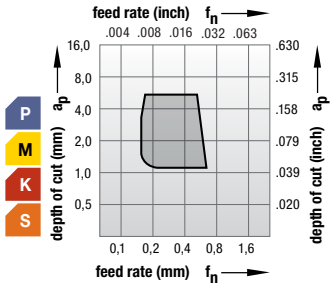
For finishing with a positive cutting edge for reduced cutting forces and superior surface quality.





UM

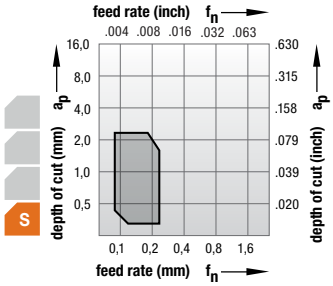
For medium-duty turning operations. Soft-cutting chipbreaker. Used in applications producing varying chip sections, such as profile or copy turning. Good dimensional accuracy. For soft steel materials and stainless steels.





UR

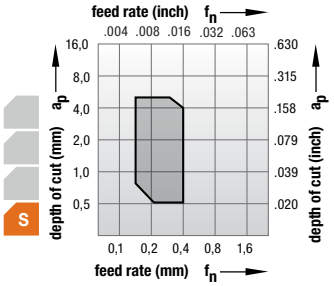
Roughing geometry with smooth chip forming and improved coolant flow for increased tool life. Positive geometry reduces cutting forces and improves depth-of-cut notching resistance. Ideally suitable for stainless steel applications and for smooth machining of steel.





FS

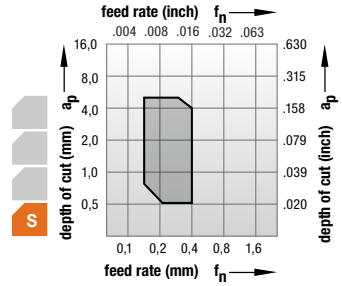
For finishing applications. Ground periphery with positive cutting edge ideally suited for high-temp alloys. Micro-finished edge on the ground periphery adds just a slight hone for improved edge integrity and reliability.





MS

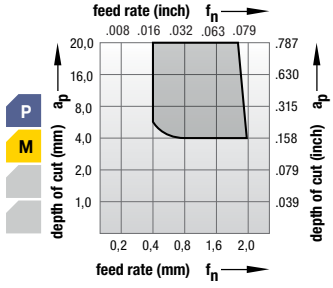
For medium machining in high-temp materials. Utilizes a micro-finished edge preparation to increase edge toughness.





.NGP

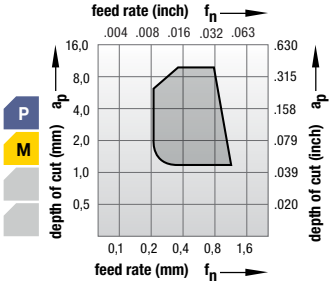
For medium-duty machining of tough work materials, such as chrome- and nickel-based alloys. Minimizes tendency for materials to adhere to insert.





SR

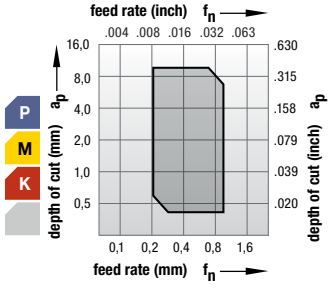
A super-roughing geometry. The –SR has a strong cutting edge to support high cutting loads in roughing applications. Can produce high metal removal rates.





65

Rough-turning geometry with chip control extending to the medium-duty range. Positive rake angle lowers cutting forces, reducing power requirements. Used on low-tensile and stainless steels.

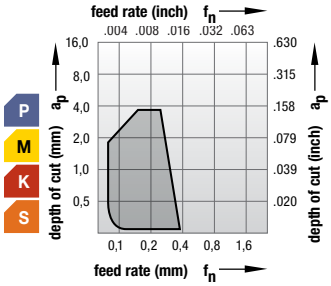




-RU

Positive geometry for smooth cutting. Positive T-land with rake angle to lower cutting forces and improve DOCN resistance. Post-coat grinding of seating surface for secure seating surface. Good edge strength for interrupted cuts, forging skin, and casting surfaces.

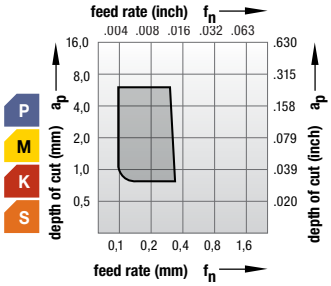
Positive Inserts





MU

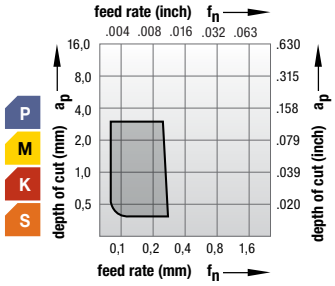
A medium universal geometry with a soft cutting action due to its positive geometry. Has a versatile application range and is suited for turning unstable components and for boring applications.

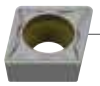




MP

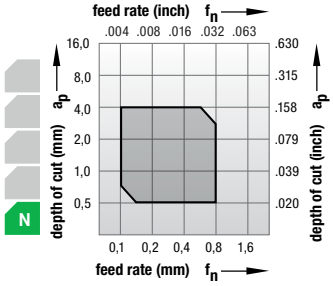
For medium to rough turning with reduced cutting forces and improved chip control for high feed rates. Suitable for high metal removal rates and spindling applications.





FP

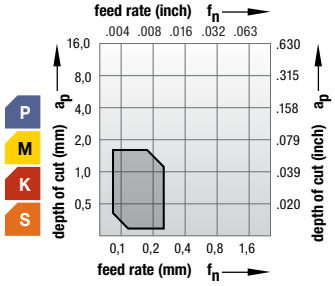
For finishing to medium turning operations with optimal chip control over a wide range of cutting conditions and workpiece materials.

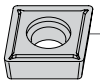




-AL

For cost-effective machining of aluminum, non-ferrous metals, and plastics. Extremely sharp cutting edges result in optimum part finishes with low cutting forces and short chips.





1P

Preferred for light finishing. Low cutting forces and reduced power requirements due to positive rake angle. Good chip control over a wide range.

P Steel Turning



Crankshaft/Camshaft
Roughing and Finishing



Connecting Rods
Boring



Gears
Roughing and Finishing



Input/Output Shafts

M Stainless Steel Turning



Turbo Charger
Roughing and Finishing



Flanges
Roughing and Finishing



Bearing Housing
Roughing and Finishing



Valve Body
Roughing and Finishing

K Cast Iron Turning



Cylinder Liner
Roughing and Finishing



Engine Block

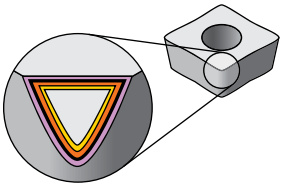


Brake Drum and Disc



Hub
Roughing and Finishing

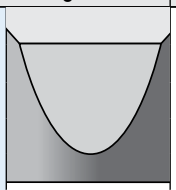
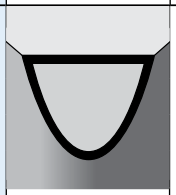
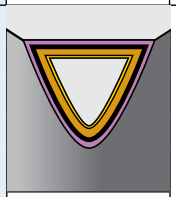
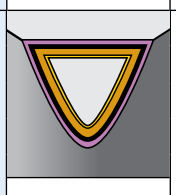
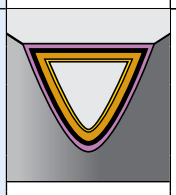
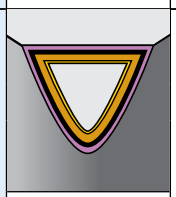
Grades and Grade Descriptions



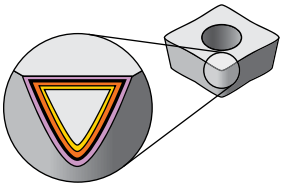
Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Grade

Coating	Grade Description	wear resistance ⟷ toughness: 05	10	15	20	25	30	35	40	45
TTR  HW-P35	Uncoated carbide. Tough grade for medium to rough turning applications in steel. Suitable for interrupted cuts and unfavorable conditions.									
WP20TT  HT-P05	Uncoated cermet. Highly wear-resistant grade suitable for finish turning applications in steel in continuous cuts. Gives excellent surface finish.									
WP05CT  HC-P10	**Composition:** A deformation-resistant, cobalt-enriched substrate combined with thick MTCVD TiCN-Al_2O_3 coating. **Application:** For high productivity turning of steels and PH stainless steels in continuous to lightly interrupted cuts. This grade provides excellent combination of toughness and high-speed wear resistance allowing the fastest steel part production. Its unique combination of substrate and coating also makes it an ideal roughing grade for cast iron where chipping resistance is required.									
WP15CT  HC-P15	Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Good balance of wear resistance and toughness properties. High-productivity machining on smooth to lightly interrupted cuts. For steels.									
WP25CT  HC-P25	Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Good toughness properties. Excellent first choice for steel machining, high-productivity metal removal for all but the harshest interrupted cuts.									
WP35CT  HC-P35	Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-TiOCN. Proven on all roughing and heavy roughing operations, wet or dry, on interrupted and uninterrupted cuts.									

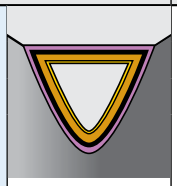
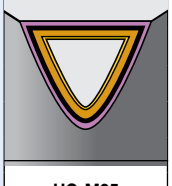
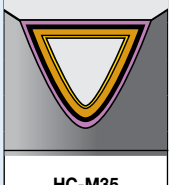
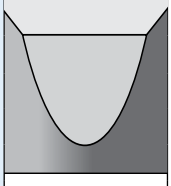
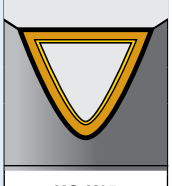
Grades and Grade Descriptions



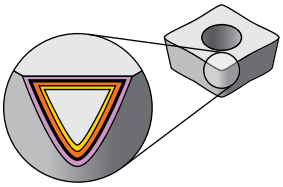
Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Grade

Coating		Grade Description	wear resistance ← → toughness	05	10	15	20	25	30	35	40	45
WM15CT	 HC-M15	Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-TiOCN. High degree of wear resistance and good resistance to depth-of-cut notching for long tool life in finishing to medium turning applications.	P				■	■				
			M		■	■	■					
			S		■	■	■					
WM20CT	 HC-K15	A multilayer CVD coated carbide grade with TiN-TiCN-Al_2O_3 coating over a wear-resistant substrate. Suitable for general-purpose/medium machining applications in stainless steels at moderate speeds and feeds. The substrate offers very good toughness and the coating provides high wear resistance, ensuring performance even in interrupted cuts with long tool life.	P					■	■			
			M			■	■	■				
WM25CT	 HC-M25	Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-TiOCN. Good balance of wear resistance and toughness properties. Light and medium machining. For austenitic stainless steel AISI series.	P							■	■	
			M				■	■	■			
			S				■	■	■			
WM35CT	 HC-M35	Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-TiOCN. Good toughness and wear resistance balance. For medium to roughing operations with light and heavily interrupted cuts.	P								■	■
			M						■	■	■	
			S						■	■	■	
THM	 HW-K15	Uncoated carbide. Extraordinary balance of toughness, wear resistance, edge stability. Suitable for light to medium turning applications in continuous and light interrupted cuts in materials like cast iron and non–ferrous metals.	K		■	■	■					
			N		■	■	■					
			S		■	■	■					
WK05CT	 HC-K05	Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3. Increased wear resistance for long tool life at high cutting speeds. Enhanced edge strength against depth-of-cut notching in interrupted cuts. Maximum wear resistance for long tool life at high cutting speeds in finish to medium machining.	P	■								
			K	■	■	■						

Grades and Grade Descriptions

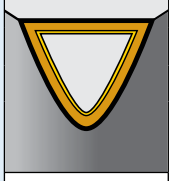
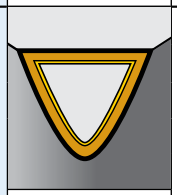
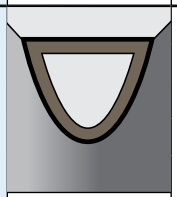
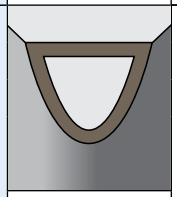
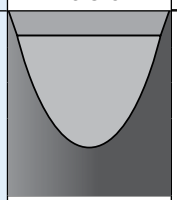
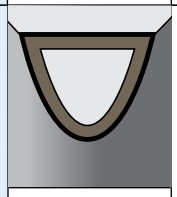


Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

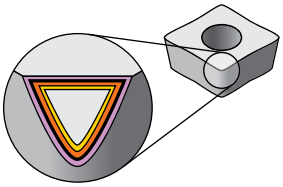
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Grade

wear resistance ⟷ toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45
WK15CT	 HC-M20	Composition: A multilayered coating with moderately thick MTCVD TiCN-Al_2O_3 layers over a highly deformation-resistant carbide substrate. Application: Designed for high-speed machining of gray and ductile irons. The substrate and coating architecture together with post-coat treatment ensure a tremendous tool life advantage, especially when cutting higher tensile strength ductile and gray irons where workpiece size consistency and reliability of tool life are critical. Excellent both in continuous cuts and varied depths of cut.	P									
			K									
WK20CT	 HC-K20	Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3. First choice for a wide range of machining on all gray and ductile irons, light to heavy machining, smooth or interrupted cuts, and wet or dry.	P									
			K									
WS10PT	 HC-S10	An advanced multilayer PVD coating over a very deformation-resistant unalloyed carbide substrate. The new and improved coating improves edge stability with wide range speed and feed capabilities. WS10PT™ is ideal for finishing to general machining of most workpiece materials at a wide range of speed and feed capabilities. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys with improved edge toughness and higher cutting speed and feed capabilities.	P									
			M									
			K									
			N									
			S									
			H									
WS25PT	 HC-S25	An advanced PVD grade with hard AlTiN coating and fine-grain unalloyed substrate. The new and improved coating improves edge stability with wide range speed and feed capabilities. WS25PT™ is ideal for general machining of most steels, stainless steels, high-temp alloys, titanium, irons, and non-ferrous materials at moderate speeds and over a wide range of feeds, with improved edge toughness for interrupted cut and high feed rates.	P									
			M									
			K									
			N									
			S									
WU10HT	 HW-N10	Uncoated carbide. Highly wear-resistant microfine substrate. Suitable for finish turning applications in aluminum and all types of non-ferrous materials, stainless steel, and high-temp alloys with suitable edge preparation. Mainly applied in continuous cuts.	M									
			N									
			S									
WU05PT	 HC-N05	Coated carbide. PVD AlTiN-coated grade with microfine substrate and highly wear-resistant coating. Suitable for finish turning in aluminum and other non-ferrous materials and also steels, stainless steel, and high-temp alloys with reliability in continuous cuts with suitable edge preparation.	P									
			M									
			K									
			N									
			S									

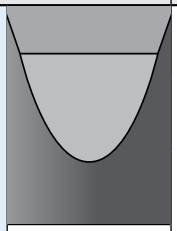
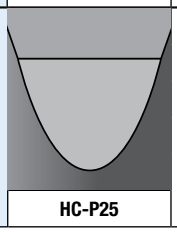
Grades and Grade Descriptions



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Grade

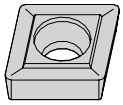
Coating	Grade Description		05	10	15	20	25	30	35	40	45
			wear resistance ←							→ toughness	
WU10PT  HC-P10	The WU10PT grade is ideal for finishing to general machining of most workpiece materials at higher speeds. Excellent for machining most steels, stainless steels, cast irons, and super alloys under stable conditions.	P									
		M									
		K									
		S									
		H									
WU25PT  HC-P25	An advanced PVD-Al TiN-coated grade with a tough, ultra-fine-grain, unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium alloys, and cast irons.	P									
		M									
		K									
		S									

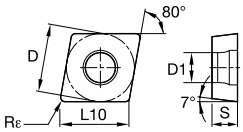


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CCMT • Medium Machining





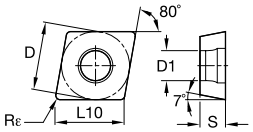
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●			●			●	●
M					○	●	●	●					●	●		○					●			●	●
K		○	○	○					●	●	●	○	○		○		●				○			○	○
N												○	○	●	●		○				○			○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CCMT060202	CCMT21505	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2031658	-	-	-	-
CCMT060204	CCMT2151	6,35	1/4	6,45	.254	2,38	3/32	0,4	1/64	2,80	.110	-	-	-	-	-	-	-	-	6671876	-	-	-	-	-	-	2031666	2031668	-	-	-
CCMT090304	CCMT321	9,53	3/8	9,67	.381	3,18	1/8	0,4	1/64	4,40	.173	-	-	-	6128252	-	-	-	-	6671877	-	-	-	-	-	-	2031693	2031695	-	-	-
CCMT090308	CCMT322	9,53	3/8	9,67	.381	3,18	1/8	0,8	1/32	4,40	.173	-	-	-	6128253	-	-	-	-	-	-	-	-	-	-	-	2031706	2027339	-	-	-
CCMT09T304	CCMT3251	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	6613610	-	-	-	-	-	-	2031723	-	-	-	-
CCMT09T308	CCMT09T308	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2599478	-	-	-	-
CCMT09T308	CCMT3252	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	6613604	-	-	-	-	-	-	2027432	-	-	-	-
CCMT120408	CCMT432	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,50	.217	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027472	-	-	-	-

CCMT-FP • Finishing Positive





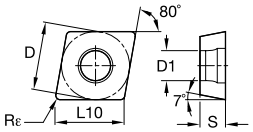
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CCMT060202FP	CCMT21505FP	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	-	4169857	4170140	-	-	4168778	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCMT060204FP	CCMT2151FP	6,35	1/4	6,45	.254	2,38	3/32	0,4	1/64	2,80	.110	-	4169858	4170141	-	4168738	4168779	-	-	-	4170032	5684337	5684340	-	-	6208108	-	-	-	-	-
CCMT060208FP	CCMT2152FP	6,35	1/4	6,45	.254	2,38	3/32	0,8	1/32	2,80	.110	-	-	4170142	-	-	4168780	-	-	-	-	5684342	5684344	-	-	-	-	-	-	-	-
CCMT09T302FP	CCMT32505FP	9,53	3/8	9,67	.381	3,97	5/32	0,2	.008	4,40	.173	-	-	4170293	-	-	4168781	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCMT09T304FP	CCMT3251FP	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,40	.173	-	4169860	4170294	-	-	4168782	-	-	-	4170084	5684341	5684343	-	-	-	-	-	-	-	-
CCMT09T308FP	CCMT3252FP	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	-	4169861	4170295	-	4168741	4168783	-	-	-	4170085	-	5684338	-	-	-	-	-	-	-	-
CCMT120404FP	CCMT431FP	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,50	.217	-	-	4170296	-	-	4168784	-	-	-	4170086	-	-	-	-	-	-	-	-	-	-
CCMT120408FP	CCMT432FP	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,50	.217	-	4169993	4170297	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CCMT-MP • Medium Positive





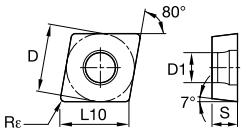
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●	●
M					○	●	●	●					●	●		○						●	●	●
K		○	○	○					●	●	●	○	○		○		●						○	○
N												○	○	●	●		○						○	○
S							○					●	●		○		○		○	●	●		●	●
H																							○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CCMT060204MP	CCMT2151MP	6,35	1/4	6,45	.254	2,38	3/32	0,4	1/64	2,80	.110	-	4170197	4170217	-	-	4168906	-	-	-	4170237	5684351	-	-	-	6208252	-	-	-	-	-
CCMT09T304MP	CCMT3251MP	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,40	.173	-	4170198	4170218	-	-	4168907	-	-	-	4170238	5684352	-	-	-	-	-	-	-	-	-
CCMT09T308MP	CCMT3252MP	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	-	4170199	4170219	-	-	4168908	-	-	-	4170239	5684350	-	-	-	-	-	-	-	-	-
CCMT09T312MP	CCMT3253MP	9,53	3/8	9,67	.381	3,97	5/32	1,2	3/64	4,40	.173	-	-	4170220	-	-	4168909	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCMT120408MP	CCMT432MP	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,50	.217	-	4170200	4170221	-	-	4168910	-	-	6730909	4170240	5684349	-	-	-	-	-	-	-	-	-
CCMT120412MP	CCMT433MP	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,50	.217	-	-	4170222	-	-	4168911	-	-	6730910	4170241	-	-	-	-	-	-	-	-	-	-

CCMT-MU • Medium Universal



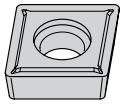


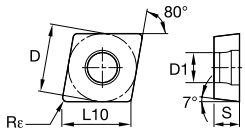
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○	○		○	●		●			●	●
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K		○	○	○					●	●	●	○	○			○		●				○	○
N												○	○	●	●		○						○	○
S							○					●	●			○		○		○	●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CCMT060208MU	CCMT2152MU	6,35	1/4	6,45	.254	2,38	3/32	0,8	1/32	2,80	.110	-	-	-	-	-	5623159	-	-	-	5623158	-	-	-	-	-	-	-	-	6942279	6868872
CCMT090304MU	CCMT321MU	9,53	3/8	9,67	.381	3,18	1/8	0,4	1/64	4,40	.173	-	-	5623420	-	-	5623421	-	-	-	6208257	-	-	-	-	-	-	-	-	-	-
CCMT090308MU	CCMT322MU	9,53	3/8	9,67	.381	3,18	1/8	0,8	.315	4,40	.173	-	5623425	5623424	-	-	5623423	-	-	-	6208258	-	-	-	-	-	-	-	-	-	-
CCMT09T3041P	CCMT32511P	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6869663	-
CCMT09T304MU	CCMT3251MU	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,40	.173	-	5623431	5623430	-	-	5623427	-	5623429	-	5623432	5623428	5623426	-	-	-	-	-	-	6942280	6868873
CCMT09T3081P	CCMT32521P	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6869664	-
CCMT09T308MU	CCMT3252MU	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	-	5623434	5623436	5623439	-	5623435	-	-	-	5623433	5623438	5623437	-	-	-	-	-	-	6942341	6868874
CCMT120404MU	CCMT431MU	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,50	.217	-	6128256	-	-	-	6128254	-	-	-	-	6128258	-	-	-	-	-	-	-	-	-	-
CCMT120408MU	CCMT432MU	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,50	.217	-	5623440	5623443	-	-	5623442	-	-	-	5623441	-	5623444	-	-	-	-	-	-	-	-	-

CCMT-1P • Finishing



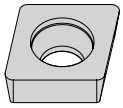


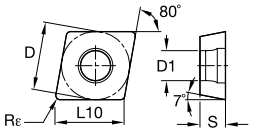
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CCMT0602041P	CCMT21511P	6,35	1/4	6,45	.254	2,38	3/32	0,4	1/64	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6869661	6868825
CCMT0602081P	CCMT21521P	6,35	1/4	6,45	.254	2,38	3/32	0,8	1/32	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6869662	6868826
CCMT09T3041P	CCMT32511P	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6868827
CCMT09T3081P	CCMT32521P	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6868828	

CCMW • Medium Machining



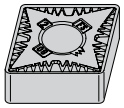


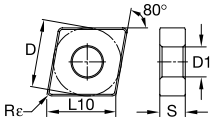
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●			●		●	●
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N												○	○	●	●		○				○	○
S							○					●	●		○		○		○	●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CCMW060202	CCMW21505	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2031733	-	-	-	-
CCMW060204	CCMW060204	6,35	1/4	6,45	.236	2,38	3/32	0,4	1/64	2,84	.112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2564221	-	-	-	-
CCMW060204	CCMW2151	6,35	1/4	6,45	.236	2,38	3/32	0,4	1/64	2,84	.112	-	-	-	-	-	-	-	-	-	4170368	-	-	-	-	-	2027507	-	-	-	-
CCMW090302	CCMW3205	9,53	3/8	9,67	.381	3,18	1/8	0,2	.00787	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2031734	-	-	-	-
CCMW090304	CCMW321	9,53	3/8	9,67	.381	3,18	1/8	0,4	1/64	4,45	.175	-	-	-	-	-	-	-	-	-	4170369	-	-	-	-	-	2027509	-	-	-	-
CCMW090308	CCMW090308	9,53	3/8	9,67	.381	3,18	1/8	0,8	1/32	4,45	.175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2564202	-	-	-	-
CCMW090308	CCMW322	9,53	3/8	9,67	.381	3,18	1/8	0,8	1/32	4,45	.175	-	-	-	-	-	-	-	4170466	-	4170370	-	-	-	-	-	-	-	-	-	-
CCMW09T304	CCMW3251	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,45	.175	-	-	-	-	-	-	-	4170467	-	4170371	-	-	-	-	-	2027511	-	-	-	-
CCMW09T308	CCMW3252	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027512	-	-	-	-
CCMW120404	CCMW431	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,50	.217	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027524	-	-	-	-
CCMW120408	CCMW120408	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,50	.217	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2564195	-	-	-	-
CCMW120408	CCMW432	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,50	.217	-	-	-	-	-	-	-	-	-	4170374	-	-	-	-	-	2027525	-	-	-	-

CNGG-FS • Finishing Sharp



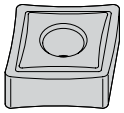


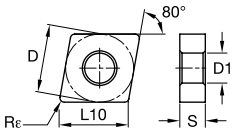
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNGG120401FS	CNGG430FS	12,70	1/2	12,90	.508	4,76	3/16	0,1	.004	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548576	-	-	-	-	-	-	-	-	-
CNGG120402FS	CNGG4305FS	12,70	1/2	12,90	.508	4,76	3/16	0,2	.008	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548575	-	-	-	-	-	-	-	-	-
CNGG120404FS	CNGG431FS	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548577	5538204	5549945	-	-	-	-	-	-	-
CNGG120408FS	CNGG432FS	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548578	5538205	5549946	-	-	-	-	-	-	-
CNGG120412FS	CNGG433FS	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548579	-	-	-	-	-	-	-	-	-

CNGP • Medium Machining



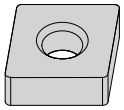


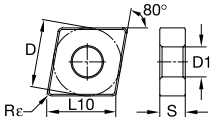
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNGP120401	CNGP430	12,70	1/2	12,90	.508	4,76	3/16	0,1	.004	5,16	.203	-	-	-	-	-	-	-	-	-	-	5549137	-	-	-	-	-	-	-	-	-
CNGP120402	CNGP4305	12,70	1/2	12,90	.508	4,76	3/16	0,2	.008	5,16	.203	-	-	-	-	-	-	-	-	-	-	5549138	-	5549206	-	-	-	-	-	-	-
CNGP120404	CNGP431	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5549139	-	5549207	-	-	-	-	-	-	-
CNGP120408	CNGP432	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5549190	-	5549208	-	-	-	-	-	-	-

CNMA • Roughing





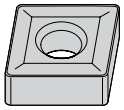
● first choice
○ alternate choice

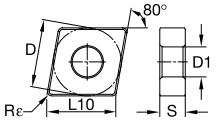
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
CNMA120404	CNMA431	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203
CNMA120408	CNMA432	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203
CNMA120412	CNMA433	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203
CNMA120416	CNMA434	12,70	1/2	12,90	.508	4,76	3/16	1,6	1/16	5,16	.203
CNMA160612	CNMA543	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250
CNMA160616	CNMA544	15,88	5/8	16,12	.635	6,35	1/4	1,6	1/16	6,35	.250
CNMA190608	CNMA642	19,05	3/4	19,34	.762	6,35	1/4	0,8	1/32	7,93	.313
CNMA190612	CNMA643	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313
CNMA190616	CNMA644	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313

	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMA120404	-	-	-	-	-	-	-	4171595	-	4171863	-	-	-	-	-	-	-	-	-	-
CNMA120408	-	-	-	-	-	-	-	4171596	6287922	4171864	-	-	-	-	-	-	-	-	-	-
CNMA120412	-	-	-	-	-	-	-	4171597	6287923	4171865	-	-	-	-	-	-	-	-	-	-
CNMA120416	-	-	-	-	-	-	-	4171598	-	4171866	-	-	-	-	-	-	-	-	-	-
CNMA160612	-	-	-	-	-	-	-	4171599	-	4171868	-	-	-	-	-	-	-	-	-	-
CNMA160616	-	-	-	-	-	-	-	-	-	4171869	-	-	-	-	-	-	-	-	-	-
CNMA190608	-	-	-	-	-	-	-	-	-	4171870	-	-	-	-	-	-	-	-	-	-
CNMA190612	-	-	-	-	-	-	-	4171602	-	4171871	-	-	-	-	-	-	-	-	-	-
CNMA190616	-	-	-	-	-	-	-	-	-	4171872	-	-	-	-	-	-	-	-	-	-

CNMG • Roughing



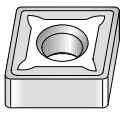


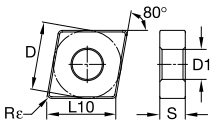
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMG120404	CNMG431	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	6613606	-	-	-	-	-	-	2559561	-	-	-	-
CNMG120408	CNMG432	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027567	-	-	-	-
CNMG190612	CNMG643	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2559382	-	-	-	-

CNMG-5 • Roughing



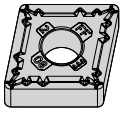


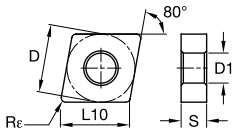
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMG120408-5	CNMG4325	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	6287924	-	-	-	-	-	-	-	-	-	-	-
CNMG120412-5	CNMG4335	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	6287925	-	-	-	-	-	-	-	-	-	-	-

CNMG-FF • Fine Finishing



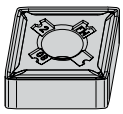


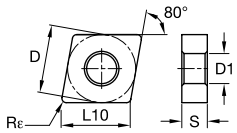
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●				●	●		○						●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○	●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMG120404FF	CNMG431FF	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	4171025	-	-	-	4172345	-	-	-	4171318	-	-	-	-	-	-	-	-	-	-
CNMG120408FF	CNMG432FF	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	4171026	-	-	-	4172346	-	-	-	4171319	-	-	-	-	-	-	-	-	-	-
CNMG120412FF	CNMG433FF	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	4171027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CNMG-FW • Finishing Wiper



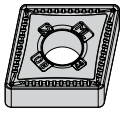


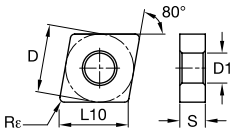
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●				●	●		○						●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○	●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMG120408FW	CNMG432FW	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	4173103	-	4171681	-	-	-	-	-	-	-	-	-	-	-	-

CNMG-ML • Medium Machining



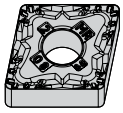


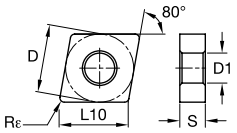
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMG120404ML	**CNMG431ML**	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	4171059	4170458	-	-	-	-	-	-	4171390	-	-	-	-	-	-	-	-	-	-
CNMG120408ML	**CNMG432ML**	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	4171060	4170459	-	-	-	-	4171658	-	4171391	-	-	-	-	-	-	-	-	-	-
CNMG120412ML	**CNMG433ML**	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	-	4170460	-	-	-	-	-	-	4171392	-	-	-	-	-	-	-	-	-	-

CNMG-MR • Medium Roughing



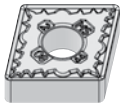


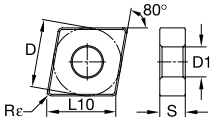
● first choice
○ alternate choice

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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMG120404MR	CNMG431MR	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	4171130	4170546	4170043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG120408MR	CNMG432MR	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	4171131	4170547	4170044	-	4172955	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG120412MR	CNMG433MR	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	4171132	4170548	4170045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG120416MR	CNMG434MR	12,70	1/2	12,90	.508	4,76	3/16	1,6	1/16	5,16	.203	-	-	5684353	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG160608MR	CNMG542MR	15,88	5/8	16,12	.635	6,35	1/4	0,8	1/32	6,35	.250	-	4171134	4170549	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG160612MR	CNMG543MR	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250	-	4171135	4170550	4170046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG160616MR	CNMG544MR	15,88	5/8	16,12	.635	6,35	1/4	1,6	1/16	6,35	.250	-	4171136	4170551	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG190612MR	CNMG643MR	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	-	4171137	4170552	-	-	4172961	4173136	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG190616MR	CNMG644MR	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313	-	4171138	4170563	-	-	4172962	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CNMG-MS • Medium Sharp



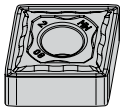


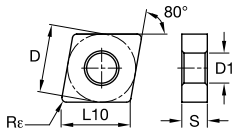
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in										
CNMG120404MS	CNMG431MS	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5908742	5908743	5908744	-	-	-	-	-	-	-
CNMG120408MS	CNMG432MS	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5908745	5908746	5908747	-	-	-	-	-	-	-
CNMG120412MS	CNMG433MS	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5908748	5908749	-	-	-	-	-	-	-	-
CNMG120416MS	CNMG434MS	12,70	1/2	12,90	.508	4,76	3/16	1,6	1/16	5,16	.203	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5908751	-	-	-	-	-	-	-	-	-
CNMG160608MS	CNMG542MS	15,88	5/8	16,12	.635	6,35	1/4	0,8	1/32	6,35	.250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5908754	5908755	5908756	-	-	-	-	-	-	-
CNMG160612MS	CNMG543MS	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5908757	5908758	5908759	-	-	-	-	-	-	-
CNMG190608MS	CNMG642MS	19,05	3/4	19,34	.762	6,35	1/4	0,8	1/32	7,93	.313	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5908760	5908761	5908762	-	-	-	-	-	-	-
CNMG190612MS	CNMG643MS	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5908763	5908764	-	-	-	-	-	-	-	-
CNMG190616MS	CNMG644MS	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,92	.312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5908766	5908767	-	-	-	-	-	-	-	-

CNMG-MW • Medium Wiper



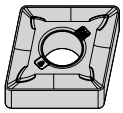


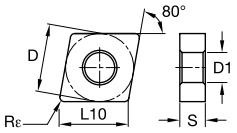
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in																		
CNMG120408MW	CNMG432MW	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	4173112	-	4171682	-	-	-	-	-	-	-	-	-	-
CNMG120412MW	CNMG433MW	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	4173113	-	4171684	-	-	-	-	-	-	-	-	-	-

CNMG-RH • Roughing





● first choice
○ alternate choice

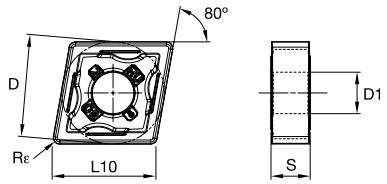
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
CNMG120408RH	CNMG432RH	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203
CNMG120412RH	CNMG433RH	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203
CNMG120416RH	CNMG434RH	12,70	1/2	12,90	.508	4,76	3/16	1,6	1/16	5,16	.203
CNMG160608RH	CNMG542RH	15,88	5/8	16,12	.635	6,35	1/4	0,8	1/32	6,35	.250
CNMG160612RH	CNMG543RH	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250
CNMG160616RH	CNMG544RH	15,88	5/8	16,12	.635	6,35	1/4	1,6	1/16	6,35	.250
CNMG190608RH	CNMG642RH	19,05	3/4	19,34	.762	6,35	1/4	0,8	1/32	7,93	.313
CNMG190612RH	CNMG643RH	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313
CNMG190616RH	CNMG644RH	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313
CNMG190624RH	CNMG646RH	19,05	3/4	19,34	.762	6,35	1/4	2,4	3/32	7,93	.313

WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
-	4170979	4171504	5684356	-	4173035	-	-	6288264	4171903	-	-	-	-	-	-	-	-	-	-
-	4170980	4171505	4171698	-	4173036	-	-	6288265	4171904	-	-	-	-	-	-	-	-	-	-
-	4170981	4171506	4171699	-	-	-	-	-	4171905	-	-	-	-	-	-	-	-	-	-
-	4170982	4171507	4171700	-	4173038	-	-	-	4171906	-	-	-	-	-	-	-	-	-	-
-	4170983	4171508	4171701	-	-	-	-	-	4171907	-	-	-	-	-	-	-	-	-	-
-	4170984	4171509	4171702	-	-	-	-	-	4171908	-	-	-	-	-	-	-	-	-	-
-	4170985	4171510	4171703	-	4173041	-	-	-	4171909	-	-	-	-	-	-	-	-	-	-
-	4170986	4171511	4171704	-	4173042	-	-	-	4171910	-	-	-	-	-	-	-	-	-	-
-	4170987	4171512	4171705	-	4173043	-	-	-	4171911	-	-	-	-	-	-	-	-	-	-
-	-	4171523	4171706	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CNMG-RU • Roughing Universal



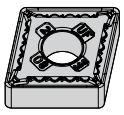


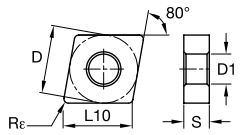
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMG120408RU	CNMG432RU	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	6690250	6690247	-	6817522	6817756	-	-	6678403	6690253	-	-	-	-	-	-	-	-	-	6795793
CNMG120412RU	CNMG433RU	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	6690251	6690248	-	6817523	6817757	-	-	6678404	6690254	-	-	-	-	-	-	-	-	-	6795794

CNMG-UF • Fine Finishing



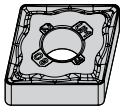


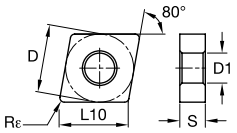
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMG120404UF	CNMG431UF	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	4169353	4169379	-	-	-	-	5645600	-	-	-	-	-	-	-	-	-
CNMG120408UF	CNMG432UF	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	4169354	4169380	-	-	-	-	5645588	-	-	-	-	-	-	-	-	-
CNMG120412UF	CNMG433UF	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	4169355	4169381	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CNMG-UM • Medium Machining





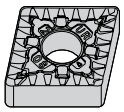
● first choice
○ alternate choice

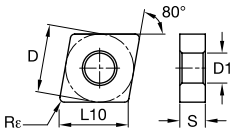
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
CNMG120404UM	CNMG431UM	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203
CNMG120408UM	CNMG432UM	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203
CNMG120412UM	CNMG433UM	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203

	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMG120404UM	-	-	-	-	-	4172380	4172410	-	-	-	5645217	-	-	-	-	-	-	-	-	-
CNMG120408UM	6496789	-	5645219	-	4172335	4172381	4172411	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG120412UM	6496790	-	-	-	-	4172382	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CNMG-UR • Universal Roughing



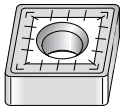


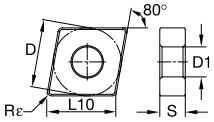
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in											
CNMG120404UR	CNMG431UR	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	-	4170500	-	4169406	4169444	4169479	-	-	5578894	5578895	-	-	-	-	-	-	-	6942344	6867867
CNMG120408UR	CNMG432UR	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	4171093	4170501	4169960	4169407	4169445	4169480	5680086	-	5680085	5301402	-	-	-	-	-	-	-	6795798	6794449
CNMG120412UR	CNMG433UR	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	4171094	4170502	4169961	4169408	4169446	4169481	-	-	4171419	5301413	5301416	-	-	-	-	-	-	6942343	6790714
CNMG120416UR	CNMG434UR	12,70	1/2	12,90	.508	4,76	3/16	1,6	1/16	5,16	.203	-	-	4170503	-	-	4169447	4169482	-	-	4171420	5680089	-	-	-	-	-	-	-	-	-
CNMG160608UR	CNMG542UR	15,88	5/8	16,12	.635	6,35	1/4	0,8	1/32	6,35	.250	-	4171096	4170504	-	4169410	4169448	4169483	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMG160612UR	CNMG543UR	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250	-	4171097	4170505	4169962	4169411	4169449	4169484	-	-	4171422	5578898	-	-	-	-	-	-	-	-	-
CNMG160616UR	CNMG544UR	15,88	5/8	16,12	.635	6,35	1/4	1,6	1/16	6,35	.250	-	4171098	4170506	-	-	4169450	4169485	-	-	4171423	5578900	5578901	-	-	-	-	-	-	-	-
CNMG190612UR	CNMG643UR	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	-	4171099	4170507	4169964	4169412	4169451	4169486	5680088	-	4171424	-	5512536	-	-	-	-	-	-	-	-
CNMG190616UR	CNMG644UR	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313	-	-	4170508	-	4169423	4169452	4169487	-	-	-	-	5579234	-	-	-	-	-	-	-	-

CNMM-8 • Heavy Roughing



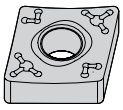


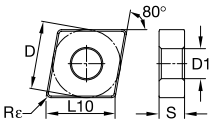
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMM1906168	CNMM6448	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313	-	-	5418451	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CNMM-65 • Heavy Roughing



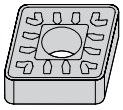


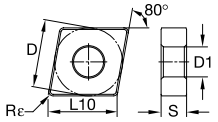
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CNMM12040865	CNMM43265	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	5698348	5698349	5698360	-	5698347	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMM12041265	CNMM43365	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	5698362	5698363	-	-	5698361	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMM16060865	CNMM54265	15,88	5/8	16,12	.635	6,35	1/4	0,8	1/32	6,35	.250	-	-	5698366	5698367	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMM16061265	CNMM54365	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250	-	-	5698370	5698371	-	5698368	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMM16061665	CNMM54465	15,88	5/8	16,12	.635	6,35	1/4	1,6	1/16	6,35	.250	-	5698372	5698373	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMM19061265	CNMM64365	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	-	-	5491016	5698376	-	5698374	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMM19061665	CNMM64465	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313	-	5698378	-	-	-	5698377	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMM19062465	CNMM64665	19,05	3/4	19,34	.762	6,35	1/4	2,4	3/32	7,93	.313	-	5698410	5698411	-	-	5698379	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CNMM-SR • Heavy Roughing

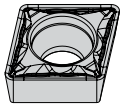


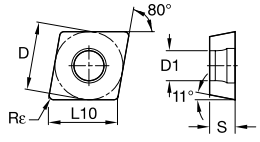


● first choice
○ alternate choice

| | | |

CPMT-FP • Finishing Positive



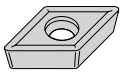


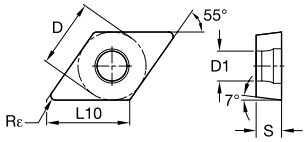
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
CPMT060204FP	CPMT2151FP	6,35	1/4	6,45	.254	2,38	3/32	0,4	1/64	2,80	.110	-	4170016	4170326	-	-	4168823	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPMT09T308FP	CPMT3252FP	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	-	4170019	4170329	-	-	-	-	-	-	4170108	-	-	-	-	-	-	-	-	-	-

DCMT • Medium Machining



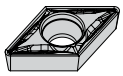


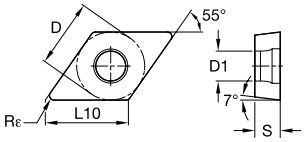
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○					●		●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○	●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DCMT070204	DCMT2151	6,35	1/4	7,75	.305	2,38	3/32	0,4	1/64	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027768	-	-	-	-
DCMT11T304	DCMT11T304	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2563573	-	-	-	-
DCMT11T304	DCMT3251	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027805	2027807	-	-	-
DCMT11T308	DCMT11T308	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,45	.175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2563479	-	-	-	-
DCMT11T308	DCMT3252	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,45	.175	-	-	-	-	-	-	-	-	6671913	-	-	-	-	-	-	2027843	-	-	-	-
DCMT11T312	DCMT3253	9,53	3/8	11,63	.458	3,97	5/32	1,2	3/64	4,45	.175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027868	-	-	-	-
DCMT150408	DCMT432	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,55	.218	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027908	2027910	-	-	-
DCMT150412	DCMT433	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,55	.218	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027932	-	-	-	-

DCMT-FP • Finishing Positive





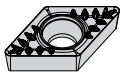
● first choice
○ alternate choice

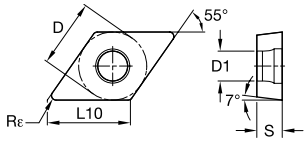
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
DCMT070202FP	DCMT21505FP	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,80	.110
DCMT070204FP	DCMT2151FP	6,35	1/4	7,75	.305	2,38	3/32	0,4	1/64	2,80	.110
DCMT070208FP	DCMT2152FP	6,35	1/4	7,75	.305	2,38	3/32	0,8	1/32	2,80	.110
DCMT11T302FP	DCMT32505FP	9,53	3/8	11,63	.458	3,97	5/32	0,2	.008	4,40	.173
DCMT11T304FP	DCMT3251FP	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173
DCMT11T308FP	DCMT3252FP	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173
DCMT150404FP	DCMT431FP	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,50	.217
DCMT150408FP	DCMT432FP	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,50	.217

ISO catalog number	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DCMT070202FP	-	-	4170299	-	-	4168787	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT070204FP	-	4169995	4170300	-	-	4168788	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT070208FP	-	-	4170301	-	-	4168789	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT11T302FP	-	4169996	4170302	-	-	4168790	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT11T304FP	-	4169997	4170303	-	4168765	4168791	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT11T308FP	-	4169998	4170304	-	-	4168792	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT150404FP	-	4170000	4170306	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT150408FP	-	4170001	4170307	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DCMT-MP • Medium Positive



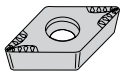


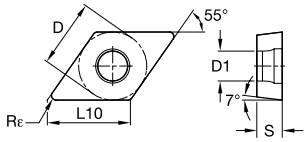
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DCMT11T304MP	DCMT3251MP	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	-	4170201	4170223	-	-	-	-	-	-	4170242	-	-	-	-	6208110	-	-	-	-	-
DCMT11T308MP	DCMT3252MP	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173	-	4170202	4170224	-	-	4168912	-	-	-	4170243	-	-	-	-	-	-	-	-	-	-
DCMT11T312MP	DCMT3253MP	9,53	3/8	11,63	.458	3,97	5/32	1,2	3/64	4,40	.173	-	4170213	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DCMT-MU • Medium Universal





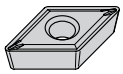
● first choice
○ alternate choice

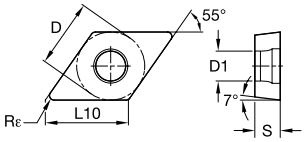
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
DCMT070204MU	DCMT2151MU	6,35	1/4	7,75	.305	2,38	3/32	0,4	1/64	2,80	.110
DCMT070208MU	DCMT2152MU	6,35	1/4	7,75	.305	2,38	3/32	0,8	1/32	3,75	.148
DCMT11T308MU	DCMT3252MU	9,52	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173
DCMT11T304MU	DCMT3251MU	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173
DCMT150404MU	DCMT431MU	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,50	.217
DCMT150408MU	DCMT432MU	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,50	.217
DCMT150412MU	DCMT433MU	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,55	.214

ISO catalog number	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DCMT070204MU	-	6128273	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6942342	6868876
DCMT070208MU	-	-	-	-	-	6128276	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT11T308MU	-	5623600	-	-	-	5623588	-	-	-	5623589	5623601	5623603	-	-	-	-	-	-	6869665	6868877
DCMT11T304MU	-	5623585	5623583	-	-	5623581	-	-	-	5623587	5623582	5623584	-	-	-	-	-	-	6869677	6863460
DCMT150404MU	-	-	-	-	-	6128281	-	-	-	-	6128282	-	-	-	-	-	-	-	-	-
DCMT150408MU	-	5623606	5623608	-	-	5623604	-	-	-	5623607	5623609	5623610	-	-	-	-	-	-	-	-
DCMT150412MU	-	-	-	-	-	-	-	-	-	5623612	-	-	-	-	-	-	-	-	-	-

DCMT-1P • Finishing



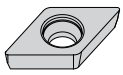


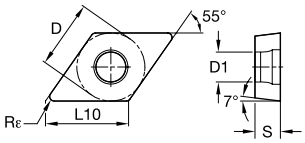
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DCMT11T3041P	DCMT32511P	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6868829
DCMT11T3081P	DCMT32521P	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6868830

DCMW • Medium Machining





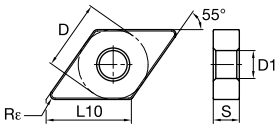
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DCMW070204	DCMW2151	6,35	1/4	7,75	.305	2,38	3/32	0,4	1/64	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027966	-	-	-	-
DCMW11T304	DCMW3251	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2027967	-	-	-	-
DCMW150408	DCMW432	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,50	.217	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2031737	-	-	-	-

DNGG-FS • Finishing Sharp



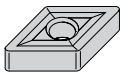


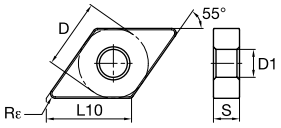
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNGG110402FS	DNGG3305FS	9,53	3/8	11,63	.458	4,76	3/16	0,2	.008	3,81	.150	-	-	-	-	-	-	-	-	-	-	5548670	-	-	-	-	-	-	-	-	-
DNGG110404FS	DNGG331FS	9,53	3/8	11,63	.458	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	-	-	-	-	-	5548671	-	5549948	-	-	-	-	-	-	-
DNGG110408FS	DNGG332FS	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	-	-	5548672	-	5549949	-	-	-	-	-	-	-
DNGG150401FS	DNGG430FS	12,70	1/2	15,50	.610	4,76	3/16	0,1	.004	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548674	-	-	-	-	-	-	-	-	-
DNGG150402FS	DNGG4305FS	12,70	1/2	15,50	.610	4,76	3/16	0,2	.008	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548673	-	-	-	-	-	-	-	-	-
DNGG150404FS	DNGG431FS	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548675	-	5549992	-	-	-	-	-	-	-
DNGG150408FS	DNGG432FS	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	-	-	5549993	-	-	-	-	-	-	-
DNGG150412FS	DNGG433FS	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548677	-	5549994	-	-	-	-	-	-	-
DNGG150604FS	DNGG441FS	12,70	1/2	15,50	.610	6,35	1/2	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548678	5538209	5549995	-	-	-	-	-	-	-
DNGG150608FS	DNGG442FS	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548679	5538230	5549996	-	-	-	-	-	-	-

DNGP • Medium Machining





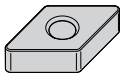
● first choice
○ alternate choice

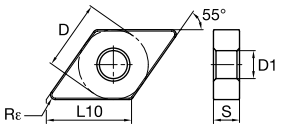
P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○				●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNGP150404	DNGP431	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5549193	-	-	-	-	-	-	-	-	-

NOTE: Single sided

DNMA • Roughing



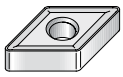


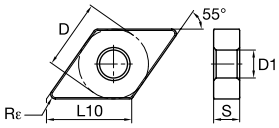
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○				●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMA110408	DNMA332	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	-	4171873	-	-	-	-	-	-	-	-	-	-
DNMA150408	DNMA432	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	4171635	-	4171875	-	-	-	-	-	-	-	-	-	-
DNMA150412	DNMA433	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	4171636	-	4171876	-	-	-	-	-	-	-	-	-	-
DNMA150608	DNMA442	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	4171637	-	4171878	-	-	-	-	-	-	-	-	-	-
DNMA150612	DNMA443	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	4171638	-	4171879	-	-	-	-	-	-	-	-	-	-
DNMA150616	DNMA444	12,70	1/2	15,50	.610	6,35	1/4	1,6	1/16	5,16	.203	-	-	-	-	-	-	-	-	-	4171880	-	-	-	-	-	-	-	-	-	-

DNMG • Roughing



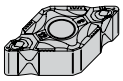


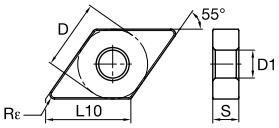
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																					○

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMG150608	DNMG442	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	6671912	-	-	-	-	-	-	-	-	-	-	-

DNMG-CT



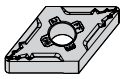


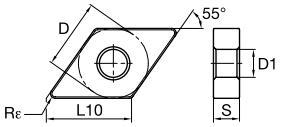
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																					○

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMG150608CT	DNMG442CT	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	-	-	-	-	4172700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DNMG-FF • Fine Finishing





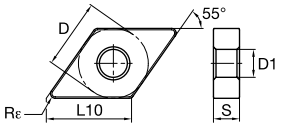
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●			●	●	●	●	●	●	●	●	●	●
M					○	●	●	●					●	●		○				●				●	●	●	●	●	●	●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○	○	○	○	○	○	○	○	○	○	○	○
N														○	○	●	●		○													
S							○					●	●		○				●			○	○	○	○	○	○	○	○	○	○	○
H																															

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
		mm	in	mm	in	mm	in	mm	in	mm	in																				
DNMG110404FF	DNMG331FF	9,53	3/8	11,63	.458	4,76	3/16	0,4	1/64	3,81	.150	-	4171028	-	-	-	-	-	-	-	4171321	-	-	-	-	-	-	-	-	-	-
DNMG110408FF	DNMG332FF	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	-	4171029	-	-	-	-	-	-	-	4171322	-	-	-	-	-	-	-	-	-	-
DNMG150404FF	DNMG431FF	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	4171030	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150408FF	DNMG432FF	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	4171031	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150604FF	DNMG441FF	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	-	4171032	-	-	-	-	-	-	-	4171375	-	-	-	-	-	-	-	-	-	-
DNMG150608FF	DNMG442FF	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	4171043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150612FF	DNMG443FF	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	4171044	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DNMG-ML • Medium Machining





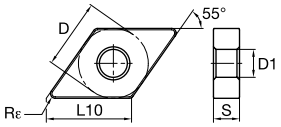
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●	●
M					○	●	●	●						●	●		○				●	●	●
K		○	○	○					●	●	●	○	○			○		●				○	○
N												○	○	●	●		○					○	○
S							○					●	●			○		○		○	●	●	
H																						○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMG110404ML	**DNMG331ML**	9,53	3/8	11,63	.458	4,76	3/16	0,4	1/64	3,81	.150	-	4171062	4170461	-	-	-	-	4171660	-	4171394	-	-	-	-	-	-	-	-	-	-
DNMG110408ML	**DNMG332ML**	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	-	4171063	4170462	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG110412ML	**DNMG333ML**	9,53	3/8	11,63	.458	4,76	3/16	1,2	3/64	3,81	.150	-	4171064	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150404ML	**DNMG431ML**	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	4171065	4170483	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150408ML	**DNMG432ML**	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	4171066	4170484	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150412ML	**DNMG433ML**	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	-	4171067	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150604ML	**DNMG441ML**	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	-	4171068	4170485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150608ML	**DNMG442ML**	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	4171069	4170486	-	-	-	-	-	-	4171400	-	-	-	-	-	-	-	-	-	-
DNMG150612ML	**DNMG443ML**	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	4171070	4170487	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DNMG-MR • Medium Roughing



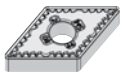


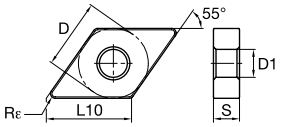
● first choice
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMG110408MR	DNMG332MR	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	-	4171139	4170564	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150404MR	DNMG431MR	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	4171140	4170565	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150408MR	DNMG432MR	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	4171141	4170566	4170052	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150412MR	DNMG433MR	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	-	4171142	4170567	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150604MR	DNMG441MR	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	-	4171143	4170568	4170054	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150608MR	DNMG442MR	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	4171144	4170569	4170055	-	4173023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150612MR	DNMG443MR	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	4171145	4170570	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DNMG-MS • Medium Sharp



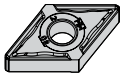


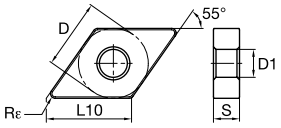
● first choice
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMG110408MS	DNMG332MS	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	-	-	5908769	5908770	5908781	-	-	-	-	-	-	-
DNMG150404MS	DNMG431MS	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908782	5908783	-	-	-	-	-	-	-	-
DNMG150408MS	DNMG432MS	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908785	5908787	-	-	-	-	-	-	-	-
DNMG150412MS	DNMG433MS	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908789	5908790	-	-	-	-	-	-	-	-
DNMG150604MS	DNMG441MS	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908792	5908793	5908794	-	-	-	-	-	-	-
DNMG150608MS	DNMG442MS	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908795	5908796	5908797	-	-	-	-	-	-	-
DNMG150612MS	DNMG443MS	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908798	5908799	5908800	-	-	-	-	-	-	-

DNMG-MW • Medium Wiper



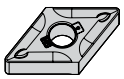


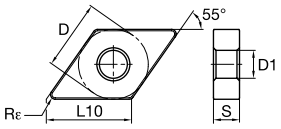
● first choice
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMG150408MW	DNMG432MW	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	4173114	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150608MW	DNMG442MW	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	4171691	-	-	-	-	-	-	-	-	-	-	-	-

DNMG-RH • Roughing





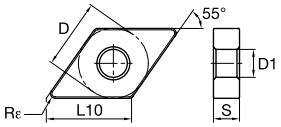
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMG150408RH	DNMG432RH	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	-	4171524	4171707	-	-	-	-	-	4171912	-	-	-	-	-	-	-	-	-	-
DNMG150608RH	DNMG442RH	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	4170991	4171526	4171709	-	-	-	-	6730880	4171914	-	-	-	-	-	-	-	-	-	-
DNMG150612RH	DNMG443RH	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	4170992	4171527	4171710	-	-	-	-	6730901	4171915	-	-	-	-	-	-	-	-	-	-
DNMG150616RH	DNMG444RH	12,70	1/2	15,50	.610	6,35	1/4	1,6	1/16	5,16	.203	-	-	4171528	4171711	-	-	-	-	-	4171916	-	-	-	-	-	-	-	-	-	-
DNMG190612RH	DNMG543RH	15,88	5/8	19,38	.763	6,35	1/4	1,2	3/64	6,35	.250	-	4170994	4171529	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DNMG-UF • Fine Finishing





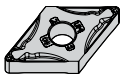
● first choice
○ alternate choice

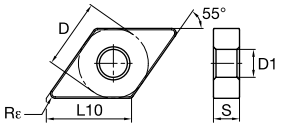
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
DNMG110404UF	DNMG331UF	9,53	3/8	11,63	.458	4,76	3/16	0,4	1/64	3,81	.150
DNMG110408UF	DNMG332UF	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150
DNMG150404UF	DNMG431UF	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203
DNMG150408UF	DNMG432UF	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203
DNMG150604UF	DNMG441UF	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203
DNMG150608UF	DNMG442UF	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203
DNMG150612UF	DNMG443UF	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203

	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMG110404UF	-	-	-	-	4169356	4169382	-	-	-	-	5645603	-	-	-	-	-	-	-	-	-
DNMG110408UF	-	-	-	-	4169357	4169383	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150404UF	-	-	-	-	4169358	4169384	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150408UF	-	-	-	-	4169359	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150604UF	-	-	-	-	4169361	4169387	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150608UF	-	-	-	-	4169362	4169388	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150612UF	-	-	-	-	4169363	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DNMG-UM • Medium Machining





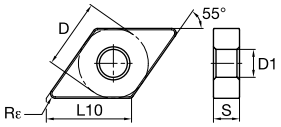
● first choice
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMG110404UM	DNMG331UM	9,53	3/8	11,63	.458	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	4172383	4172413	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG110408UM	DNMG332UM	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	4172338	4172384	4172414	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150404UM	DNMG431UM	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	4172386	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150408UM	DNMG432UM	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	4172341	4172387	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150604UM	DNMG441UM	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	-	-	-	-	-	4172389	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150608UM	DNMG442UM	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	-	-	-	4172364	4172390	4172420	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150612UM	DNMG443UM	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	-	-	-	-	4172391	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150616UM	DNMG444UM	12,70	1/2	15,50	.610	6,35	1/4	1,6	1/16	5,16	.203	-	-	-	-	-	4172392	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DNMG-UR • Universal Roughing



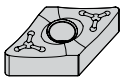


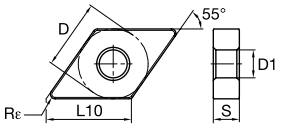
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in											
DNMG110408UR	DNMG332UR	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	-	4171101	4170509	-	4169424	4169453	4169488	-	-	-	-	-	-	-	-	-	-	-	-	6942345	6867868
DNMG110412UR	DNMG333UR	9,53	3/8	11,63	.458	4,76	3/16	1,2	3/64	3,81	.150	-	4171102	4170510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMG150408UR	DNMG432UR	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	4171103	4170511	-	-	4169454	-	-	-	4171428	-	5579271	-	-	-	-	-	-	-	-	-
DNMG150412UR	DNMG433UR	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	-	-	4170512	-	-	-	-	-	-	-	-	5579292	-	-	-	-	-	-	-	-	-
DNMG150608UR	DNMG442UR	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	4171105	4170513	4169969	4169427	4169456	4169492	-	-	4171431	-	5579276	-	-	-	-	-	-	-	6942346	6867869
DNMG150612UR	DNMG443UR	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	4171106	4170514	-	-	4169457	4169493	5680172	-	4171432	-	-	-	-	-	-	-	-	-	6942347	6867870
DNMG150616UR	DNMG444UR	12,70	1/2	15,50	.610	6,35	1/4	1,6	1/16	5,16	.203	-	-	4170515	-	-	-	4169494	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DNMM-65 • Heavy Roughing



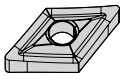


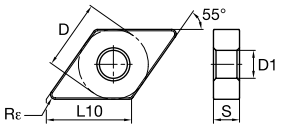
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMM15060865	DNMM44265	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	5698413	5698414	5698415	-	5698412	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMM15061265	DNMM44365	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	5698417	5494773	-	-	5698416	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DNMM15061665	DNMM44465	12,70	1/2	15,50	.610	6,35	1/4	1,6	1/16	5,16	.203	-	5698418	5698419	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DNMP • Medium Machining



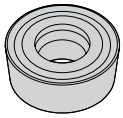


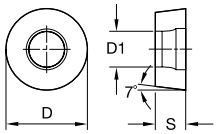
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
DNMP150404	DNMP431	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	4172484	-	-	-	-	-	-	-	-	-
DNMP150408	DNMP432	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	4172485	-	-	-	-	-	-	-	-	-
DNMP150604	DNMP441	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	-	-	-	-	-	4173661	-	-	-	-	4172486	-	-	-	-	-	-	-	-	-
DNMP150608	DNMP442	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	-	-	-	-	4173662	-	-	-	-	4172487	4172616	-	-	-	-	-	-	-	-
DNMP150612	DNMP443	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	4172488	4172617	-	-	-	-	-	-	-	-

RCMT • Medium Machining



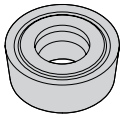


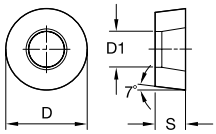
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
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N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	D1 mm	D1 in															
RCMT0602M0	RCMT0602M0	6,00	.236	2,38	3/32	2,80	.110	-	4169975	4170536	-	-	-	-	-	-	4170478	-	-	-	-	-	2028115	-	-	-	-
RCMT0803M0	RCMT0803M0	8,00	.315	3,18	1/8	3,40	.134	-	4169976	4170537	-	-	-	-	-	-	4170479	-	-	-	-	-	2028129	-	-	-	-
RCMT10T3M0	RCMT10T3M0	10,00	.394	3,97	5/32	4,40	.173	-	4169977	4170538	4170752	-	-	-	-	-	4170480	-	-	-	-	-	2028143	2028145	-	-	-
RCMT1204M0	RCMT1204M0	12,00	.472	4,76	3/16	4,40	.173	-	4169978	4170539	4170803	-	-	-	-	-	4170481	-	-	-	-	-	2028157	-	-	-	-
RCMT1606M0	RCMT1606M0	16,00	.630	6,35	1/4	5,50	.217	-	4169979	-	4170804	-	-	-	-	-	4170482	-	-	-	-	-	-	-	-	-	-

RCMX • Roughing



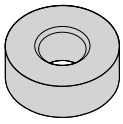


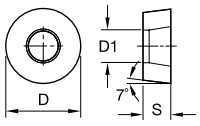
● first choice
○ alternate choice

	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P	●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M				○	●	●	●				●	●		○				●	●	●
K	○	○	○					●	●	●	○	○		○		●			○	○
N											○	○	●	●		○			○	○
S						○					●	●		○		○		○	●	●
H																			○	

ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
RCMX2006M0	RCMX2006M0	20,00	.7874	6,35	1/4	6,50	.256	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2563657	-	-	-
RCMX2006M0T	RCMX2006M0T	20,00	.7874	6,35	1/4	6,50	.256	-	4169980	4170541	4170805	-	-	-	-	-	4170543	-	-	-	-	-	-	-	-	-	-
RCMX2507M0T	RCMX2507M0T	25,00	63/64	7,94	5/16	7,40	.291	-	4169981	-	4170806	-	-	-	-	-	4170544	-	-	-	-	-	-	2028196	-	-	-
RCMX3209M0	RCMX3209M0	32,00	1.2598	9,53	3/8	11,85	.465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2563606	-	-	-
RCMX3209M0T	RCMX3209M0T	32,00	1.258	9,53	3/8	9,50	.374	-	4169982	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RNMA • Roughing



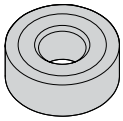


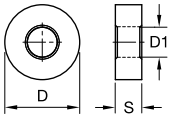
● first choice
○ alternate choice

	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P	●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●			●	●		○				●	●	●
K	○	○	○						●	●	○	○		○		●			○	○
N											○	○	●	●		○			○	○
S						○					●	●		○		○		○	●	●
H																			○	

ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
RNMA120400	RNMA43	12,70	1/2	4,76	3/16	5,16	.203	-	-	-	-	-	-	-	4171639	-	4171881	-	-	-	-	-	-	-	-	-	-

RNMG-RH • Roughing





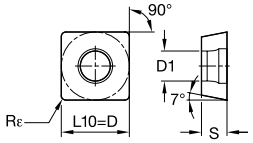
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	D1 mm	D1 in																
RNMG090300RH	**RNMG32RH**	9,53	3/8	3,18	1/8	3,81	.150	-	-	4171530	-	-	-	-	-	-	-	-	-	-	-	-	-
RNMG120400RH	**RNMG43RH**	12,70	1/2	4,76	3/16	5,16	.203	-	4170996	4171531	4171713	-	-	-	-	-	-	-	-	-	-	-	-
RNMG190600RH	**RNMG64RH**	19,05	3/4	6,35	1/4	7,93	.313	-	-	4171532	4171714	-	-	-	-	-	-	-	4171917	-	-	-	-

SCMT • Medium Machining



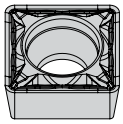


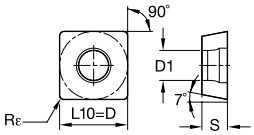
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in																
SCMT090304	SCMT321	9,53	3/8	9,53	.375	3,18	1/8	0,4	1/64	4,45	.175	-	-	-	6128305	-	-	-	-	-	-	-	-	-	2028225	-	-	-
SCMT090308	SCMT322	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	4,40	.173	-	-	-	6128306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCMT09T304	SCMT3251	9,53	3/8	9,53	.375	3,97	5/32	0,4	1/64	4,45	.175	-	-	-	-	-	-	-	-	-	-	-	-	-	2028255	-	-	-	-
SCMT09T308	SCMT3252	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	2028270	2028272	-	-	-
SCMT120408	SCMT432	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,50	.217	-	-	-	6128307	-	-	-	-	-	-	-	-	-	2028286	2028289	-	-	-
SCMT150512	SCMT5353	15,88	5/8	15,88	.625	5,56	7/32	1,2	3/64	5,50	.217	-	-	-	6128308	-	-	-	-	-	-	-	-	-	2028306	2028307	-	-	-

SCMT-FP • Finishing Positive





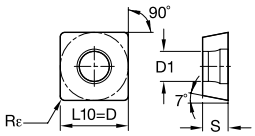
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●															
M					○	●	●	●				●	●		○				●			●	●														
K		○	○	○					●	●	●	○	○		○		●																			
N												○	○	●	●		○																			
S							○					●	●		○		○		○																	
H																																				

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SCMT09T308FP	SCMT3252FP	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	-	-	4170309	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCMT120408FP	SCMT432FP	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,50	.217	-	-	4170311	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SCMT-MP • Medium Positive



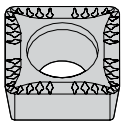


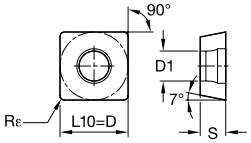
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●															
M					○	●	●	●				●	●		○				●			●	●														
K		○	○	○					●	●	●	○	○		○		●																			
N												○	○	●	●		○																			
S							○					●	●		○		○		○																	
H																																				

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SCMT09T304MP	SCMT3251MP	9,53	3/8	9,53	.375	3,97	5/32	0,4	1/64	4,40	.173	-	-	4170226	-	-	-	-	-	6730906	4170244	-	-	-	-	-	-	-	-	-	-
SCMT09T308MP	SCMT3252MP	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	-	-	4170227	-	-	4168914	-	-	6730907	4170245	-	-	-	-	-	-	-	-	-	-
SCMT120404MP	SCMT431MP	12,70	1/2	12,70	.500	4,76	3/16	0,4	1/64	5,50	.217	-	-	4170228	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCMT120408MP	SCMT432MP	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,50	.217	-	4170215	4170229	-	-	-	-	-	6730908	4170247	-	-	-	-	-	-	-	-	-	-
SCMT120412MP	SCMT433MP	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,50	.217	-	-	4170230	-	-	4168917	-	-	-	4170248	-	-	-	-	-	-	-	-	-	-

SCMT-MU • Medium Universal



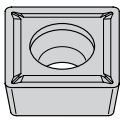


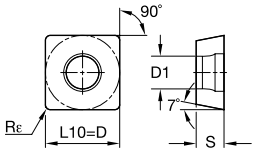
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●		●	●
M					○	●	●	●					●	●		○				●	●	●										
K		○	○	○					●	●	●	○	○		○		●						○	○							
N												○	○	●	●		○														
S							○					●	●		○		○		○				●	●							
H																															

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SCMT090308MU	SCMT322MU	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	4,40	.173	-	5623446	-	-	-	-	-	-	-	5623445	-	-	-	-	-	-	-	-	-	-
SCMT09T304MU	SCMT3251MU	9,53	3/8	9,53	.375	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	5623447	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCMT09T308MU	SCMT3252MU	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	-	5623461	5623464	5623462	-	5623448	-	-	-	5623449	5623460	6127251	-	-	-	-	-	-	-	-
SCMT120408MU	SCMT432MU	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,50	.217	-	-	6127255	-	-	6127252	-	-	-	-	-	-	-	-	-	-	-	-	-	6868882
SCMT120412MU	SCMT433MU	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,50	.217	-	-	-	-	-	-	-	-	-	-	-	6127256	-	-	-	-	-	-	-	-

SCMT-1P • Finishing



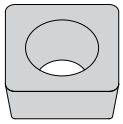


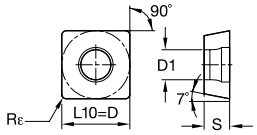
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●										
K		○	○	○					●	●	●	○	○		○		●						○	○							
N												○	○	●	●		○														
S							○					●	●		○		○		○				●	●							
H																															

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SCMT1204081P	SCMT4321P	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,50	.217	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6868861

SCMW • Medium Machining



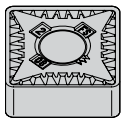


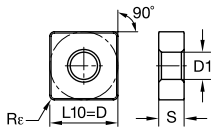
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SCMW090304	SCMW321	9,53	3/8	9,53	.375	3,18	1/8	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2028308	-	-	-	-
SCMW09T308	SCMW3252	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	4170379	-	-	-	-	-	-	-	-	-	-
SCMW120408	SCMW432	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,50	.217	-	-	-	-	-	-	-	-	-	4170380	-	-	-	-	-	2028310	-	-	-	-

SNGG-FS • Finshing Sharp



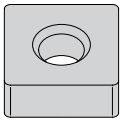


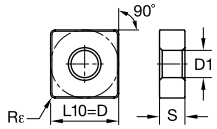
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SNGG120408FS	SNGG432FS	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548680	-	5549997	-	-	-	-	-	-	-

SNMA • Roughing



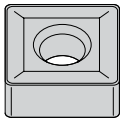


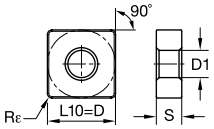
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SNMA120408	SNMA120408	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2560030	-	-	-	-
SNMA120408	SNMA432	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	4171640	6287926	4171882	-	-	-	-	-	2028371	-	-	-	-
SNMA120412	SNMA433	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	4171641	6287927	4171883	-	-	-	-	-	-	-	-	-	-
SNMA120416	SNMA434	12,70	1/2	12,70	.500	4,76	3/16	1,6	1/16	5,16	.203	-	-	-	-	-	-	-	-	-	4171884	-	-	-	-	-	-	-	-	-	-
SNMA150608	SNMA542	15,88	5/8	15,88	.625	6,35	1/4	0,8	1/32	6,35	.250	-	-	-	-	-	-	-	-	-	4171885	-	-	-	-	-	-	-	-	-	-
SNMA150612	SNMA543	15,88	5/8	15,88	.625	6,35	1/4	1,2	3/64	6,35	.250	-	-	-	-	-	-	-	-	-	4171886	-	-	-	-	-	-	-	-	-	-
SNMA150616	SNMA544	15,88	5/8	15,88	.625	6,35	1/4	1,6	1/16	6,35	.250	-	-	-	-	-	-	-	4171644	-	4171887	-	-	-	-	-	-	-	-	-	-
SNMA190612	SNMA643	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313	-	-	-	-	-	-	-	4171645	-	4171888	-	-	-	-	-	-	-	-	-	-
SNMA190616	SNMA644	19,05	3/4	19,05	.750	6,35	1/4	1,6	1/16	7,93	.313	-	-	-	-	-	-	-	4171646	-	4171889	-	-	-	-	-	-	-	-	-	-
SNMA250724	SNMA250724	25,40	1	25,40	1.000	7,94	5/16	2,4	3/32	9,12	.359	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2559949	-	-	-	-
SNMA250724	SNMA856	25,40	1	25,40	1.000	7,94	5/16	2,4	3/32	9,12	.359	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2559959	-	-	-

SNMG • Roughing



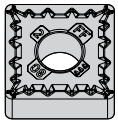


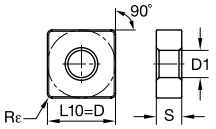
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in																	
SNMG120408	**SNMG120408**	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	-	-	-	2559247	-	-	-	-
SNMG190612	**SNMG190612**	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313	-	-	-	-	-	-	-	-	-	-	-	-	-	2559191	-	-	-	-
SNMG120408	**SNMG432**	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	6613608	-	-	-	-	-	-	-	-	-
SNMG250724	**SNMG856**	25,40	1	25,40	1.000	7,94	5/16	2,4	3/32	9,12	.359	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2559116	-	-	-
SNMG250924	**SNMG866**	25,40	1	25,40	1.000	9,53	3/8	2,4	3/32	9,12	.359	-	-	-	5091303	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SNMG-FF • Fine Finishing



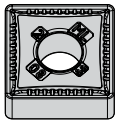


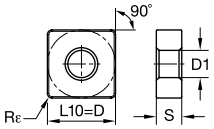
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SNMG090308FF	SNMG322FF	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	3,81	.150	-	4171046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG120404FF	SNMG431FF	12,70	1/2	12,70	.500	4,76	3/16	0,4	1/64	5,16	.203	-	4171047	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG120408FF	SNMG432FF	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	4171048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG120412FF	SNMG433FF	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	-	4171049	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SNMG-ML • Medium Machining





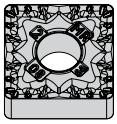
● first choice
○ alternate choice

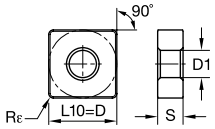
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
SNMG090304ML	SNMG321ML	9,53	3/8	9,53	.375	3,18	1/8	0,4	1/64	3,81	.150
SNMG090308ML	SNMG322ML	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	3,81	.150
SNMG120404ML	SNMG431ML	12,70	1/2	12,70	.500	4,76	3/16	0,4	1/64	5,16	.203
SNMG120408ML	SNMG432ML	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203
SNMG120412ML	SNMG433ML	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203

	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SNMG090304ML	-	4171071	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG090308ML	-	4171072	4170488	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG120404ML	-	-	-	-	-	-	-	-	-	4171403	-	-	-	-	-	-	-	-	-	-
SNMG120408ML	-	4171073	4170489	-	-	-	-	-	-	4171404	-	-	-	-	-	-	-	-	-	-
SNMG120412ML	-	4171074	4170490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SNMG-MR • Medium Roughing





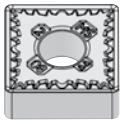
● first choice
○ alternate choice

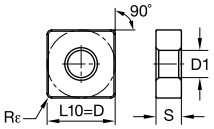
		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
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N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
SNMG120408MR	SNMG432MR	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203
SNMG120412MR	SNMG433MR	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203
SNMG120416MR	SNMG434MR	12,70	1/2	12,70	.500	4,76	3/16	1,6	1/16	5,16	.203
SNMG150612MR	SNMG543MR	15,88	5/8	15,88	.625	6,35	1/4	1,2	3/64	6,35	.250
SNMG190612MR	SNMG643MR	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313

SNMG120408MR	SNMG432MR	-	4171146	4170571	4170057	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG120412MR	SNMG433MR	-	-	5684355	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG120416MR	SNMG434MR	-	-	-	-	-	-	4173142	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG150612MR	SNMG543MR	-	4171147	-	-	-	4173029	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG190612MR	SNMG643MR	-	4171148	4170572	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SNMG-MS • Medium Sharp





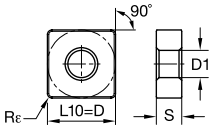
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SNMG120408MS	SNMG432MS	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908847	5908848	5908849	-	-	-	-	-	-	-
SNMG120412MS	SNMG433MS	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908850	5908921	-	-	-	-	-	-	-	-
SNMG120416MS	SNMG434MS	12,70	1/2	12,70	.500	4,76	3/16	1,6	1/16	5,16	.203	-	-	-	-	-	-	-	-	-	-	6219754	-	-	-	-	-	-	-	-	-
SNMG150612MS	SNMG543MS	15,88	5/8	15,88	.625	6,35	1/4	1,2	3/64	6,35	.250	-	-	-	-	-	-	-	-	-	-	-	5908923	5908924	-	-	-	-	-	-	-
SNMG190612MS	SNMG643MS	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313	-	-	-	-	-	-	-	-	-	-	5908925	5908926	-	-	-	-	-	-	-	-
SNMG190616MS	SNMG644MS	19,05	3/4	19,05	.750	6,35	1/4	1,6	1/16	7,94	.312	-	-	-	-	-	-	-	-	-	-	6219756	-	-	-	-	-	-	-	-	-

SNMG-RH • Roughing



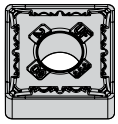


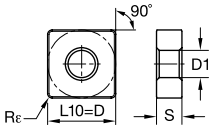
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
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N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in																	
SNMG120408RH	SNMG432RH	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	4170998	4171533	4171715	-	-	-	-	-	4171918	-	-	-	-	-	-	-	-
SNMG120412RH	SNMG433RH	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	-	4170999	4171534	4171716	-	-	-	-	-	4171919	-	-	-	-	-	-	-	-
SNMG120416RH	SNMG434RH	12,70	1/2	12,70	.500	4,76	3/16	1,6	1/16	5,16	.203	-	4171000	4171535	-	-	-	-	-	-	4171920	-	-	-	-	-	-	-	-
SNMG150608RH	SNMG542RH	15,88	5/8	15,88	.625	6,35	1/4	0,8	1/32	6,35	.250	-	4171001	4171536	-	-	-	-	-	-	4171921	-	-	-	-	-	-	-	-
SNMG150612RH	SNMG543RH	15,88	5/8	15,88	.625	6,35	1/4	1,2	3/64	6,35	.250	-	4171002	4171537	4171719	-	-	-	-	-	4171922	-	-	-	-	-	-	-	-
SNMG150616RH	SNMG544RH	15,88	5/8	15,88	.625	6,35	1/4	1,6	1/16	6,35	.250	-	4171003	4171538	4171720	-	-	-	-	-	4171923	-	-	-	-	-	-	-	-
SNMG190608RH	SNMG642RH	19,05	3/4	19,05	.750	6,35	1/4	0,8	1/32	7,93	.313	-	-	4171539	4171721	-	-	4173055	-	-	-	-	-	-	-	-	-	-	-
SNMG190612RH	SNMG643RH	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313	-	4171005	4171540	4171722	-	-	4173056	-	-	4171925	-	-	-	-	-	-	-	-
SNMG190616RH	SNMG644RH	19,05	3/4	19,05	.750	6,35	1/4	1,6	1/16	7,93	.313	-	-	-	4171723	-	-	4173057	-	-	4171926	-	-	-	-	-	-	-	-

SNMG-UF • Fine Finishing



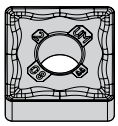


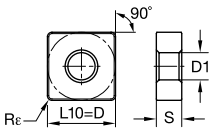
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○				●		●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SNMG120404UF	SNMG431UF	12,70	1/2	12,70	.500	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	4169364	4169390	-	-	-	-	5645610	-	-	-	-	-	-	-	-	-
SNMG120408UF	SNMG432UF	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	4169391	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SNMG-UM • Medium Machining



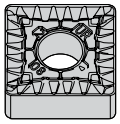


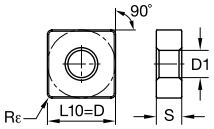
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○				●		●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SNMG120404UM	SNMG431UM	12,70	1/2	12,70	.500	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	4172393	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG120408UM	SNMG432UM	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	4172367	4172394	4172424	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG120412UM	SNMG433UM	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	4172395	4172425	-	-	-	-	-	-	-	-	-	-	-	-	-

SNMG-UR • Universal Roughing





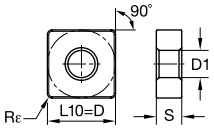
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in											
SNMG120408UR	SNMG432UR	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	4171108	4170516	4169989	4169429	4169458	4169495	-	-	4171434	-	-	-	-	-	-	-	-	-	6942348	6867891
SNMG120412UR	SNMG433UR	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	-	4171109	4170517	4169990	4169430	4169459	4169496	-	-	-	-	5579350	-	-	-	-	-	-	-	5384941	6867892
SNMG120416UR	SNMG434UR	12,70	1/2	12,70	.500	4,76	3/16	1,6	1/16	5,16	.203	-	4171110	-	-	-	4169460	4169497	-	-	4171436	5680174	5680173	-	-	-	-	-	-	-	-	-
SNMG150612UR	SNMG543UR	15,88	5/8	15,88	.625	6,35	1/4	1,2	3/64	6,35	.250	-	4171111	4170518	4169991	-	4169461	4169498	-	-	4171437	-	5579352	-	-	-	-	-	-	-	-	-
SNMG150616UR	SNMG544UR	15,88	5/8	15,88	.625	6,35	1/4	1,6	1/16	6,35	.250	-	-	4170519	-	-	4169462	4169499	-	-	4171438	-	5512538	-	-	-	-	-	-	-	-	-
SNMG190612UR	SNMG643UR	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313	-	4171113	4170520	-	4169433	4169463	4169500	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMG190616UR	SNMG644UR	19,05	3/4	19,05	.750	6,35	1/4	1,6	1/16	7,93	.313	-	4171114	4170521	-	-	4169464	4169501	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SNMM-8 • Heavy Roughing



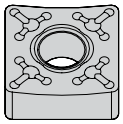


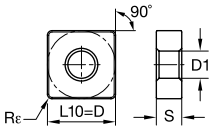
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SNMM2507248	SNMM8568	25,40	1	25,40	1.000	7,94	5/16	2,4	3/32	9,12	.359	-	5429112	5429111	5370813	-	5429116	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SNMM-65 • Heavy Roughing



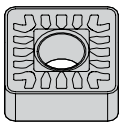


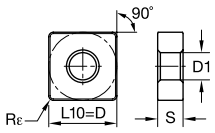
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SNMM12040865	SNMM43265	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	5696554	5696555	-	5696553	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMM12041265	SNMM43365	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	-	-	5696557	-	-	5696556	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMM15061665	SNMM54465	15,88	5/8	15,88	.625	6,35	1/4	1,6	1/16	6,35	.250	-	-	5696559	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMM19061265	SNMM64365	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313	-	5696611	5696612	5696613	-	5696610	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMM19061665	SNMM64465	19,05	3/4	19,05	.750	6,35	1/4	1,6	1/16	7,93	.313	-	5696615	-	-	-	5696614	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SNMM19062465	SNMM64665	19,05	3/4	19,05	.750	6,35	1/4	2,4	3/32	7,93	.313	-	-	5696617	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SNMM-SR • Heavy Roughing

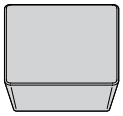


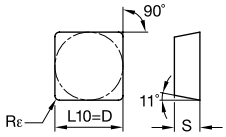


● first choice
○ alternate choice

| | | |

SPGN/SPG • Medium Machining

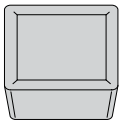


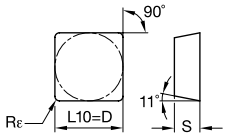


● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●										
M					○	●	●	●					●	●		○					●	●										
K		○	○	○					●	●	●	○	○		○		●				○	○										
N												○	○	●	●		○				○	○										
S							○					●	●		○		○		○		●	●										
H																																
ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SPGN090308	SPG322	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	-	-	-	-	-	-	-	-	-	4170943	-	-	-	-	-	-	-	-	-	-

SPMR • Medium Machining

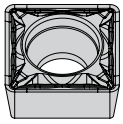


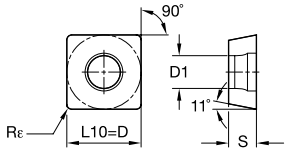


● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●										
M					○	●	●	●					●	●		○					●	●										
K		○	○	○					●	●	●	○	○		○		●				○	○										
N												○	○	●	●		○				○	○										
S							○					●	●		○		○		○		●	●										
H																																
ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SPMR120308	SPMR422	12,70	1/2	12,70	.500	3,18	1/8	0,8	1/32	-	4170854	-	4170652	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SPMT-FP • Finishing Positive





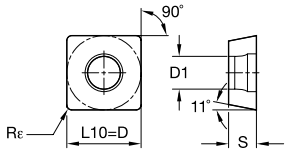
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●			●	●	●
M					○	●	●	●					●	●		○						●	●	●
K		○	○	○					●	●	●	○	○		○		●					○	○
N												○	○	●	●		○					○	○
S							○					●	●		○		○		○		●	●
H																						○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SPMT09T308FP	SPMT3252FP	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	4170111	-	-	-	-	-	-	-	-	-	-

SPMT-MP • Medium Positive



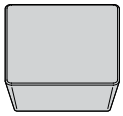


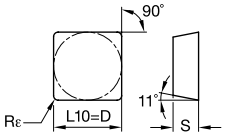
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●			●	●	●
M					○	●	●	●					●	●		○						●	●	●
K		○	○	○					●	●	●	○	○		○		●					○	○
N												○	○	●	●		○					○	○
S							○					●	●		○		○		○		●	●
H																						○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SPMT09T308MP	SPMT3252MP	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	4170269	-	-	-	-	-	-	-	-	-	-
SPMT120408MP	SPMT432MP	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,50	.217	-	-	4170262	-	-	-	-	-	-	4170270	-	-	-	-	-	-	-	-	-	-

SPUN/SPU • Medium Machining



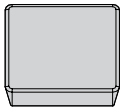


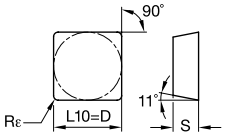
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in													
SPUN090308	SPU322	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	-	-	-	-	-	-	-	-	-	-	-	2028543	-	-	-	-
SPUN120304	SPU421	12,70	1/2	12,70	.500	3,18	1/8	0,4	1/64	-	-	-	-	-	-	-	-	-	-	-	2028547	-	-	-	-
SPUN120308	SPU422	12,70	1/2	12,70	.500	3,18	1/8	0,8	1/32	-	4170857	-	-	-	-	-	-	-	4170950	-	-	-	-	-	2028555	-	-	-	-
SPUN120308	SPUN120308	12,70	1/2	12,70	.500	3,18	1/8	0,8	1/32	-	-	-	-	-	-	-	-	-	-	-	2561957	-	-	-	-
SPUN120312	SPU423	12,70	1/2	12,70	.500	3,18	1/8	1,2	3/64	-	-	-	-	-	-	-	-	-	-	-	2028560	-	-	-	-
SPUN120312	SPUN120312	12,70	1/2	12,70	.500	3,18	1/8	1,2	3/64	-	-	-	-	-	-	-	-	-	-	-	2561927	-	-	-	-
SPUN120412	SPU433	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	-	-	-	-	-	-	-	-	-	-	-	2028562	-	-	-	-
SPUN150412	SPUN533	15,88	5/8	15,88	.625	4,76	3/16	1,2	3/64	-	-	-	-	-	-	-	-	-	-	-	2028565	2028567	-	-	-
SPUN190412	SPUN633	19,05	3/4	19,05	.750	4,76	3/16	1,2	3/64	-	-	-	-	-	-	-	-	-	-	-	2028568	-	-	-	-
SPUN190416	SPU634	19,05	3/4	19,05	.750	4,76	3/16	1,6	1/16	-	-	-	-	-	-	-	-	-	-	-	2561892	-	-	-	-

SPUN-T/SPU-T • Medium Machining



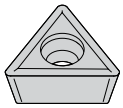


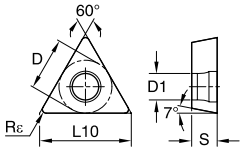
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
SPUN250620T	SPU845T	25,40	1	25,40	1.000	6,35	1/4	2,0	5/64	-	4170858	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TCMT • Medium Machining



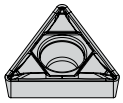


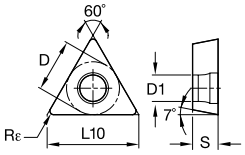
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TCMT110202	TCMT21505	6,35	1/4	11,00	.433	2,38	3/32	0,2	.008	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2028579	-	-	-	-
TCMT110204	TCMT2151	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2028587	2028589	-	-	-
TCMT16T304	TCMT3251	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2028607	-	-	-	-
TCMT16T308	TCMT3252	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2028624	2028627	-	-	-
TCMT220408	TCMT432	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,50	.217	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2028660	-	-	-	-

TCMT-FP • Finishing Positive



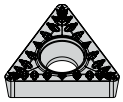


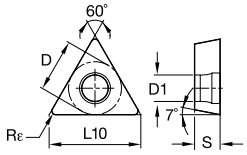
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○						●	●	●
K		○	○	○					●	●	●	○	○		○		●					○	○
N												○	○	●	●		○					○	○
S							○					●	●		○		○			○	●	●
H																						○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TCMT110202FP	TCMT21505FP	6,35	1/4	11,00	.433	2,38	3/32	0,2	.008	2,90	.114	-	-	-	-	-	4168800	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TCMT110204FP	TCMT2151FP	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	-	4170006	4170313	-	-	4168801	-	-	-	4170097	-	-	-	-	6208107	-	-	-	-	-
TCMT110208FP	TCMT2152FP	6,35	1/4	11,00	.433	2,38	3/32	0,8	1/32	2,80	.110	-	4170007	-	-	-	-	-	-	-	4170098	-	-	-	-	-	-	-	-	-	-	-
TCMT16T304FP	TCMT3251FP	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	-	4170008	4170315	-	-	-	-	-	-	4170099	-	-	-	-	-	-	-	-	-	-	-
TCMT16T308FP	TCMT3252FP	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	-	-	4170316	-	-	-	-	-	-	4170100	-	-	-	-	-	-	-	-	-	-	-
TCMT220408FP	TCMT432FP	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,50	.217	-	-	4170317	-	-	4168806	-	-	-	4170102	-	-	-	-	-	-	-	-	-	-	-

TCMT-MP • Medium Positive





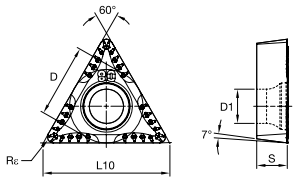
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○	●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TCMT110208MP	TCMT2152MP	6,35	1/4	11,00	.433	2,38	3/32	0,8	1/32	2,80	.110	-	-	4170231	-	-	-	-	-	6730905	4170249	-	-	-	-	-	-	-	-	-	-
TCMT16T304MP	TCMT3251MP	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	-	-	4170232	-	4168904	4168918	-	-	-	4170250	-	-	-	-	-	-	-	-	-	-
TCMT16T308MP	TCMT3252MP	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	-	4170216	4170233	-	-	4168919	-	-	6730904	4170251	-	-	-	-	-	-	-	-	-	-
TCMT16T312MP	TCMT3253MP	9,53	3/8	16,50	.650	3,97	5/32	1,2	3/64	4,40	.173	-	-	4170234	-	-	-	-	-	-	4170252	-	-	-	-	-	-	-	-	-	-

TCMT-MU • Medium Universal





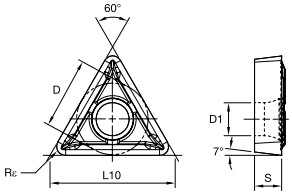
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○	●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TCMT16T304MU	TCMT3251MU	9,53	3/8	13,89	.547	3,97	5/32	0,4	1/64	4,40	.173	-	5623614	5623615	-	-	5623613	-	-	-	5623616	-	5623617	-	-	-	-	-	-	-	-
TCMT16T308MU	TCMT3252MU	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	-	5623621	5623620	-	-	5623619	-	-	-	5623618	5623622	-	-	-	-	-	-	-	6869671	6868884
TCMT220412MU	TCMT433MU	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,50	.217	-	-	-	6128327	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TCMT-1P • Finishing



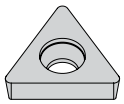


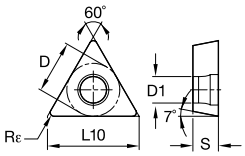
● first choice
○ alternate choice

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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in																						
TCMT1102041P	TCMT21511P	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6868862
TCMT1102081P	TCMT21521P	6,35	1/4	11,00	.433	2,38	3/32	0,8	1/32	2,80	.110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6868863
TCMT16T3041P	TCMT32511P	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6868865

TCMW • Medium Machining



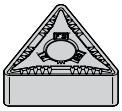


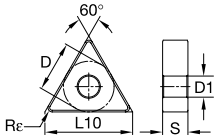
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in																						
TCMW110204	TCMW2151	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,85	.112	-	-	-	-	-	-	-	4170476	-	4170381	-	-	-	-	-	2028668	-	-	-	-	-	-
TCMW16T304	TCMW3251	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,45	.175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2028670	-	-	-	-	-	-

TNGG-FS • Finishing Sharp

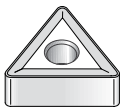


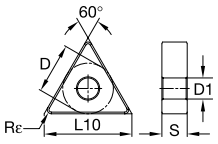


● first choice
○ alternate choice

| | | |

TNMG • Roughing



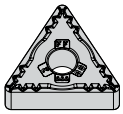


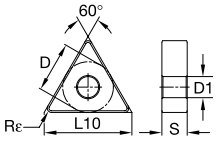
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P	●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●
M				○	●	●	●					●	●		○				●	●	●
K	○	○	○					●	●	●	○	○	○		○		●			○	○
N											○	○	○	●	●		○			○	○
S						○					●	●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in																					
TNMG160404	TNMG160404	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2559750	-	-	-	-
TNMG160408	TNMG160408	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2039543	-	-	-	-
TNMG160404	TNMG331	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	-	-	-	6671911	-	-	-	-	-	-	-	-	-	-	-	-
TNMG160408	TNMG332	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	6617524	-	-	-	-	-	-	-	-	-	-	-	-
TNMG160412	TNMG333	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	-	-	-	-	-	-	-	-	6671880	-	-	-	-	-	-	-	-	-	-	-	-

TNMG-FF • Fine Finishing





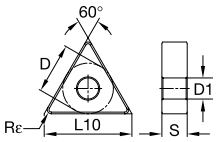
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P	●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●
M				○	●	●	●					●	●		○				●	●	●
K	○	○	○					●	●	●	○	○	○		○		●			○	○
N											○	○	○	●	●		○			○	○
S						○					●	●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in																					
TNMG160404FF	TNMG331FF	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	-	4171050	-	-	-	4172691	-	-	-	4171385	-	-	-	-	-	-	-	-	-	-	-
TNMG160408FF	TNMG332FF	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	-	4171051	-	-	-	-	-	-	-	4171386	-	-	-	-	-	-	-	-	-	-	-
TNMG160412FF	TNMG333FF	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	-	4171052	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TNMG-ML • Medium Machining





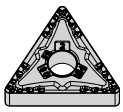
● first choice
○ alternate choice

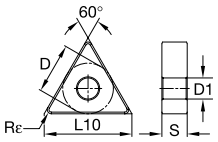
		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
TNMG160404ML	TNMG331ML	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150
TNMG160408ML	TNMG332ML	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150
TNMG160412ML	TNMG333ML	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150
TNMG220404ML	TNMG431ML	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203
TNMG220408ML	TNMG432ML	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203

	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMG160404ML	-	4171075	4170491	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG160408ML	-	4171076	4170492	-	-	-	-	4171672	-	4171410	-	-	-	-	-	-	-	-	-	-
TNMG160412ML	-	4171077	4170493	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220404ML	-	5684348	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220408ML	-	4171078	4170494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TNMG-MR • Medium Roughing





● first choice
○ alternate choice

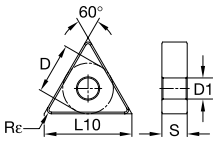
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
TNMG160404MR	TNMG331MR	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150
TNMG160408MR	TNMG332MR	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150
TNMG160412MR	TNMG333MR	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150
TNMG220404MR	TNMG431MR	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203
TNMG220408MR	TNMG432MR	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203
TNMG220412MR	TNMG433MR	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203
TNMG220416MR	TNMG434MR	12,70	1/2	22,00	.866	4,76	3/16	1,6	1/16	5,16	.203

	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMG160404MR	-	4171150	4170573	4170059	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG160408MR	-	4171151	4170574	4170060	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG160412MR	-	4171152	4170575	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220404MR	-	4171153	4170576	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220408MR	-	4171154	4170577	4170063	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220412MR	-	4171155	4170578	4170064	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220416MR	-	-	4170579	4170065	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TNMG-MS • Medium Sharp





● first choice
○ alternate choice

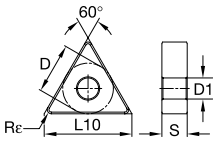
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
TNMG160404MS	TNMG331MS	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150
TNMG160408MS	TNMG332MS	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150
TNMG220404MS	TNMG431MS	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203
TNMG220408MS	TNMG432MS	12,70	1/2	22,00	.867	4,76	3/16	0,8	1/32	5,16	.203
TNMG220412MS	TNMG433MS	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203
TNMG270608MS	TNMG542MS	15,88	5/8	27,50	1.083	6,35	1/4	0,8	1/32	6,35	.250

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMG160404MS	TNMG331MS	-	-	-	-	-	-	-	-	-	-	5908927	5908928	5908929	-	-	-	-	-	-	-
TNMG160408MS	TNMG332MS	-	-	-	-	-	-	-	-	-	-	5908930	5908931	5908932	-	-	-	-	-	-	-
TNMG220404MS	TNMG431MS	-	-	-	-	-	-	-	-	-	-	5908933	5908934	5908935	-	-	-	-	-	-	-
TNMG220408MS	TNMG432MS	-	-	-	-	-	-	-	-	-	-	5908936	5908937	5908938	-	-	-	-	-	-	-
TNMG220412MS	TNMG433MS	-	-	-	-	-	-	-	-	-	-	-	5908940	-	-	-	-	-	-	-	-
TNMG270608MS	TNMG542MS	-	-	-	-	-	-	-	-	-	-	-	5908942	5908943	-	-	-	-	-	-	-

TNMG-RH • Roughing



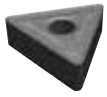


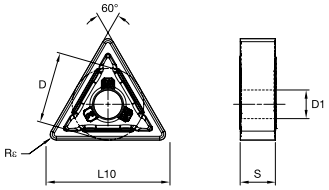
● first choice
○ alternate choice

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K		○	○	○					●	●	●	○	○		○		●						○	○
N												○	○	●	●		○						○	○
S							○					●	●		○		○		○		○	●	●
H																							○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMG160408RH	TNMG332RH	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	-	4171007	4171542	4171724	-	4173058	-	-	6673946	4171927	-	-	-	-	-	-	-	-	-	-
TNMG160412RH	TNMG333RH	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	-	-	4171543	4171725	-	-	-	-	-	4171928	-	-	-	-	-	-	-	-	-	-
TNMG220408RH	TNMG432RH	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	-	4171009	4171544	4171726	-	-	-	-	-	4171929	-	-	-	-	-	-	-	-	-	-
TNMG220412RH	TNMG433RH	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203	-	4171010	4171545	4171727	-	-	-	-	-	4171930	-	-	-	-	-	-	-	-	-	-
TNMG220416RH	TNMG434RH	12,70	1/2	22,00	.866	4,76	3/16	1,6	1/16	5,16	.203	-	-	-	4171728	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG270612RH	TNMG543RH	15,88	5/8	27,50	1.083	6,35	1/4	1,2	3/64	6,35	.250	-	-	4171547	4171729	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG270616RH	TNMG544RH	15,88	5/8	27,50	1.083	6,35	1/4	1,6	1/16	6,35	.250	-	-	4171548	4171730	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG330924RH	TNMG666RH	19,05	3/4	33,00	1.299	9,53	3/8	2,4	3/32	7,93	.313	-	-	4171549	4171731	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TNMG-RU • Roughing Universal



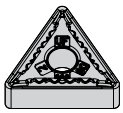


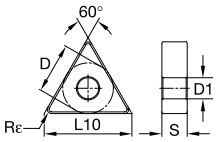
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMG160408RU	TNMG332RU	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	-	6776800	6776799	-	6817524	6777051	-	-	6746845	6817450	-	-	-	-	-	-	-	-	-	6795795
TNMG160412RU	TNMG333RU	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	-	6776936	6776935	-	6817525	6776937	-	-	6746846	6817521	-	-	-	-	-	-	-	-	-	6791846

TNMG-UF • Fine Finishing



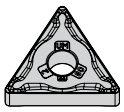


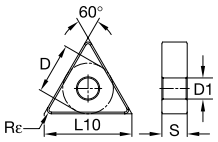
● first choice
○ alternate choice

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K		○	○	○					●	●	●	○	○		○		●			○	○
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMG160404UF	TNMG331UF	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	4169367	4169393	-	-	-	-	5432605	-	-	-	-	-	-	-	-	-
TNMG160408UF	TNMG332UF	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	4169368	4169394	-	-	-	-	5432606	-	-	-	-	-	-	-	-	-
TNMG220404UF	TNMG431UF	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	4169370	4169396	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220408UF	TNMG432UF	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	4169397	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TNMG-UM • Medium Machining





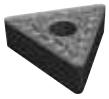
● first choice
○ alternate choice

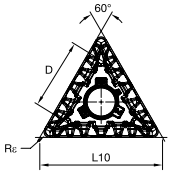
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
TNMG160404UM	TNMG331UM	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150
TNMG160408UM	TNMG332UM	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150
TNMG160412UM	TNMG333UM	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150
TNMG160416UM	TNMG334UM	9,53	3/8	16,50	.650	4,76	3/16	1,6	1/16	3,81	.150
TNMG220404UM	TNMG431UM	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203
TNMG220408UM	TNMG432UM	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203
TNMG220412UM	TNMG433UM	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMG160404UM	TNMG331UM	-	-	-	-	4172369	4172396	-	-	-	-	5550226	-	-	-	-	-	-	-	-	-
TNMG160408UM	TNMG332UM	-	-	-	-	4172370	4172397	4172427	-	-	-	5550228	-	-	-	-	-	-	-	-	-
TNMG160412UM	TNMG333UM	-	-	-	-	-	4172398	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG160416UM	TNMG334UM	-	-	-	-	-	4172399	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220404UM	TNMG431UM	-	-	-	-	-	4172400	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220408UM	TNMG432UM	-	-	-	-	-	4172401	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220412UM	TNMG433UM	-	-	-	-	-	4172402	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TNMG-UR • Universal Roughing





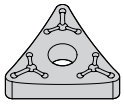
● first choice
○ alternate choice

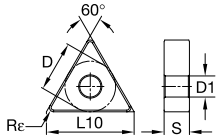
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
TNMG160408UR	TNMG332UR	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150
TNMG160412UR	TNMG333UR	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150
TNMG160416UR	TNMG334UR	9,53	3/8	16,50	.650	4,76	3/16	1,6	1/16	3,81	.150
TNMG220408UR	TNMG432UR	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203
TNMG220412UR	TNMG433UR	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203
TNMG220416UR	TNMG434UR	12,70	1/2	22,00	.866	4,76	3/16	1,6	1/16	5,16	.203
TNMG270612UR	TNMG543UR	15,88	5/8	27,50	1.083	6,35	1/4	1,2	3/64	6,35	.250
TNMG270616UR	TNMG544UR	15,88	5/8	27,50	1.083	6,35	1/4	1,6	1/16	6,35	.250

ISO catalog number	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMG160408UR	-	4171115	4170522	4170035	4169434	4169465	-	-	-	4171441	-	5579395	-	-	-	-	-	-	-	-
TNMG160412UR	-	4171116	4170523	-	-	4169466	-	-	-	-	-	5680175	-	-	-	-	-	-	6791842	6791845
TNMG160416UR	-	4171117	-	-	-	-	-	-	-	4171443	-	-	-	-	-	-	-	-	-	-
TNMG220408UR	-	4171118	4170524	4170036	4169435	4169468	4169503	-	-	4171444	-	-	-	-	-	-	-	-	-	-
TNMG220412UR	-	-	4170525	-	-	4169469	4169504	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG220416UR	-	4171120	-	-	-	4169470	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG270612UR	-	-	4170527	-	-	4169471	4169506	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMG270616UR	-	4171122	4170528	-	-	4169472	4169507	-	-	-	-	-	-	-	-	-	-	-	-	-

TNMM-65 • Heavy Roughing



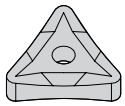


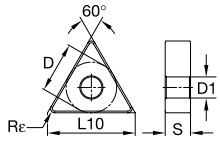
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○				●			●	●
K		○	○	○					●	●	●	○	○		○		●					○	○
N												○	○	●	●		○					○	○
S							○					●	●		○		○		○		●	●
H																						○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMM16040865	TNMM33265	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	-	-	5696618	5696619	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMM22040865	TNMM43265	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	-	5696621	5696622	5696623	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMM22041265	TNMM43365	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203	-	-	5696625	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TNMP • Medium Machining



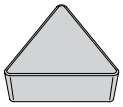


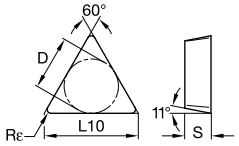
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○				●			●	●
K		○	○	○					●	●	●	○	○		○		●					○	○
N												○	○	●	●		○					○	○
S							○					●	●		○		○		○		●	●
H																						○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TNMP160404	TNMP331	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	4173670	4173709	-	-	-	4172491	-	-	-	-	-	-	-	-	-
TNMP160408	TNMP332	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	4173671	4173710	-	-	-	4172492	4172623	-	-	-	-	-	-	-	-	-
TNMP160412	TNMP333	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	-	-	-	-	-	4173672	-	-	-	-	-	4172624	-	-	-	-	-	-	-	-	-
TNMP220404	TNMP431	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	4172494	-	-	-	-	-	-	-	-	-	-
TNMP220408	TNMP432	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	4173674	-	-	-	-	4172495	4172625	-	-	-	-	-	-	-	-	-

TPGN • Medium Machining



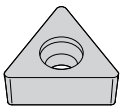


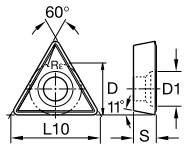
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TPGN110304	TPG221	6,35	1/4	11,00	.433	3,18	1/8	0,4	1/64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2015100	-	-	-	-
TPGN110308	TPG222	6,35	1/4	11,00	.433	3,18	1/8	0,8	1/32	-	-	-	-	-	-	-	-	-	4170952	-	-	-	-	-	-	-	-	-	-
TPGN160308	TPG322	9,53	3/8	16,50	.650	3,18	1/8	0,8	1/32	-	-	-	-	-	-	-	-	-	4170953	-	-	-	-	-	-	-	-	-	-

TPGA • Medium Machining



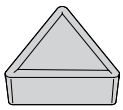


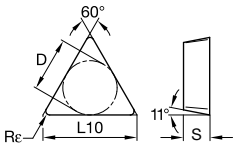
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TPGA110204	TPGA2151	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	3,40	.134	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2015081	-	-	-	-
TPGA110208	TPGA2152	6,35	1/4	11,00	.433	2,38	3/32	0,8	1/32	3,40	.134	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2031786	-	-	-	-

TPMR • Medium Machining



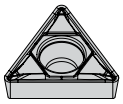


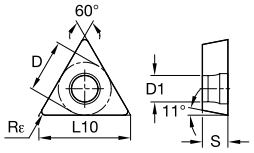
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S						○						●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TPMR110304	TPMR221	6,35	1/4	11,00	.433	3,18	1/8	0,4	1/64	-	4170859	-	4170784	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPMR110308	TPMR222	6,35	1/4	11,00	.433	3,18	1/8	0,8	1/32	-	4170860	-	4170785	-	-	-	-	-	4170954	-	-	-	-	-	-	-	-	-	-
TPMR160304	TPMR321	9,53	3/8	16,50	.650	3,18	1/8	0,4	1/64	-	4170861	-	4170786	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPMR160308	TPMR322	9,53	3/8	16,50	.650	3,18	1/8	0,8	1/32	-	4170862	-	4170787	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPMR160312	TPMR323	9,53	3/8	16,50	.650	3,18	1/8	1,2	3/64	-	4170863	-	4170788	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TPMT-FP • Finishing Positive



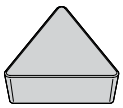


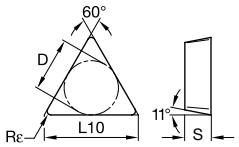
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S						○						●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TPMT110204FP	TPMT2151FP	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	-	-	-	-	-	-	-	-	-	4170113	-	-	-	-	-	-	-	-	-	-
TPMT16T308FP	TPMT3252FP	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	-	-	-	-	-	4168837	-	-	-	4170116	-	-	-	-	-	-	-	-	-	-
TPMT220408FP	TPMT432FP	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,50	.217	-	-	4170340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TPUN/TPU • Medium Machining



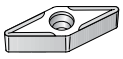


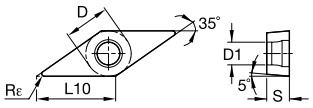
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
TPUN110304	TPU221	6,35	1/4	11,00	.433	3,18	1/8	0,4	1/64	-	4170864	-	4170789	-	-	-	-	-	-	-	-	-	-	-	2028806	-	-	-	-
TPUN110308	TPU222	6,35	1/4	11,00	.433	3,18	1/8	0,8	1/32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2028814	-	-	-	-
TPUN160304	TPU321	9,53	3/8	16,50	.650	3,18	1/8	0,4	1/64	-	4170866	4170645	-	-	-	-	-	-	4170958	-	-	-	-	-	2028821	2562837	-	-	-
TPUN160308	TPU322	9,53	3/8	16,50	.650	3,18	1/8	0,8	1/32	-	4170867	4170646	-	-	-	-	-	-	4170959	-	-	-	-	-	2028830	2028832	-	-	-
TPUN160312	TPU323	9,53	3/8	16,50	.650	3,18	1/8	1,2	3/64	-	-	-	-	-	-	-	-	-	4170960	-	-	-	-	-	2028833	-	-	-	-
TPUN220408	TPU432	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	-	4170868	-	4170790	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPUN220408	TPUN 432	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	-	-	4170648	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPUN220412	TPU433	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	-	-	4170649	4170791	-	-	-	-	-	4170961	-	-	-	-	-	2028843	2028847	-	-	-

VBMT • Medium Machining



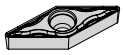


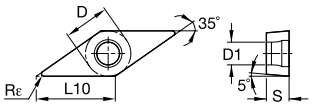
● first choice
○ alternate choice

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S						○						●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VBMT160404	**VBMT331**	9,53	3/8	16,66	.656	4,76	3/16	0,4	1/64	4,45	.175	-	4169983	4170553	4170807	-	-	-	-	-	-	-	-	-	-	-	2028860	-	-	-	-
VBMT160408	**VBMT332**	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	4,40	.173	-	4169984	4170554	4170808	-	-	-	-	6671879	-	-	-	-	-	-	2028870	-	-	-	-
VBMT160412	**VBMT333**	9,53	3/8	16,61	.654	4,76	3/16	1,2	3/64	4,40	.173	-	4169985	-	-	-	-	-	-	-	-	-	-	-	-	-	2028876	-	-	-	-

VBMT-FP • Finishing Positive



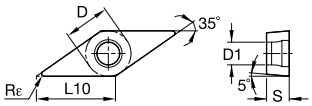


● first choice
○ alternate choice

| | | |

VBMT-MP • Medium Positive





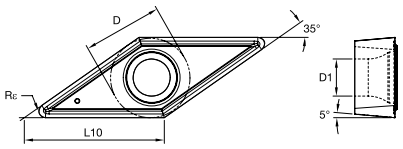
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VBMT160404MP	VBMT331MP	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	4,40	.173	-	-	4170235	-	-	4168921	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VBMT160408MP	VBMT332MP	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	4,40	.173	-	-	4170236	-	-	4168922	-	-	-	4170254	-	-	-	-	-	-	-	-	-	-

VBMT-1P • Finishing



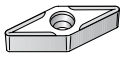


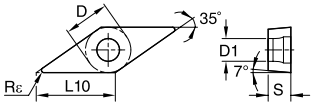
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VBMT1604041P	VBMT3311P	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6869672	6868867
VBMT1604081P	VBMT3321P	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	4,40	.173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6869673	6868868

VCMT • Medium Machining





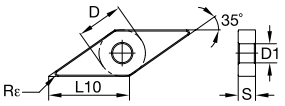
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●
M						○	●	●	●					●	●		○					●	●	●
K		○	○	○						●	●	●	○	○		○		●			○	○
N													○	○	●	●		○			○	○
S							○						●	●		○		○		○	●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VCMT16T304	VCMT3251	9,53	3/8	16,61	.654	3,97	5/32	0,4	1/64	4,40	.173	-	-	-	-	-	-	-	-	6672411	-	-	-	-	-	-	2563826	-	-	-	-
VCMT16T308	VCMT3252	9,53	3/8	16,61	.654	3,97	5/32	0,8	1/32	4,40	.180	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-

VNGG-FS • Finishing Sharp



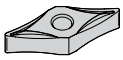


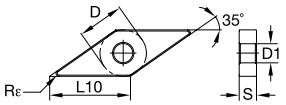
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M						○	●	●	●					●	●		○					●	●	●
K		○	○	○						●	●	●	○	○		○		●			○	○
N													○	○	●	●		○			○	○
S							○						●	●		○		○		○	●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNGG160402FS	VNGG3305FS	9,53	3/8	16,61	.654	4,76	3/16	0,2	.008	3,81	.150	-	-	-	-	-	-	-	-	-	-	5548683	-	5549999	-	-	-	-	-	-	-
VNGG160401FS	VNGG330FS	9,53	3/8	16,61	.654	4,76	3/16	0,1	.004	3,81	.150	-	-	-	-	-	-	-	-	-	-	5548684	-	5550000	-	-	-	-	-	-	-
VNGG160404FS	VNGG331FS	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	-	-	-	-	-	5548685	-	5550001	-	-	-	-	-	-	-
VNGG160408FS	VNGG332FS	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	-	-	5548686	5538233	5550002	-	-	-	-	-	-	-

VNGP • Medium Machining





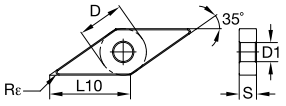
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNGP160402	VNGP3305	9,53	3/8	16,61	.654	4,76	3/16	0,2	.008	3,81	.150	-	-	-	-	-	-	-	-	-	-	5549196	-	-	-	-	-	-	-	-	-
VNGP160401	VNGP330	9,53	3/8	16,61	.654	4,76	3/16	0,1	.004	3,81	.150	-	-	-	-	-	-	-	-	-	-	5549195	-	5549211	-	-	-	-	-	-	-
VNGP220408	VNGP432	12,70	1/2	22,14	.872	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	-	-	5549212	-	-	-	-	-	-	-

VNMA • Roughing





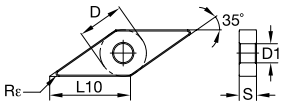
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●					●	●		○					●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMA160408	VNMA332	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	4171652	-	4171897	-	-	-	-	-	-	-	-	-	-

VNMG • Medium Machining



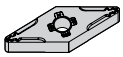


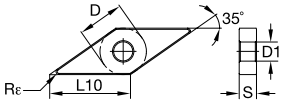
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●				●	●		○						●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMG12T304	VNMG12T304	7,14	9/32	12,45	.490	3,97	5/32	0,4	.016	3,60	.142	-	-	-	-	-	-	-	-	-	-	5095163	5095164	-	-	-	-	-	-	-	-
VNMG12T308	VNMG12T308	7,14	9/32	12,45	.490	3,97	5/32	0,8	.031	3,60	.142	-	-	-	-	-	-	-	-	-	4170965	5095165	5095166	-	-	-	-	-	-	-	-

VNMG-FF • Fine Finishing



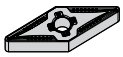


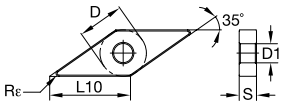
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●				●	●		○						●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S							○					●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMG160404FF	VNMG331FF	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	-	4171053	-	-	-	4172694	-	-	-	-	5684334	-	-	-	-	-	-	-	-	-
VNMG160408FF	VNMG332FF	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	4171054	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

VNMG-ML • Medium Machining



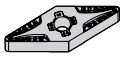


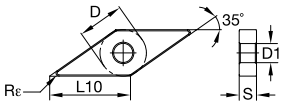
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●										
M					○	●	●	●					●	●		○				●	●											
K		○	○	○					●	●	●	○	○		○		●				○	○										
N													○	○	●	●		○														
S							○						●	●		○		○		○	●											
H																																

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMG160404ML	VNMG331ML	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	-	4171079	4170495	-	-	-	-	-	-	4171413	-	-	-	-	-	-	-	-	-	-
VNMG160408ML	VNMG332ML	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	4171080	4170496	-	-	-	-	-	-	4171414	-	-	-	-	-	-	-	-	-	-

VNMG-MR • Medium Roughing



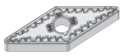


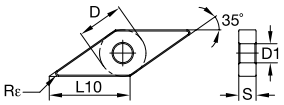
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●										
M					○	●	●	●					●	●		○				●	●											
K		○	○	○					●	●	●	○	○		○		●				○	○										
N													○	○	●	●		○														
S							○						●	●		○		○		○	●											
H																																

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMG160408MR	VNMG332MR	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	4171157	4170580	4170066	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

VNMG-MS • Medium Sharp





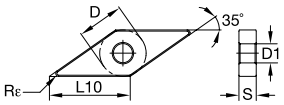
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●					●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●				○	○
N												○	○	●	●		○				○	○
S						○						●	●		○		○		○		●	●
H																					○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMG160404MS	VNMG331MS	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	-	-	-	-	-	5908944	5908945	5908946	-	-	-	-	-	-	-
VNMG160408MS	VNMG332MS	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	-	-	5908947	5908948	5908949	-	-	-	-	-	-	-
VNMG220404MS	VNMG431MS	12,70	1/2	22,14	.872	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908950	5908961	5908962	-	-	-	-	-	-	-
VNMG220408MS	VNMG432MS	12,70	1/2	22,14	.872	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908963	5908964	5908965	-	-	-	-	-	-	-

VNMG-RH • Roughing





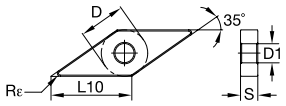
● first choice
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMG160408RH	VNMG332RH	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	-	4171550	4171732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VNMG220408RH	VNMG432RH	12,70	1/2	22,14	.872	4,76	3/16	0,8	1/32	5,16	.203	-	-	4171551	4171733	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VNMG220412RH	VNMG433RH	12,70	1/2	22,14	.872	4,76	3/16	1,2	3/64	5,16	.203	-	4171017	4171552	4171734	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

VNMG-UF • Fine Finishing





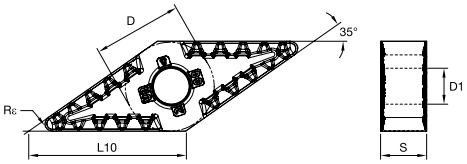
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMG160404UF	VNMG331UF	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	4169372	4169398	-	-	-	-	5645616	-	-	-	-	-	-	-	-	-
VNMG160408UF	VNMG332UF	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	5645618	-	-	4169373	4169399	-	-	-	-	-	-	-	-	-	-	-	-	-	-

VNMG-UR • Universal Roughing



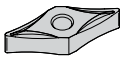


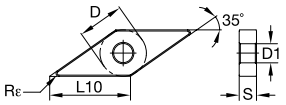
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMG160408UR	VNMG332UR	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	4171123	4170529	-	4169439	4169473	4169508	-	-	4171449	-	-	-	-	-	-	-	-	6942349	6867893
VNMG160412UR	VNMG333UR	9,53	3/8	16,61	.654	4,76	3/16	1,2	3/64	3,81	.150	-	4171124	4170530	-	-	4169474	-	-	-	4171450	5680176	-	-	-	-	-	-	-	6942350	6867894

VNMP • Medium Machining



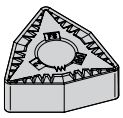


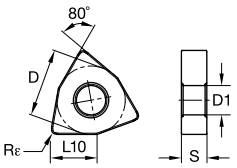
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
VNMP160404	VNMP331	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	-	-	-	-	-	4172497	-	-	-	-	-	-	-	-	-
VNMP160408	VNMP332	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	-	-	4172498	-	-	-	-	-	-	-	-	-

WNGG-FS • Finishing Sharp



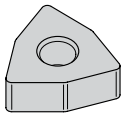


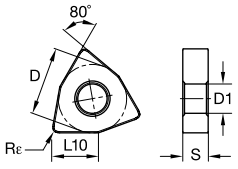
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNGG080404FS	WNGG431FS	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548687	5538234	5550003	-	-	-	-	-	-	-
WNGG080408FS	WNGG432FS	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5548688	-	5550004	-	-	-	-	-	-	-

WNMA • Roughing



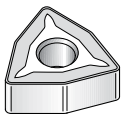


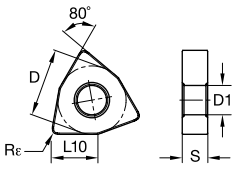
● first choice
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMA060408	WNMA332	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	▪	▪	▪	▪	▪	▪	▪	4171653	▪	4171898	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪
WNMA060412	WNMA333	9,53	3/8	6,52	.257	4,76	3/16	1,2	3/64	3,81	.150	▪	▪	▪	▪	▪	▪	▪	▪	▪	4171899	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪
WNMA080408	WNMA432	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	▪	▪	▪	▪	▪	▪	▪	4171654	6288267	4171900	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪
WNMA080412	WNMA433	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	▪	▪	▪	▪	▪	▪	▪	4171655	6288268	4171901	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪
WNMA080416	WNMA434	12,70	1/2	8,69	.342	4,76	3/16	0,6	1/16	5,16	.203	▪	▪	▪	▪	▪	▪	▪	▪	▪	4171902	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪

WNMG-5 • Roughing





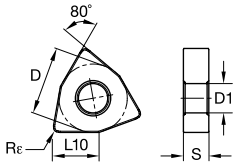
● first choice
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG080408-5	WNMG4325	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	▪	▪	▪	▪	▪	▪	▪	▪	6613603	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪

WNMG-FF • Fine Finishing



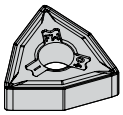


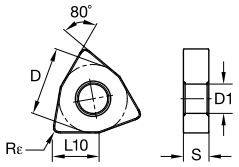
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG060404FF	WNMG331FF	9,53	3/8	6,52	.257	4,76	3/16	0,4	1/64	3,81	.150	-	4171055	-	-	-	-	-	-	-	4171388	-	-	-	-	-	-	-	-	-	-
WNMG060408FF	WNMG332FF	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	-	4171056	-	-	-	-	-	-	-	4171389	-	-	-	-	-	-	-	-	-	-
WNMG080404FF	WNMG431FF	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	-	4171057	-	-	-	4172697	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080408FF	WNMG432FF	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	4171058	-	-	-	4172698	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WNMG-FW • Finishing Wiper





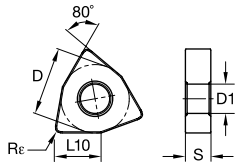
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG080408FW	WNMG432FW	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	5623515	-	-	-	4173110	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WNMG-ML • Medium Machining





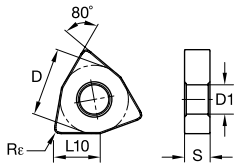
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG060404ML	WNMG331ML	9,53	3/8	6,52	.257	4,76	3/16	0,4	1/64	3,81	.150	-	4171081	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG060408ML	WNMG332ML	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	-	4171082	4170497	-	-	-	-	4171677	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080404ML	WNMG431ML	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	-	4171083	4170498	-	-	-	-	4171678	-	4171417	-	-	-	-	-	-	-	-	-	-	-
WNMG080408ML	WNMG432ML	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	4171084	4170499	-	-	-	-	4171679	-	4171418	-	-	-	-	-	-	-	-	-	-	-

WNMG-MR • Medium Roughing



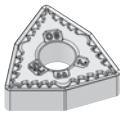


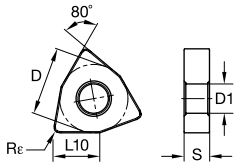
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●											
M					○	●	●	●				●	●		○					●	●	●												
K		○	○	○					●	●	●	○	○		○		●			○	○	○												
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG080408MR	WNMG432MR	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	4171158	4170581	4170067	-	4173033	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080412MR	WNMG433MR	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	-	4171159	4170582	4170068	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080416MR	WNMG434MR	12,70	1/2	8,69	.342	4,76	3/16	1,6	1/16	5,16	.203	-	4171160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WNMG-MS • Medium Sharp



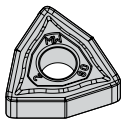


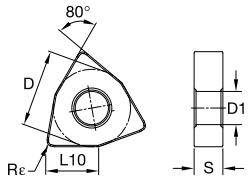
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●									
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K		○	○	○					●	●	●	○	○		○		●				○	○										
N												○	○	●	●		○				○	○										
S							○					●	●		○		○		○		○	●										
H																															

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG060408MS	WNMG332MS	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	-	-	5908966	5908967	5908968	-	-	-	-	-	-	-
WNMG080404MS	WNMG431MS	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908969	5908970	5908971	-	-	-	-	-	-	-
WNMG080408MS	WNMG432MS	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	5908972	5908973	5908974	-	-	-	-	-	-	-

WNMG-MW • Medium Wiper



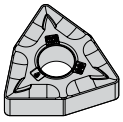


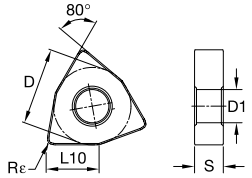
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●		●	●									
M					○	●	●	●				●	●		○					●												
K		○	○	○					●	●	●	○	○		○		●				○	○										
N												○	○	●	●		○				○	○										
S							○					●	●		○		○		○		○	●										
H																															

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG080408MW	WNMG432MW	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	4173118	-	4171695	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080412MW	WNMG433MW	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	4173119	-	4171697	-	-	-	-	-	-	-	-	-	-	-	-

WNMG-RH • Roughing



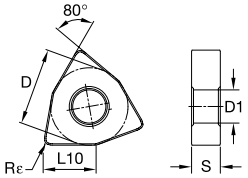


● first choice
○ alternate choice

| | | |

WNMG-UF • Fine Finishing





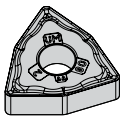
● first choice
○ alternate choice

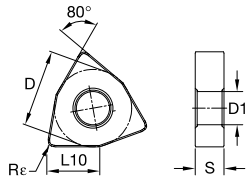
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in
WNMG060404UF	WNMG331UF	9,53	3/8	6,52	.257	4,76	3/16	0,4	1/64	3,81	.150
WNMG060408UF	WNMG332UF	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150
WNMG080404UF	WNMG431UF	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203
WNMG080408UF	WNMG432UF	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203
WNMG080412UF	WNMG433UF	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203

		WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG060404UF	WNMG331UF	-	-	-	-	4169374	4169400	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG060408UF	WNMG332UF	-	-	-	-	-	4169401	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080404UF	WNMG431UF	-	-	-	-	4169376	4169402	-	-	-	-	5645619	-	-	-	-	-	-	-	-	-
WNMG080408UF	WNMG432UF	-	-	-	-	4169377	4169403	-	-	-	-	5645623	-	-	-	-	-	-	-	-	-
WNMG080412UF	WNMG433UF	-	-	-	-	4169378	4169404	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WNMG-UM • Medium Machining





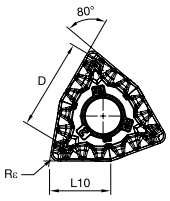
● first choice
○ alternate choice

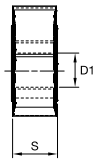
P		●	●	●	●	○	○	○	○	○	○	○	○	○		○	●		●			●	●
M					○	●	●	●						●	●		○						●	●	●
K		○	○	○					●	●	●	○	○			○		●				○	○
N												○	○	●	●		○					○	○
S							○					●	●			○		○		○	●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG060404UM	WNMG331UM	9,53	3/8	6,52	.257	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	4172375	4172403	4172432	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG060408UM	WNMG332UM	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	4172376	4172404	4172433	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG060412UM	WNMG333UM	9,53	3/8	6,52	.257	4,76	3/16	1,2	3/64	3,81	.150	-	-	-	-	-	4172405	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080404UM	WNMG431UM	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	4172377	4172406	4172435	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080408UM	WNMG432UM	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	6496991	-	5645270	-	4172378	4172407	4172436	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080412UM	WNMG433UM	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	6496992	-	-	-	-	4172408	-	-	-	-	5645269	-	-	-	-	-	-	-	-	-

WNMG-UR • Universal Roughing





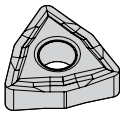


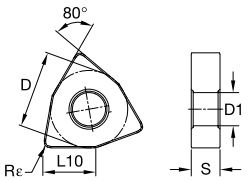
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMG060408UR	WNMG332UR	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	-	4171125	4170531	-	4169441	4169475	-	-	-	4171451	5680178	-	-	-	-	-	-	-	6942361	6867895
WNMG060412UR	WNMG333UR	9,53	3/8	6,52	.257	4,76	3/16	1,2	3/64	3,81	.150	-	4171126	4170532	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WNMG080408UR	WNMG432UR	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	4171127	4170533	4170040	4169442	4169476	4169509	5680179	-	4171453	-	-	-	-	-	-	-	-	6942362	6867896
WNMG080412UR	WNMG433UR	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	-	4171128	4170534	4170041	-	4169477	4169510	-	-	4171454	5579420	-	-	-	-	-	-	-	6942363	6867897
WNMG080416UR	WNMG434UR	12,70	1/2	8,69	.342	4,76	3/16	1,6	1/16	5,16	.203	-	-	-	-	-	4169478	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WNMP • Medium Machining



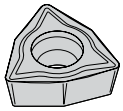


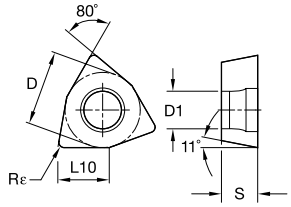
● first choice
○ alternate choice

P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
H																				○	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WNMP080408	WNMP432	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	-	-	4172499	-	-	-	-	-	-	-	-	-

WPMT-FP • Finishing Positive





● first choice
○ alternate choice

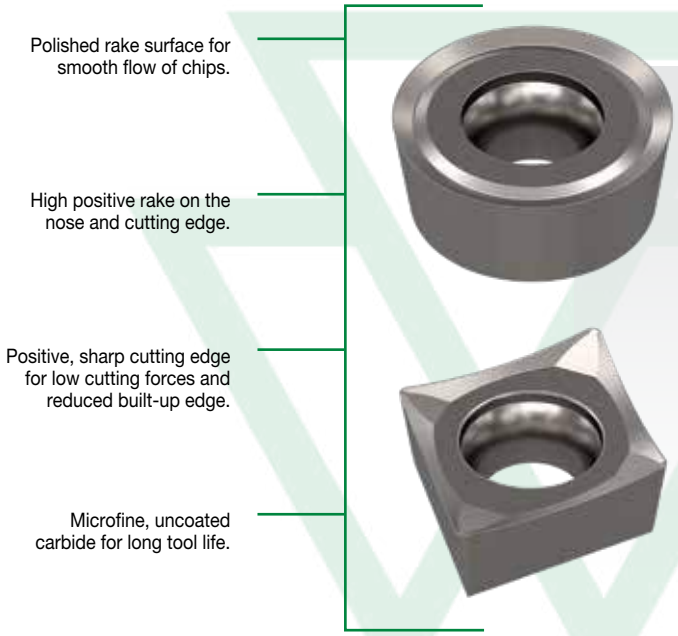
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P		●	●	●	●	○	○	○	○	○	○	○	○		○	●		●		●	●
M					○	●	●	●				●	●		○				●	●	●
K		○	○	○					●	●	●	○	○		○		●			○	○
N												○	○	●	●		○			○	○
S							○					●	●		○		○		○	●	●
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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WP05CT	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK15CT	WK20CT	WS10PT	WS25PT	WU10HT	WU05PT	WP20TT	THM	TTR	WM20CT	WU10PT	WU25PT
WPMT06T308FP	WPMT3252FP	9,53	3/8	6,52	.257	3,97	5/32	0,8	1/32	4,40	.173	-	-	4170342	-	-	4168840	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Inserts for Aluminum

-AL Geometry

The AL geometry ISO turning series offers various grades and popular styles, giving customers more versatility and optionality when machining aluminum and non-ferrous metal materials in medium to finish turning applications.



The AL geometry inserts are available in uncoated microfine carbide, as well as advanced ALTiN PVD coating with sharp cutting edges, polished rake faces and positive rakes to enable short set-up times and extend the tool life.

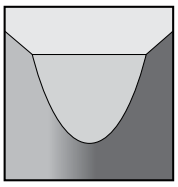
INSERTS FOR ALUMINUM

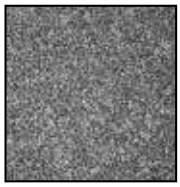
VERSATILE **RELIABLE** **AFFORDABLE**

MEDIUM TO FINISHING ALUMINUM TURNING

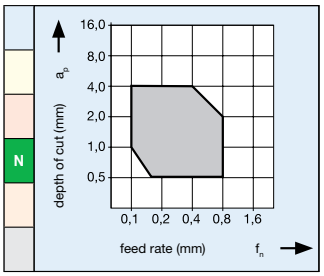
WU10HT/WU05PT • GRADE INFORMATION

A hard, unalloyed, low-binder content with fine-grained carbide. WU10HT/WU05PT are wear-resistant, uncoated carbide grades for machining of aluminum and other non-ferrous materials.





WU10HT/WU05PT



For cost-effective machining of aluminum, non-ferrous metals, and plastics. Extremely sharp cutting edges result in optimum part finishes with low cutting forces and short chips.

Conditions	Geometry AL
Lightly Interrupted Cut	WU10HT/WU05PT
Varying Depth of Cut	WU10HT/WU05PT
Smooth Cut	WU10HT/WU05PT

APPLICATIONS

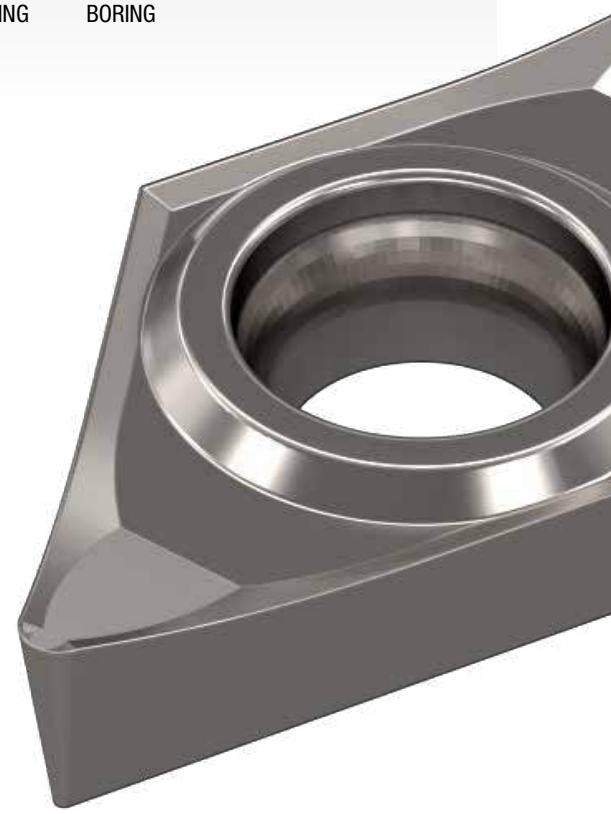
TURNING FACING PROFILING CHAMFERING BORING

INDUSTRY

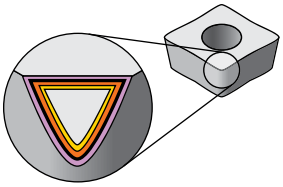
GENERAL ENGINEERING

AEROSPACE

TRANSPORTATION

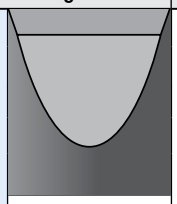
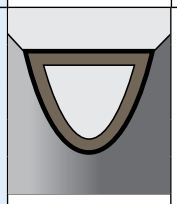


Grades and Grade Descriptions



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Coating	Grade Description	wear resistance ← → toughness									
			05	10	15	20	25	30	35	40	45
WU10HT  HW-N10	Uncoated carbide. Highly wear-resistant microfine substrate. Suitable for finish turning applications in aluminum and all types of non-ferrous materials, stainless steel, and high-temp alloys with suitable edge preparation. Mainly applied in continuous cuts.										
		M									
		N									
		S									
WU05PT  HC-N05	Coated carbide. PVD AlTiN-coated grade with microfine substrate and highly wear-resistant coating. Suitable for finish turning in aluminum and other non-ferrous materials and also steels, stainless steel, and high-temp alloys with reliability in continuous cuts with suitable edge preparation.	P									
		M									
		K									
		N									
		S									

CUTTING SPEED RECOMMENDATION • N • INCH

Low-Silicon Aluminum Alloys (hypoeutectic <12,2% Si) and Magnesium Alloys

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	1250 (4000)	1500 (4800)	1750 (5600)	2000 (6400)	2250 (7200)	2500 (8000)	Starting Conditions m/min	Starting Conditions SFM
N1	WU10HT		◁▷									488	1597

Low-Silicon Aluminum Alloys (hypoeutectic <12,2% Si) and Magnesium Alloys

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	1250 (4000)	1500 (4800)	1750 (5600)	2000 (6400)	2250 (7200)	2500 (8000)	Starting Conditions m/min	Starting Conditions SFM
N2	WU10HT		◁▷									488	1597

High-Silicon Aluminum Alloys (hypereutectic >12,2% Si) and Magnesium Alloys

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	1250 (4000)	1500 (4800)	1750 (5600)	2000 (6400)	2250 (7200)	2500 (8000)	Starting Conditions m/min	Starting Conditions SFM
N3	WU10HT		◁▷									488	1597
	WU05PT		◁▷									550	1800

Copper-, Brass-, Zinc-Based on a Machinability Index Range of 70–100

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions SFM
N4	WU10HT	◁▷				259	847
	WU05PT	◁▷				275	900

Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass, and Glass

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions m/min
N5	WU10HT	◁▷				170	550
	WU05PT	◁▷				170	550

Carbon and Graphite Composites: Brush Alloys, Kevlar, and Graphite (280–400 HB) (30–43 HRC)

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions m/min
N6	WU05PT	◁▷				200	650

MMCs (Aluminum-Based Metal Matrix Composites)

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions SFM
N7	WU10HT	◁▷				180	589

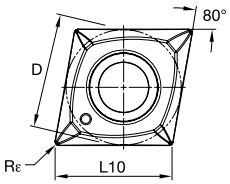
Tin Alloys, Cast: ASTM 823, Alloys 1, 2, 3, 11

Speed — m/min (SFM)

material group	grade	250 (800)	500 (1600)	750 (2400)	1000 (3200)	Starting Conditions m/min	Starting Conditions SFM
N8	WU05PT	◁▷				215	700

CCGT-AL • Inserts for Aluminum





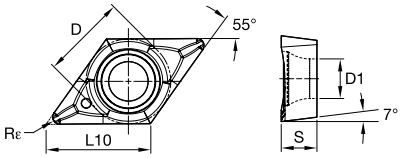
● first choice
○ alternate choice

P			○
M			○
K			○
N		●	●
S		○	○
H			

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WU10HT	WU05PT
CCGT060202AL	CCGT21505AL	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	6846528	-
CCGT060204AL	CCGT2151AL	6,35	1/4	6,47	.255	2,38	3/32	0,4	.016	2,79	.110	6846529	6968709
CCGT060208AL	CCGT2152AL	6,35	1/4	6,45	.254	2,38	3/32	0,8	.031	2,80	.110	6846530	6968710
CCGT09T302AL	CCGT32505AL	9,53	3/8	9,67	.381	3,97	5/32	0,2	.008	4,40	.173	6846581	-
CCGT09T304AL	CCGT3251AL	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	6846582	6968751
CCGT09T308AL	CCGT3252AL	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	6846583	6968752
CCGT120402AL	CCGT4305AL	12,70	1/2	12,90	.508	4,76	3/16	0,2	.008	5,50	.217	6846584	-
CCGT120404AL	CCGT431AL	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	5,50	.217	6846585	6968753
CCGT120408AL	CCGT432AL	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,50	.217	6846586	6968754

DCGT-AL • Inserts for Aluminum





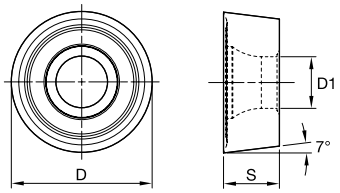
● first choice
○ alternate choice

P	○
M	○
K	○
N	● ●
S	○ ○
H	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WU10HT	WU05PT
DCGT070202AL	DCGT21505AL	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,90	.114	6846587	-
DCGT070204AL	DCGT2151AL	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,90	.114	6846588	6968755
DCGT11T302AL	DCGT32505AL	9,53	3/8	11,63	.458	3,97	5/32	0,2	.008	4,40	.173	6846589	-
DCGT11T304AL	DCGT3251AL	9,53	3/8	11,59	.457	3,97	5/32	0,4	.016	4,40	.173	6846590	6968756
DCGT11T308AL	DCGT3252AL	9,53	3/8	11,63	.458	3,97	5/32	0,8	.031	4,40	.173	6846591	6968757

RCGT-AL • Inserts for Aluminum





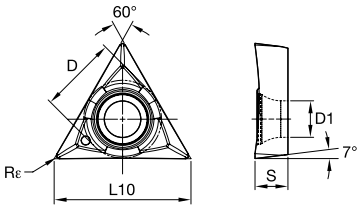
● first choice
○ alternate choice

P	○
M	○
K	○
N	● ●
S	○ ○
H	

ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	D1 mm	D1 in	WU10HT	WU05PT
RCGT0803M0AL	RCGT0803M0AL	8,00	.315	3,18	1/8	3,40	.134	-	6968758
RCGT1204M0AL	RCGT1204M0AL	12,00	.4724	4,76	3/16	4,40	.173	6846592	-

TCGT-AL • Inserts for Aluminum





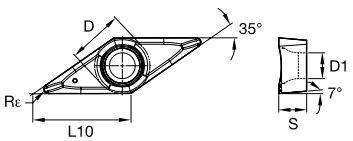
● first choice
○ alternate choice

P	○
M	○
K	○
N	● ●
S	○ ○
H	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WU10HT	WU05PT
TCGT110204AL	TCGT2151AL	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	6846593	6968759
TCGT16T304AL	TCGT3251AL	9,53	3/8	16,51	.650	3,97	5/32	0,4	.016	4,40	.173	6846594	6968760
TCGT16T308AL	TCGT3252AL	9,53	3/8	16,50	.650	3,97	5/32	0,8	.031	4,40	.173	6846595	6968761

VCGT-AL • Inserts for Aluminum





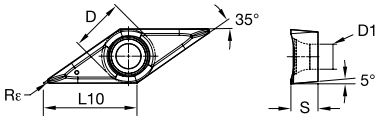
● first choice
○ alternate choice

P	○
M	○
K	○
N	● ●
S	○ ○
H	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WU10HT	WU05PT
VCGT160404AL	VCGT331AL	9,53	3/8	16,61	.654	4,76	3/16	0,4	.031	4,40	.173	-	6968762
VCGT160408AL	VCGT332AL	9,53	3/8	16,61	.654	4,76	3/16	0,8	.031	4,40	.173	-	6968763

VBGT-AL • Inserts for Aluminum





● first choice
○ alternate choice

P			○										
M			○										
K			○										
N		●	●										
S		○	○										
H													

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WU10HT	WU05PT
VBGT160404AL	**VBGT331AL**	9,53	3/8	16,61	.654	4,76	3/16	0,4	.016	4,40	.173	6846596	-
VBGT160408AL	**VBGT332AL**	9,53	3/8	16,46	.648	4,76	3/16	0,8	.031	4,40	.173	6846597	-

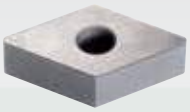
Advanced Material Inserts

Ceramic, PcBN, PCD Inserts

Hard part turning, along with the machining of cast irons, high-temp alloys, and non-ferrous materials, can be accomplished through the use of inserts made from advanced materials. These advanced materials include ceramics, PcBN (polycrystalline cubic boron nitride), and PCD (polycrystalline diamond).

ADVANCED MATERIAL INSERT COMPOSITION

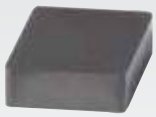
CERAMIC INSERTS



- Silicon-nitride based ceramic for cast iron machining.
- Mixed ceramic for hard machining and finishing of cast iron.
- Whisker ceramic for high-temp alloy and hard part turning.



PCBN SOLID INSERTS



- Inserts are made only from PcBN.
- No material joint.
- Best heat-absorption capacity.
- Can work at highest temperatures.
- Inserts suitable for hard part turning with interruptions.

PcBN Tipped Inserts



- Require a carrier and a PcBN tip.
- The tips are brazed to a carrier.
- The substrate has to have a pocket that will accommodate and support the tip.
- Inserts are available in Multi Tip.
- Inserts suitable for hard part turning in continuous and interrupted applications.

PCD Inserts



- Targeted machining of non-ferrous materials.
- Significant advantage in hardness over carbide tools.
- Increased productivity through higher speeds and longer tool life.
- Best used in processing materials that are un-machinable with conventional tooling.

ADVANCED MATERIAL INSERTS

MATERIALS

K H

CERAMIC

- Ceramics offer greater wear resistance and toughness.
- Ceramics can be used in high-speed, continuous, and lightly interrupted turning applications in cast iron materials.
- Ceramics can be used for high-speed applications in high-temp alloys.
- Ceramics can also be used for hard part turning.

MATERIALS

H

PCBN

- PVD-coated grades available.
- Complete range of CBN grades for continuous to heavily interrupted turning.
- Industry-leading grades for gray cast iron machining.
- Full line of grades for hard part turning.
- For best performance: solid, full-top, and tipped inserts are available.

MATERIALS

N

PCD

- Two PCD grades — WDN25U and WDN00U — cover a wide range of applications.
- New grades provide outstanding performance to increase productivity and cut manufacturing costs.
- High abrasion and chipping resistance.
- Used in machining aluminum alloys with low- and high-silicon content, copper alloys, ceramics, and plastics.
- Suitable for machining highly abrasive materials such as titanium and Metal Matrix Composites (MMC).

INDUSTRY

GENERAL ENGINEERING

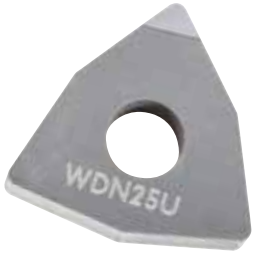
TRANSPORTATION

ENERGY

MEDICAL

ENERGY





Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

C — Insert Shape

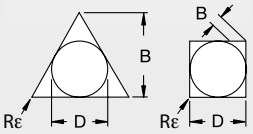
H	Hexagon 120°
O	Octagon 135°
P	Pentagon 108°
R	Round —
S	Square 90°
T	Triangular 60°
C D E M V	Rhomboid 80° 55° 75° 86° 35°
W	Trigon 80° with enlarged corner angles
L	Rectangular 90°
A B N/K	Parallelogram 85° 82° 55°

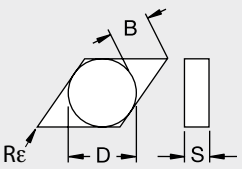
C — Insert Clearance Angle

A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	For other clearance angles requiring descriptions.

G — Tolerance Class

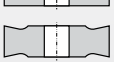
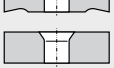
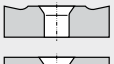
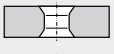
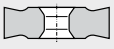
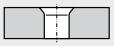
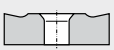
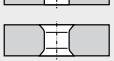
Tolerances apply prior to edge prep and coating





D = Theoretical diameter of the insert inscribed circle
S = Thickness
B = See figures below

W — Insert Features

N	
R	
F	
A	
M	
G	
W	
T	
Q	
U	
B	
H	
C	
J	
X V	Special Design

2 — Size

"D" inch	"D" inch	Code for inch cutting edge length "L10" C	D	R	S	T	V	W
1.2 (5)	5/32	S4	04	03	03	06	—	—
1.5 (6)	3/16	04	05	04	04	08	08	S3
1.8 (7)	7/32	05	06	05	05	09	09	03
—	.236	—	—	06	—	—	—	—
2	1/4	06	07	06	06	11	11	04
2.5	5/16	08	09	07	07	13	13	05
—	.315	—	—	08	—	—	—	—
3	3/8	09	11	09	09	16	16	06
—	.394	—	—	10	—	—	—	—
3.5	7/16	11	13	11	11	19	19	07
—	.472	—	—	12	—	—	—	—
4	1/2	12	15	12	12	22	22	08
4.5	9/16	14	17	14	14	24	24	09
5	5/8	16	19	15	15	27	27	10
—	.630	—	—	16	—	—	—	—
5.5	11/16	17	21	17	17	30	30	11
6	3/4	19	23	19	19	33	33	13
—	.787	—	—	20	—	—	—	—
7	7/8	22	27	22	22	38	38	15
—	.984	—	—	25	—	—	—	—
8	1	25	31	25	25	44	44	17
10	1-1/4	32	38	31	31	54	54	21
—	1.260	—	—	32	—	—	—	—

tolerance class*	tolerance on "D"	tolerance on "B"	tolerance on "S"
C	±.0010"	±.0005"	±.001"
H	±.0005"	±.0005"	±.001"
E	±.0010"	±.0010"	±.001"
G	±.0010"	±.0010"	±.005"
M	See tables on next page		±.005"
U	See tables on next page		±.005"

**Tolerances apply prior to edge prep and coating.*

Catalog Numbering System

(continued)

15	05		E			C	
Thickness "S"	Corner Radius "Rε"	Hand of Insert (optional)	Cutting Edge (optional)	T-Land Width (optional)	T-Land Angle (optional)	Tip Style (optional)	Chipbreaker (optional)

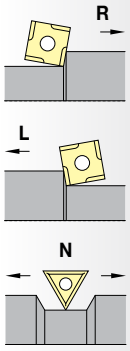
symbol inch	thick-ness inch
.5 (1)	1/32
.6	.040
1 (2)	1/16
1.2	5.64
1.5 (3)	3/32
2	1/8
2.5	5/32
3	3/16
3.5	7/32
4	1/4
5	5/16
6	3/8
7	7/16
8	1/2

symbol inch	corner radius inch
X0	.0015
0	.004
.5	.008
1	1/64
2	1/32
3	3/64
4	1/16
5	5/64
6	3/32
7	7/64
8	1/8
—	round insert
—	

R = Right hand

L = Left hand

N = Neutral



F* Sharp

E Rounded

T* Chamfered

S* Chamfered and Rounded

K Double-Chamfered

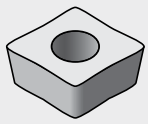
P Double-Chamfered and Rounded

**Also available in wiper style.*

symbol ANSI	inch size
04	.004
08	.008

symbol	size
10	10°
15	15°
20	20°
25	25°
30	30°

symbol	usage
C	full top
M	mini tip
MT	multi-tip
ST	single tip



FW = Finishing Wiper

MW = Medium Wiper

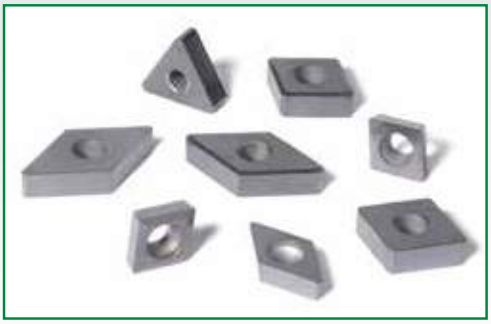
"D" inch	± Tolerance on "D" Class M Tolerance Shapes S, T, C, R, & W inch	Shape D inch	Shape V inch	Class U Tolerance Shapes S, T, & C inch
5/32	.002	–	–	–
3/16	.002	–	–	.003
7/32	.002	.002	.002	.003
1/4	.002	.002	.002	.003
5/16	.002	.002	.002	.003
3/8	.002	.002	.002	.003
7/16	.003	.003	.003	.005
1/2	.003	.003	.003	.005
9/16	.003	.003	.003	.005
5/8	.004	.004	.004	.007
11/16	.004	.004	.004	.007
3/4	.004	.004	.004	.007
7/8	.005	–	–	.010
1	.005	–	–	.010
1 1/4	.006	–	–	.010

"D" inch	± Tolerance on "B" Class M Tolerance Shapes S, T, C, R, & W inch	Shape D inch	Shape V inch	Class U Tolerance Shapes S, T, & C inch
5/32	.003	–	–	–
3/16	.003	–	–	.005
7/32	.003	.004	–	.005
1/4	.003	.004	–	.005
5/16	.003	.004	–	.005
3/8	.003	.004	.007	.005
7/16	.005	.006	–	–
1/2	.005	.006	.010	.008
9/16	.005	.006	–	–
5/8	.006	.007	–	.011
11/16	.006	.007	–	.011
3/4	.006	.007	–	.011
7/8	.006	–	–	.015
1	.007	–	–	.015
1 1/4	.008	–	–	.015

WBH20P™ for Enhanced Performance — Five Unique Features

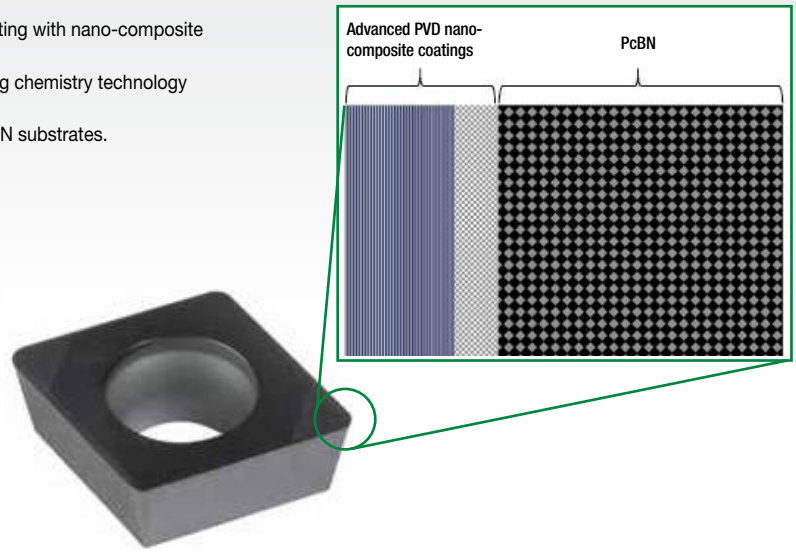
1 Newly developed substrate enables application in a wide variety of demanding situations.

The substrate contains superhard grains with a uniquely formulated size distribution and nano-structured binder phase. This unique combination provides an unparalleled balance of wear resistance and toughness. The net result is a robust hard turning tooling solution for a wide range of applications, including continuous to interrupted cutting.



2 Nano-composite coating that enhances speed capabilities and tool life.

- Specially developed, advanced PVD coating with nano-composite architecture for improved performance.
- Improved wear resistance by PVD coating chemistry technology for machining hardened steels.
- Enhanced PVD coating adhesion on PcBN substrates.



3 Improved edge preparation technology for longer tool life, reliable performance, better surface finish, and tighter workpiece tolerances.

A critical performance factor is the edge preparation itself. The grind direction, surface roughness, hone sizes, and tolerances have great impact on performance and process reliability. WIDIA™ has performed significant research work and optimized edge preparation to improve your overall machining effectiveness.

WBH20P™ for Enhanced Performance — Five Unique Features

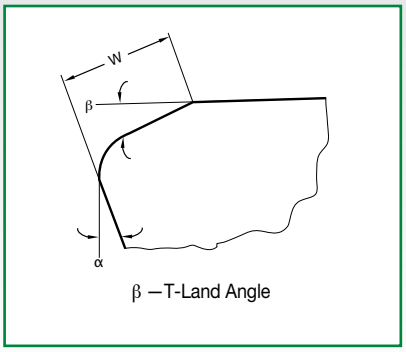
(continued)

4 Large standard portfolio.

Standard edge preparation — the optimum combination of T-land angle, T-land width, and hone size — is paramount in achieving maximum performance. WIDIA™ has developed three standard edge configurations, including wiper inserts.

- Light machining edge prep E.
- Medium machining edge prep S01015.
- Heavy machining edge prep S01025.

E: Honed cutting edge
S01015: W x ß = 0,10mm x 15°
S01025: W x ß = 0,10mm x 25°



β —T-Land Angle

These edge preps are available in common styles, sizes, and nose radii in both positive and negative geometries.

5 CB1 chipbreaker in positive and negative geometries, solving chipbreaking and chip control issues.

Chipbreaker — when machining case-hardened steel with a hard outer skin and a tough and softer core, a chipbreaker provides a great advantage. The CB1 chipbreaker is a proven solution to effectively breaking chips. Long chips can form bird nests, causing machine malfunctions, increasing scrap-rates, and reducing the overall equipment effectiveness.

Available as a custom solution product.





Insert without Chipbreaker



- Long chips.
- Bird-nest formation.

Insert with Chipbreaker



- Chips are broken.

Grade Numbering System — Ceramics

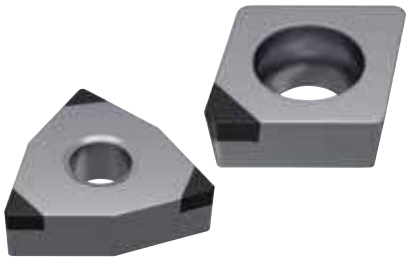
CW	2	0	15
Brand	Cutting Material Group		Application Range
CW = WIDIA™	**2** = CM Mixed (black) ceramic **3** = CR Whisker reinforced ceramic **5** = CN Silicon-nitride ceramic	**0** = Stationary cutting edges (turning, parting, threading) **1** = First successor **2** = Semi-standard rotating cutting edges **3** = Semi-standard general applications **5** = Rotating cutting edges (milling, drilling, reaming)	**05** = fine finishing **10** = finishing **15**, **20**, **25** = medium to roughing **30**, **35** = roughing **40**, **45**, **50** = heaviest roughing



Grade Numbering System — PcBN and PCD

W	B	H	30	P
Brand	Cutting Material Group	Material Range	Application Range	Coating
WIDIA™	**B** = CBN **D** = PCD	**H** = hardened materials **N** = non-ferrous materials	**05** = fine finishing **10** = finishing **15** = medium to roughing **20** = medium to roughing **25** = medium to roughing **30** = roughing **35** = roughing **40** = heaviest roughing **45** = heaviest roughing **50** = heaviest roughing	**U** = Uncoated **C** = CVD Coated **P** = PVD Coated

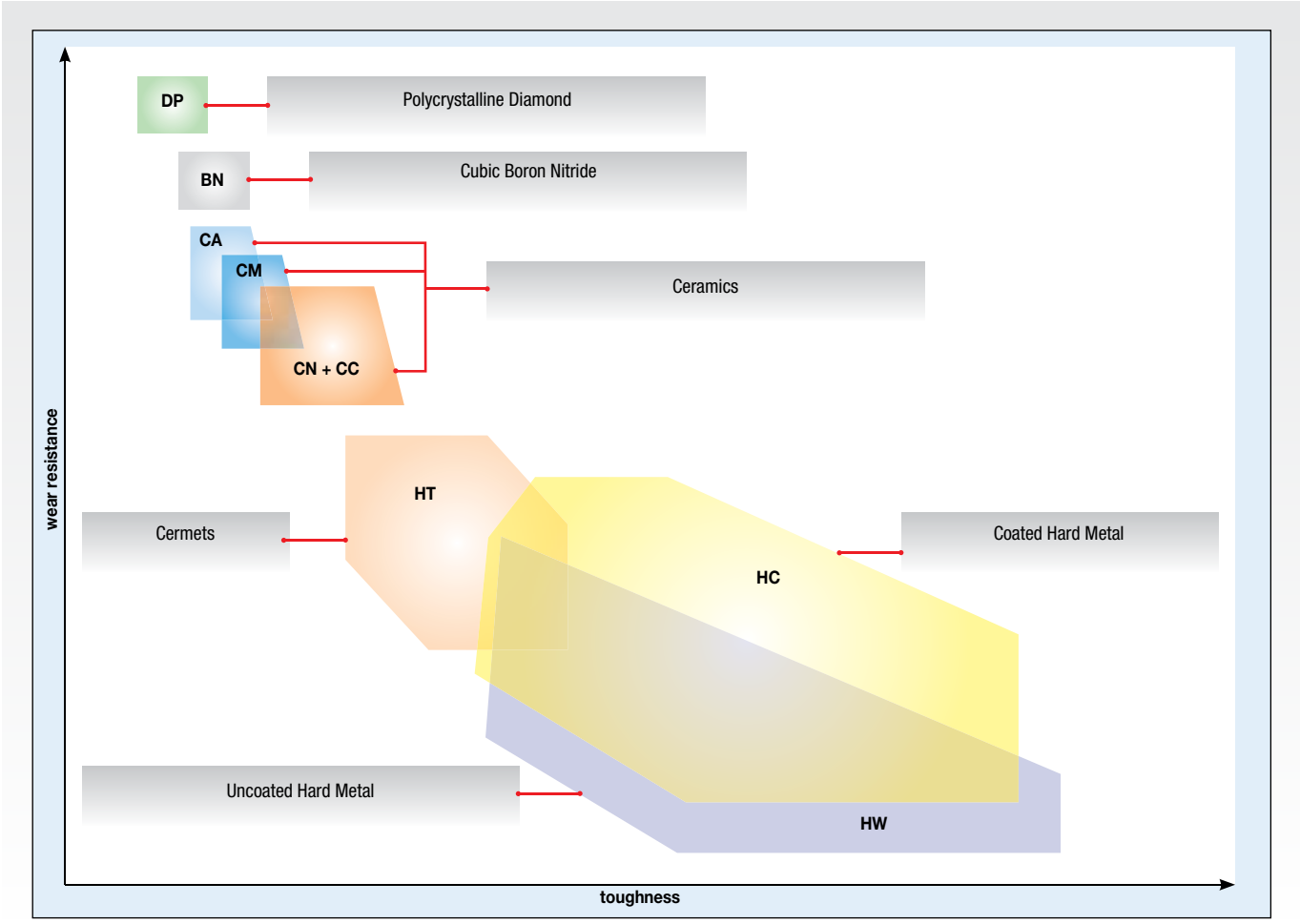
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials
U	Universal Machining



Cutting Material Groups

The cutting tool materials are classified by the combination of their hardness and wear-resistance characteristics.

The extended standard DIN ISO 513 also includes ceramic cutting materials and the super-hard polycrystalline materials, boron nitride and diamond, resulting in additional identification symbols for these cutting material groups.



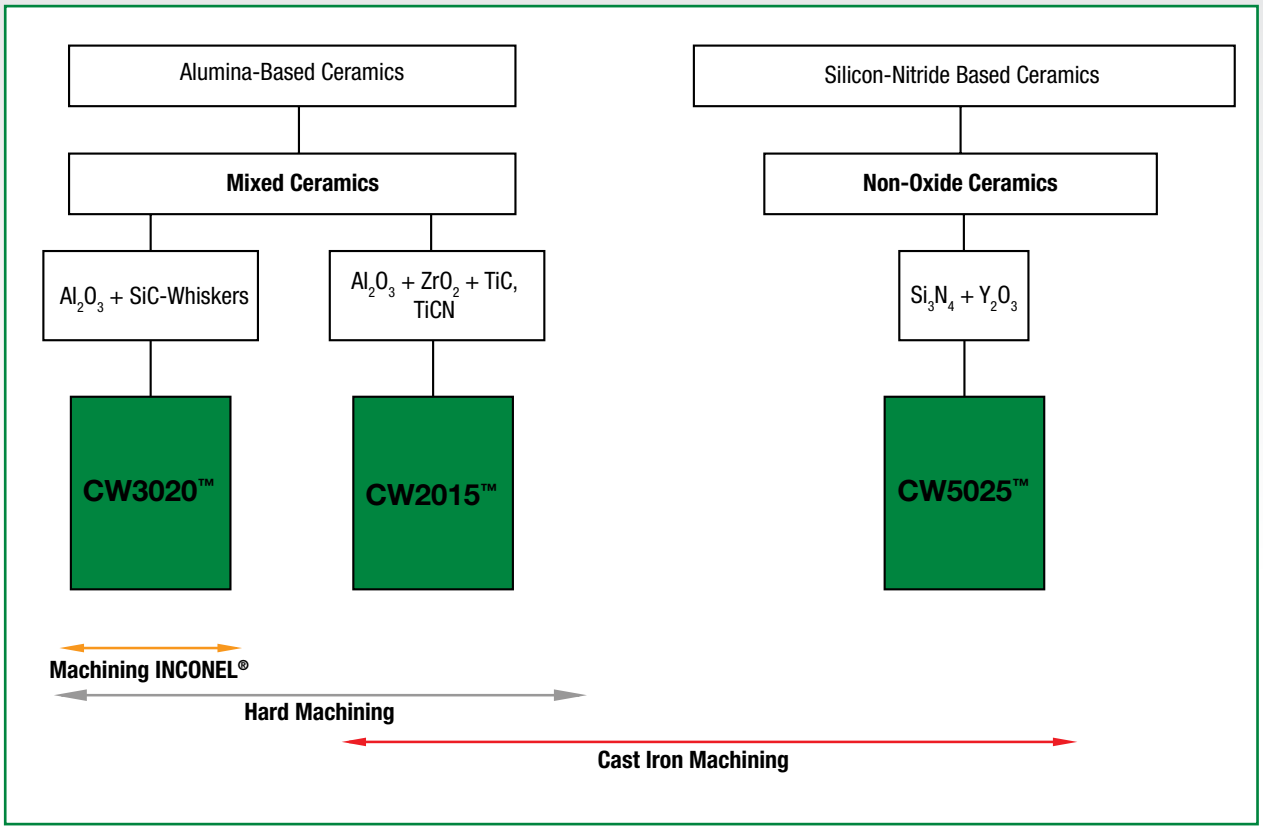
main group	sub-group (symbol)	feature
hard metal	HW	Uncoated WC-base hard metal
	HT	Uncoated TiC/TiN-base hard metal (cermets)
	HC	Coated hard metal
ceramics	CA	Al_2O_3-base oxide ceramics
	CM	Composite ceramics Al_2O_3 + metal carbide
	CN	Si_3N_4-base nitride ceramics
	CC	Coated ceramics
cubic boron nitride	BL	Cubic boron nitride (CBN) with low CBN content
	BH	Cubic boron nitride (CBN) with high CBN content
diamond	DP	Polycrystalline diamond (PCD)

Ceramic Inserts for Hard Turning, Turning in Cast Iron Materials, and Turning in High-Temp Alloys



- Ceramics offer greater wear resistance and toughness.
- Ceramics can be used in high-speed, continuous, and lightly interrupted turning applications in cast iron materials.
- Ceramics can be used for high-speed applications in high-temp alloys.

Ceramic Turning Grades



CW2015™

- Alumina and titanium carbo-nitride.
- High hardness and wear resistance.
- TiCN increases strength and hardness.
- Black in color.

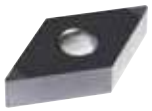
CW3020™

- Alumina + SiC whisker.
- High hardness and wear resistance.
- Whisker ceramic with elongated crystals and very high strength.
- Gray-green color.

CW5025™

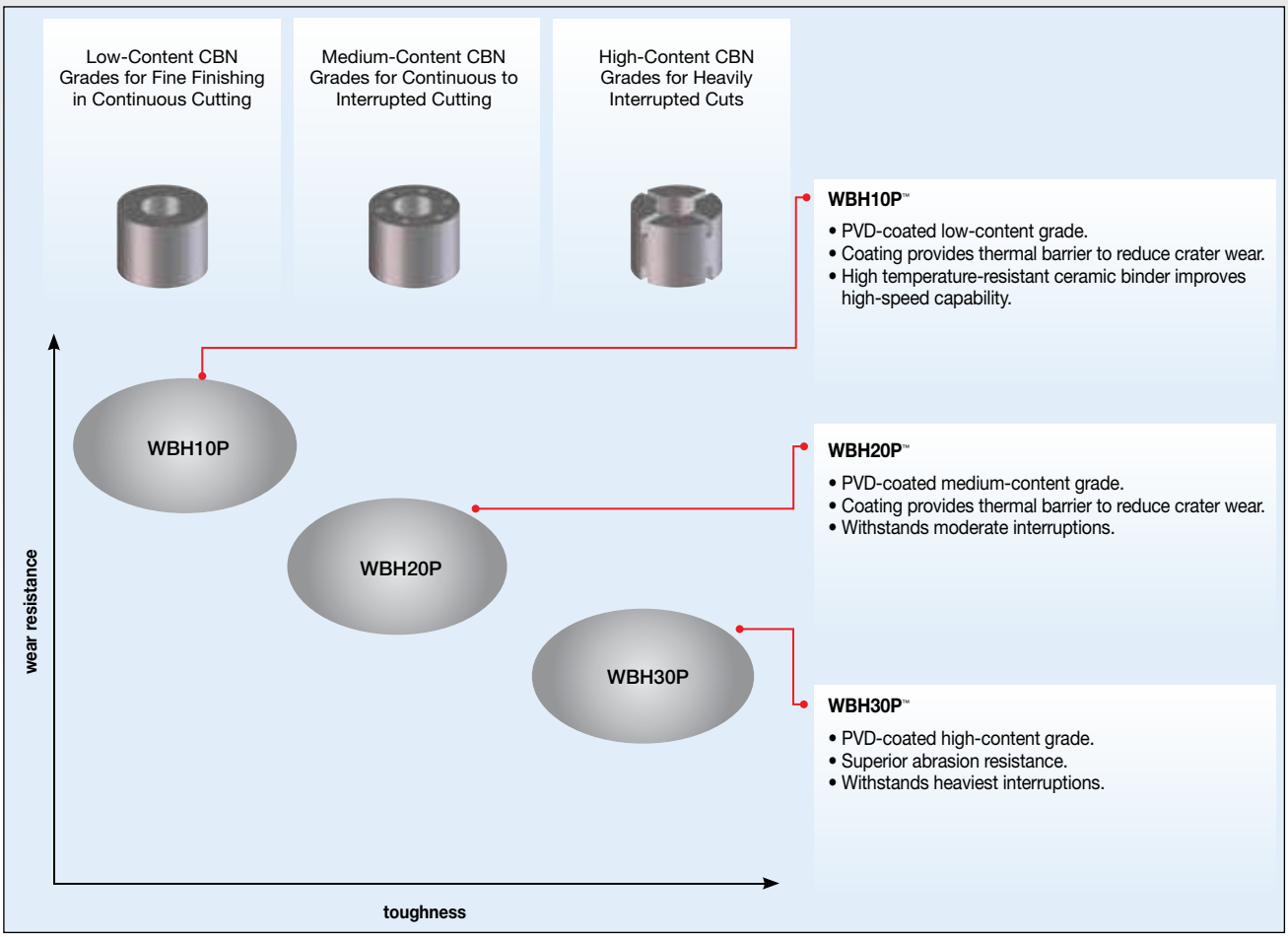
- Pure silicon-nitride composition.
- Used in high-speed turning applications.
- Designed for use in gray cast iron and lower-tensile ductile irons.

PcBN Grades for Hard Turning, Powder Metal, and Gray Cast Iron Machining



- PVD-coated grades available.
- Complete range of CBN grades for continuous to heavily interrupted turning.
- Industry-leading grades for gray cast iron machining.
- Full line of grades for hard turning.
- For best performance: solid, full-top, and tipped inserts are available.

Hard Turning Grades

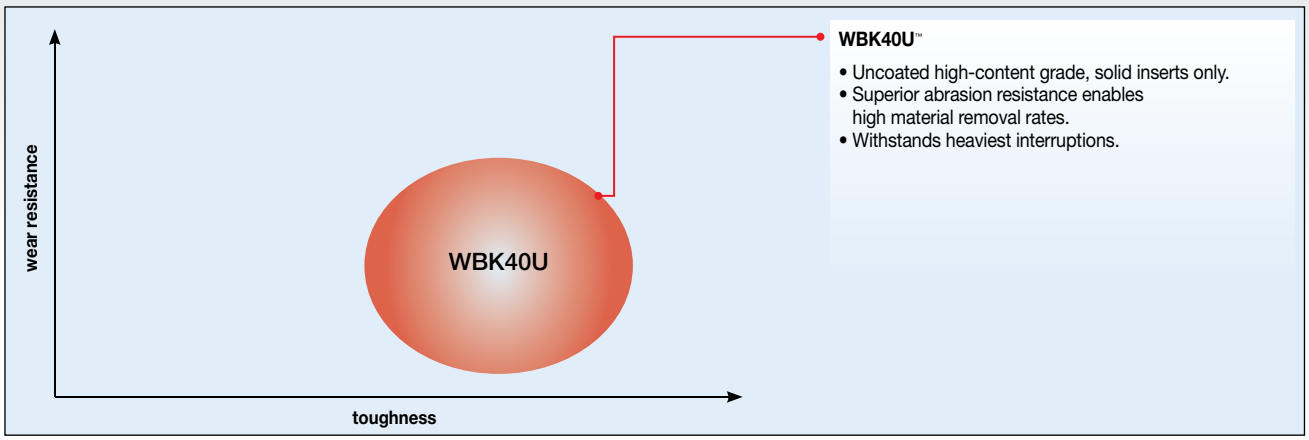


WBH10P™
- PVD-coated low-content grade.
- Coating provides thermal barrier to reduce crater wear.
- High temperature-resistant ceramic binder improves high-speed capability.

WBH20P™
- PVD-coated medium-content grade.
- Coating provides thermal barrier to reduce crater wear.
- Withstands moderate interruptions.

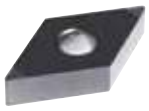
WBH30P™
- PVD-coated high-content grade.
- Superior abrasion resistance.
- Withstands heaviest interruptions.

Gray Cast Iron Grade



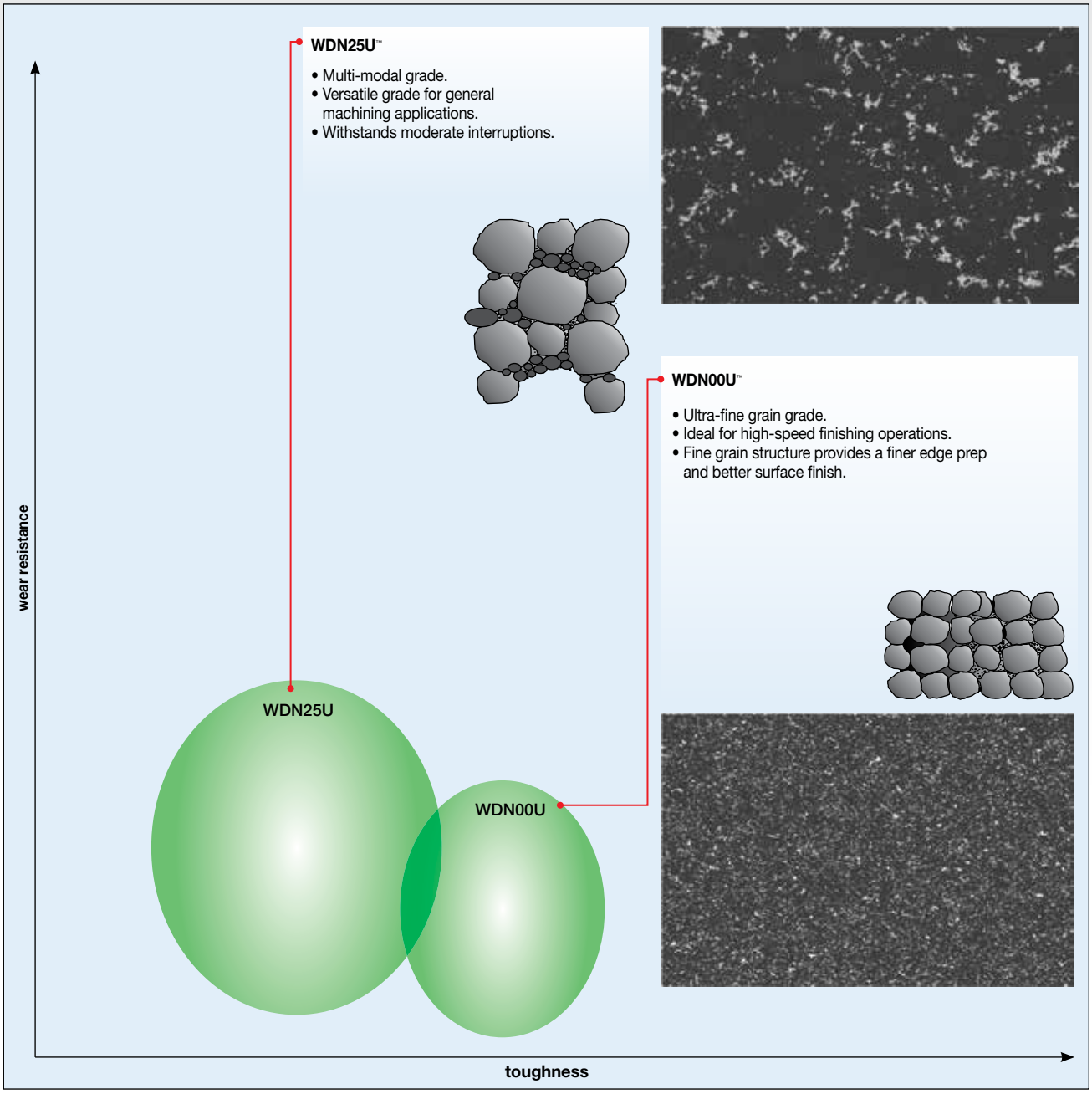
WBK40U™
- Uncoated high-content grade, solid inserts only.
- Superior abrasion resistance enables high material removal rates.
- Withstands heaviest interruptions.

PCD Grades for Turning Non-Ferrous Materials

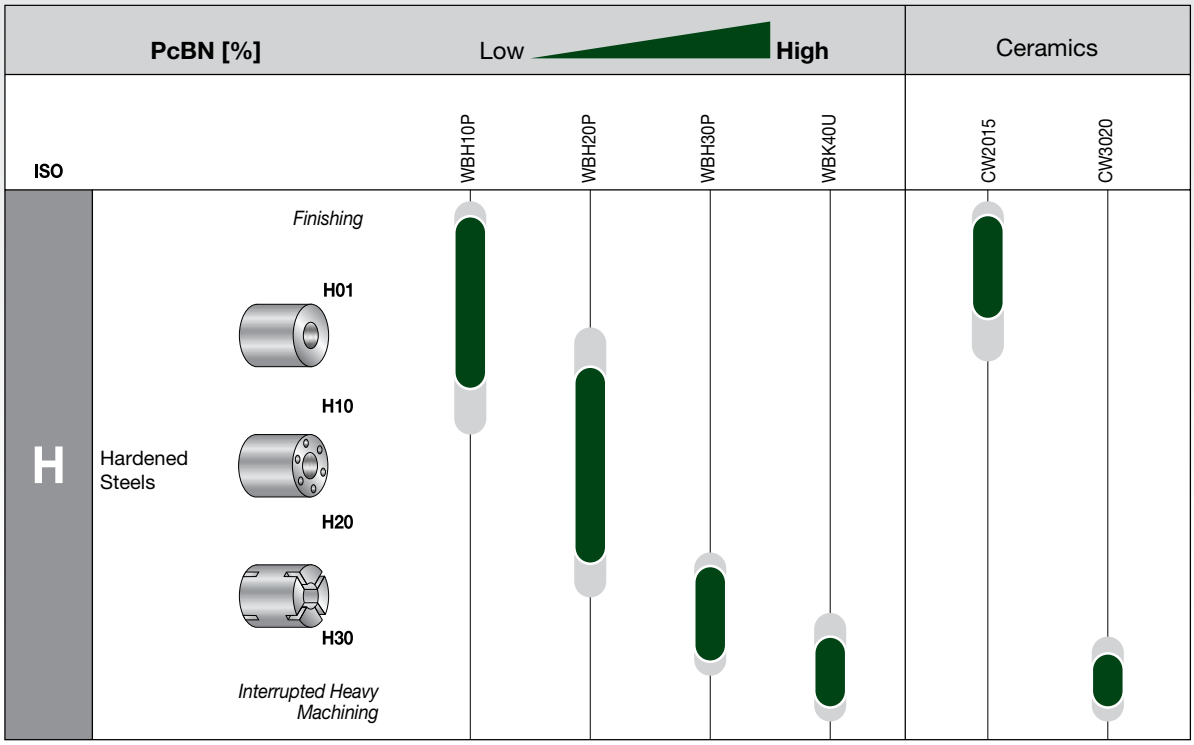


- Two PCD grades — WDN25U and WDN00U — cover a wide range of applications.
- Grades provide outstanding performance to increase productivity and cut manufacturing costs.
- High abrasion and chipping resistance.
- Used in machining aluminum alloys with low- and high-silicon content, copper alloys, ceramics, and plastics.
- Suitable for machining highly abrasive materials such as titanium and Metal Matrix Composites (MMC).

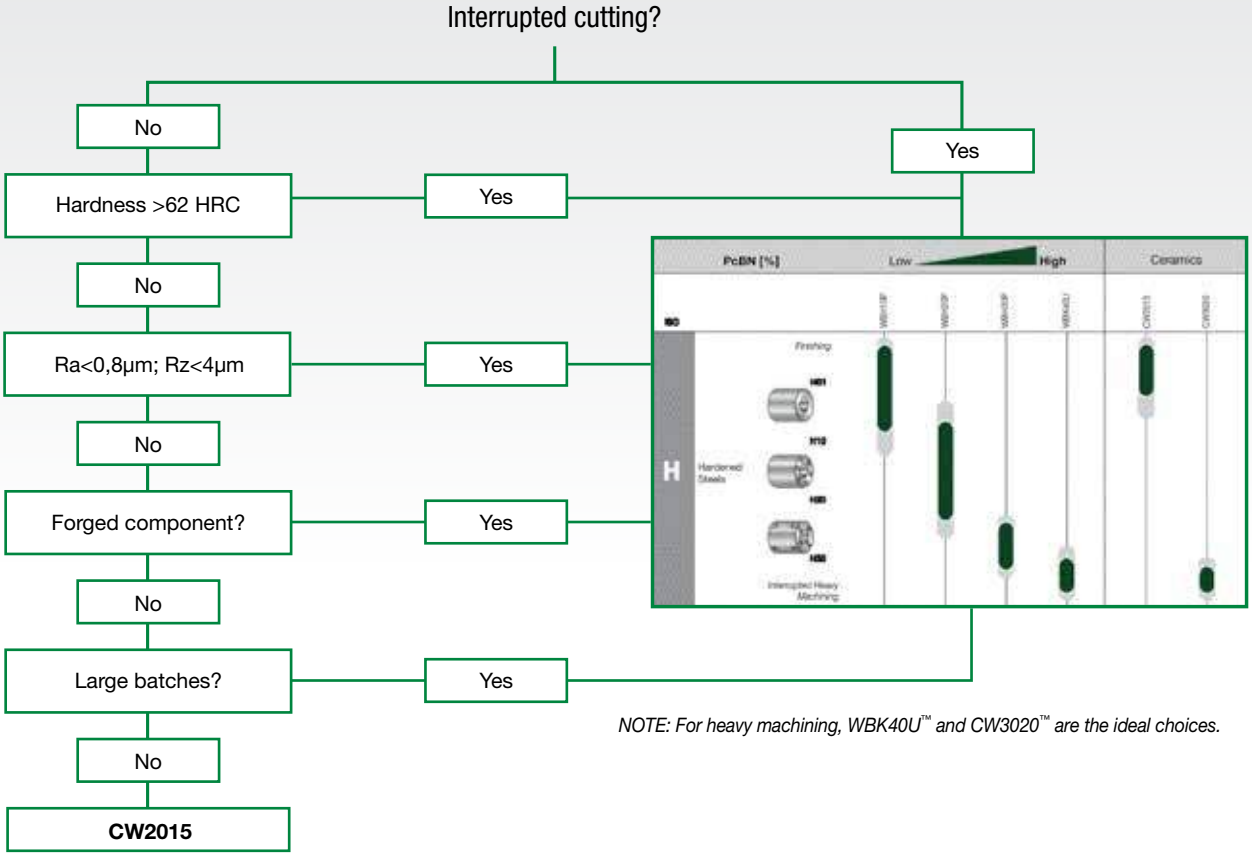
Non-Ferrous Grades



Advanced Materials for Hard Turning

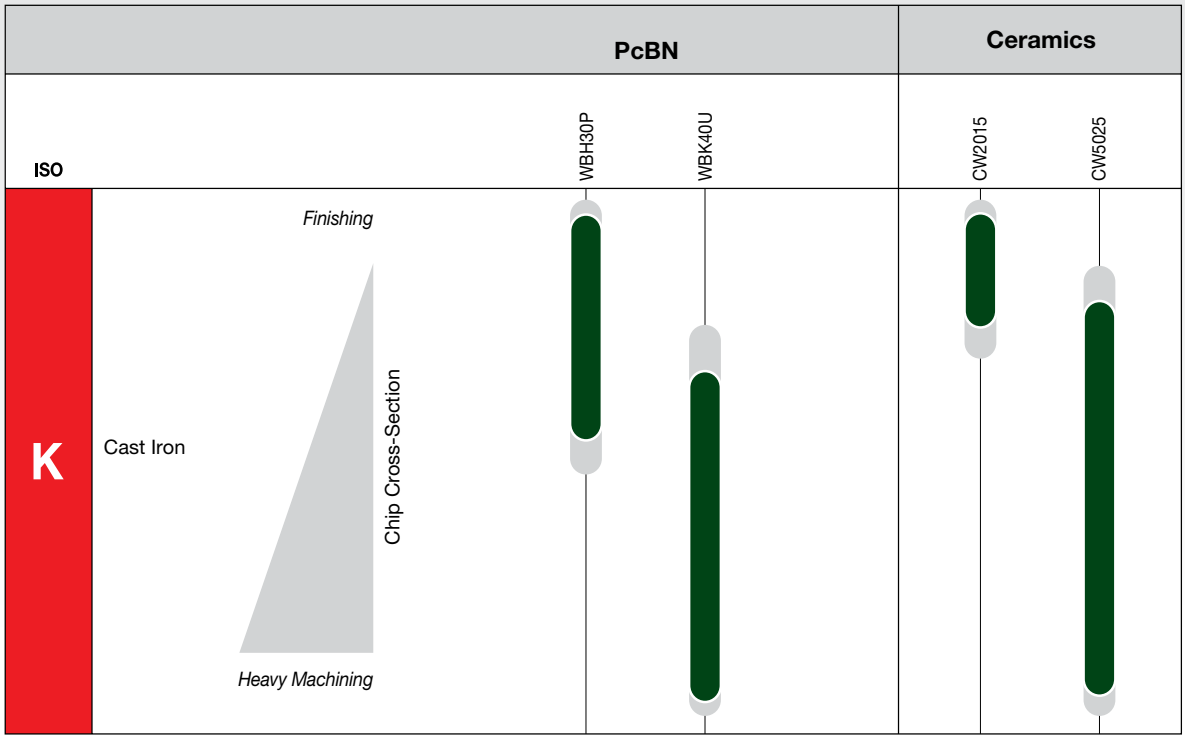


Hard Turning Grade Selection

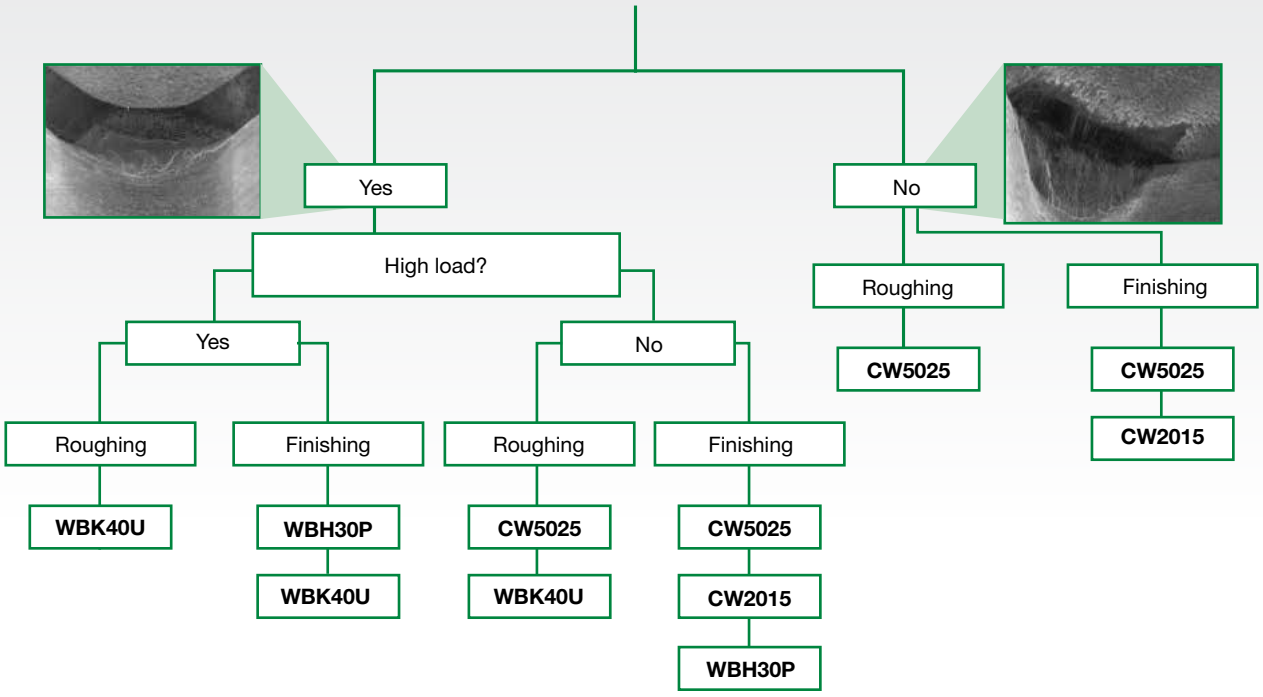


NOTE: For heavy machining, WBK40U™ and CW3020™ are the ideal choices.

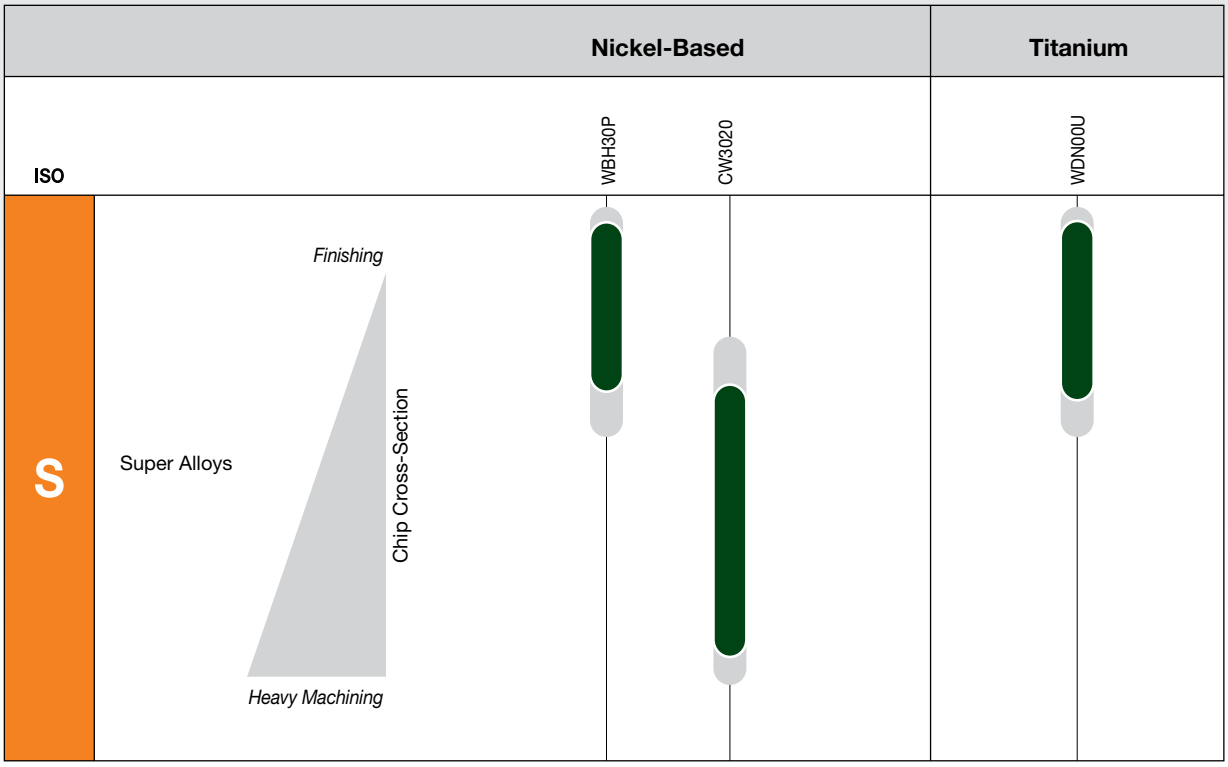
Advanced Materials for Cast Iron Machining



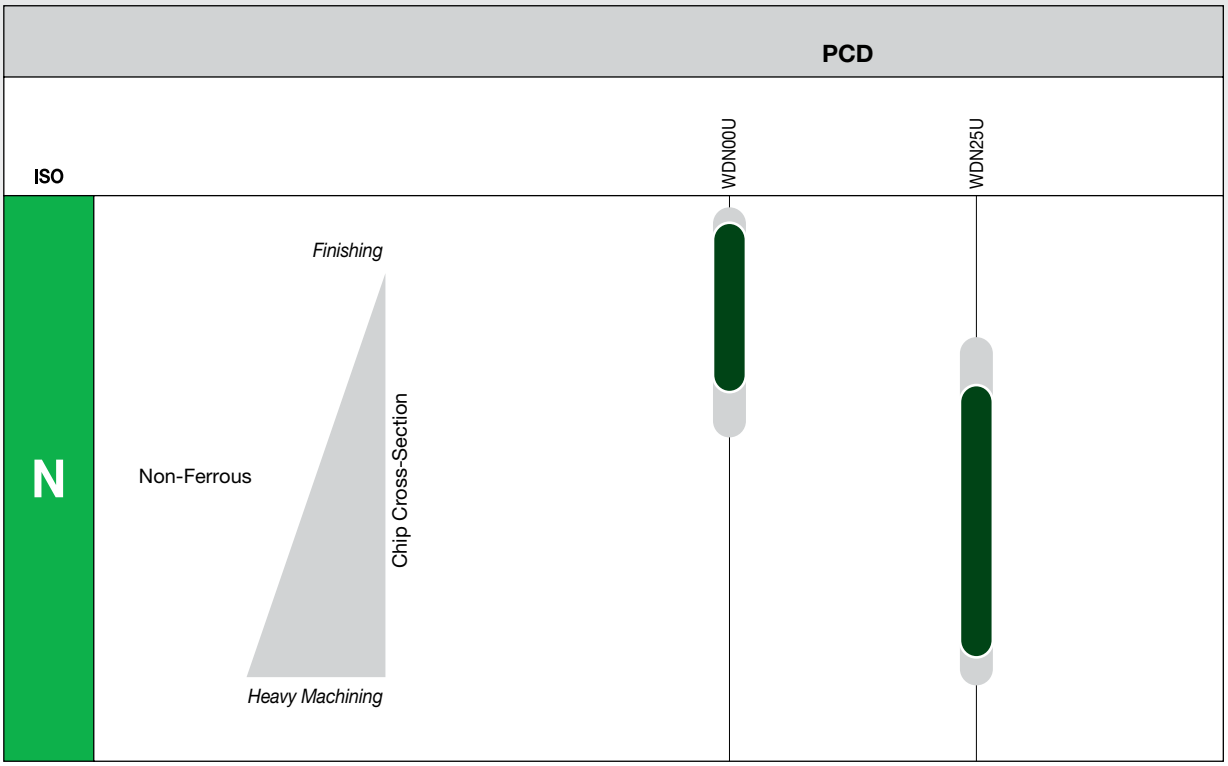
Cast Iron Machining Grade Selection



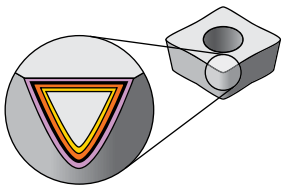
Advanced Materials for High-Temperature Machining



Advanced Materials for Non-Ferrous Machining



Grades and Grade Descriptions



Reduce cycle times. High speed and feed capability. Long tool life. New multi-layer coating provides better wear resistance.

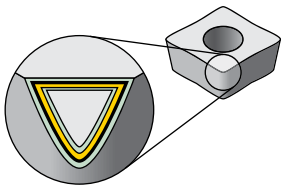
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade

Coating		Grade Description		05	10	15	20	25	30	35	40	45
CW2015	CM-H10	Mixed (black) ceramic. Matrix Al_2O_3 and TiCN. Good toughness properties combined with good wear resistance. Semi-finishing and finishing. For hardened iron base materials and gray cast iron (finishing).	K									
			H									
CW5025	CN-K15	Silicon-nitride ceramic. Extraordinary toughness properties. Roughing, also in heavily interrupted cuts. Capable of high-performance turning. To be used with or without coolant. For gray cast iron.	K									
CW3020	C4	Whisker ceramic with a matrix of Al_2O_3 + SiCw. The SiC whiskers embedded in the micro-structure give this ceramic excellent toughness for cutting high-temp alloys and cast materials with high Brinell hardness.	S									
			H									
WBK40U	BN-K40	A high-content CBN, solid CBN insert with multiple cutting edges. Applied in roughing to finishing of fully pearlitic gray cast iron, chilled irons, high-chrome alloyed steels, sintered powdered metals, and heavy cuts in hardened steels (>45 HRC). Use for finishing chilled and fully pearlitic cast iron. Solid inserts offer better security and shock resistance than tipped inserts, while also enabling deeper depth-of-cut capability.	K									
			H									
WBH10P	BN-H10	A low-content CBN grade with a PVD-AlTiN coating for added wear resistance. Designed for precision machining of hardened steels (>45 HRC); the harder the steel the better. PVD coating offers improved wear resistance and excellent surface finish capability. Effectively applied on bearing steels, hot and cold work tool steels, high-speed steels, die steels, case-hardened steels, carburized and nitrided irons, and some hard coatings.	H									

Grades and Grade Descriptions

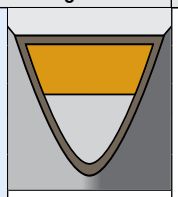
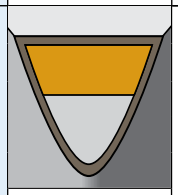
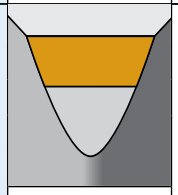
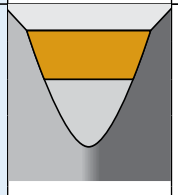


Reduce cycle times. High speed and feed capability. Long tool life. New multi-layer coating provides better wear resistance.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade

Coating	Grade Description		05	10	15	20	25	30	35	40	45
WBH20P  BN-H25	A PVD-AlTiN coating over a low-content, CBN tip brazed onto a carbide insert. Designed for roughing to finishing of hardened steels (>45 HRC). Use on bearing steel, hot and cold work tool steels, high-speed steels, die steels, case-hardened steels, carburized and nitrided irons, and some hard coatings.	H									
WBH30P  BN-H30	A PVD-AlTiN coating over a low-content, CBN tip brazed onto a carbide insert. Designed for roughing to finishing in interrupted cuts on hardened steels (>45 HRC). Applied on gray cast iron, chilled irons, high-chrome alloyed steels, high-temp alloys, and sintered powdered metals.	K S H									
WDN00U  DP-N10	An ultra-fine grained polycrystalline diamond (PCD) tip brazed onto a carbide substrate. Designed for general-purpose turning of primarily non-ferrous materials. Applied over a wide range of continuous to interrupted cuts where superior surface finish is needed. Use on low to medium silicon content aluminum alloys, non-metallics, copper, brass, and zinc-based alloys. The ultra-fine grained diamond particle size enables superior surface finishes while ensuring the best mechanical shock resistance of any PCD cutting tool.	N S									
WDN25U  DP-N25	A multi-modal PCD grade with a range of grain sizes brazed onto a carbide substrate. Engineered for extreme abrasion resistance and good edge strength for demanding applications. An ideal choice for high-silicon aluminum alloys, bi-metallic (AL/GCI) materials, MMC, carbon-fiber reinforced plastics, and other abrasive non-metallic materials.	N									

Grade available as Custom Solution only.

Speed and Feed Chart • Ceramics • Metric

Material Group		Cutting Speed — vc m/min								
		CW2015			CW3020			CW5025		
		min	Start	max	min	Start	max	min	Start	max
ap [mm]		0,5		4,0	0,5		4,0	1,0		8,0
f [mm/rev]		0,2		0,4	0,1		0,5	0,2		0,6
P	0	–	–	–	–	–	–	–	–	–
	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–
	6	–	–	–	–	–	–	–	–	–
M	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
K	1	250	**475**	725	–	–	–	250	**760**	1000
	2	300	**550**	800	–	–	–	275	**365**	490
	3	250	**400**	600	–	–	–	275	**335**	440
N	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–
	6	–	–	–	–	–	–	–	–	–
	7	–	–	–	–	–	–	–	–	–
	8	–	–	–	–	–	–	–	–	–
S	1	–	–	–	170	**200**	375	–	–	–
	2	–	–	–	170	**200**	375	–	–	–
	3	–	–	–	190	**250**	375	–	–	–
	4	–	–	–	–	–	–	–	–	–
H	1	60	**100**	140	45	**85**	125	–	–	–
	2	60	**100**	140	45	**85**	125	–	–	–
	3	60	**100**	140	45	**85**	125	–	–	–
	4	60	**100**	140	45	**85**	125	–	–	–

Speed and Feed Chart • Ceramics • Inch

Material Group		Cutting Speed — vc SFM								
		CW2015			CW3020			CW5025		
		min	Start	max	min	Start	max	min	Start	max
ap [inch]		0.0197		0.1575	0.0197		0.0394	0.0394		0.315
f [inch]		0.0079		0.0157	0.0039		0.0197	0.0047		0.0236
P	0	–	–	–	–	–	–	–	–	–
	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–
	6	–	–	–	–	–	–	–	–	–
M	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
K	1	815	**1555**	2375	–	–	–	800	**2500**	3300
	2	980	**1800**	2600	–	–	–	900	**1200**	1600
	3	820	**1310**	1965	–	–	–	900	**1100**	1450
N	1	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–
	6	–	–	–	–	–	–	–	–	–
	7	–	–	–	–	–	–	–	–	–
	8	–	–	–	–	–	–	–	–	–
S	1	–	–	–	550	**650**	1200	–	–	–
	2	–	–	–	550	**720**	1200	–	–	–
	3	–	–	–	600	**820**	1200	–	–	–
	4	–	–	–	–	–	–	–	–	–
H	1	200	**325**	450	150	**275**	400	–	–	–
	2	200	**325**	450	150	**275**	400	–	–	–
	3	200	**325**	450	150	**275**	400	–	–	–
	4	200	**325**	450	150	**275**	400	–	–	–

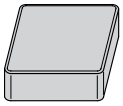
Speed and Feed Chart • PcBN PCD • Metric

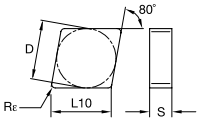
Material Group		Cutting Speed – vc m/min																	
		WBH10P			WBH20P			WBH30P			WBK40U			WDN00U			WDN25U		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
ap [mm]		0,10		0,50	0,10		0,50	0,08		0,40	0,10		1,50	0,20		2,00	0,20		2,00
f [mm/rev]		0,06		0,25	0,05		0,20	0,05		0,20	0,08		0,20	0,10		0,30	0,10		0,25
P	0/1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
M	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
K	1	–	–	–	–	–	–	400	**600**	800	650	**800**	1200	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–	500	**765**	2500	500	**765**	2500
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	350	**580**	1000
	3	–	–	–	–	–	–	–	–	–	–	–	–	250	**520**	1000	250	**520**	1000
	4	–	–	–	–	–	–	–	–	–	–	–	–	250	**400**	750	250	**400**	750
	5	–	–	–	–	–	–	–	–	–	–	–	–	550	**760**	1000	550	**760**	1000
	6	–	–	–	–	–	–	–	–	–	–	–	–	400	**460**	850	400	**365**	750
	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	120	**160**	200	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	120	**160**	200	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	120	**160**	200	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	100	**180**	320	–	–	–
H	1	80	**170**	260	80	**160**	230	60	**120**	220	60	**120**	220	–	–	–	–	–	–
	2	80	**170**	260	80	**160**	230	60	**120**	220	60	**120**	220	–	–	–	–	–	–
	3	80	**170**	260	80	**160**	230	60	**120**	220	60	**120**	220	–	–	–	–	–	–
	4	80	**170**	260	80	**160**	230	60	**120**	220	60	**120**	220	–	–	–	–	–	–

Speed and Feed Chart • PcBN PCD • Inch

Material Group		Cutting Speed – vc SFM																	
		WBH10P			WBH20P			WBH30P			WBK40U			WDN00U			WDN25U		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
ap [inch]		0.004		0.020	0.004		0.020	0.003		0.016	0.008		0.080	0.008		0.079	0.008		0.079
f [inch]		0.002		0.010	0.002		0.008	0.002		0.008	0.003		0.010	0.004		0.010	0.004		0.010
P	0/1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
M	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
K	1	–	–	–	–	–	–	1310	**1975**	2625	2125	**2625**	3950	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–	1600	**2500**	8000	1600	**2500**	8000
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1000	**2000**	3200
	3	–	–	–	–	–	–	–	–	–	–	–	–	800	**1700**	3200	800	**1700**	3200
	4	–	–	–	–	–	–	–	–	–	–	–	–	800	**1300**	2400	800	**1300**	2400
	5	–	–	–	–	–	–	–	–	–	–	–	–	1700	**2500**	3200	1700	**2500**	3200
	6	–	–	–	–	–	–	–	–	–	–	–	–	1000	**1200**	2400	1000	**1500**	2800
	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	400	**525**	650	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	400	**525**	650	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	400	**525**	650	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	325	**600**	1050	–	–	–
H	1	275	**550**	850	275	**525**	755	200	**400**	725	200	**400**	725	–	–	–	–	–	–
	2	275	**550**	850	275	**525**	755	200	**400**	725	200	**400**	725	–	–	–	–	–	–
	3	275	**550**	850	275	**525**	755	200	**400**	725	200	**400**	725	–	–	–	–	–	–
	4	275	**550**	850	275	**525**	755	200	**400**	725	200	**400**	725	–	–	–	–	–	–

Ceramic Inserts • CNGN/CNG



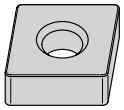


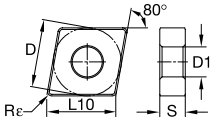
● first choice
○ alternate choice

P												
M												
K										●		●
N												
S											●	
H										●		

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
CNGN120404T02020	CNG431T0820	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	2952551	-	-
CNGN120408T01020	CNG432T0420	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	-	3869578	-
CNGN120408T02020	CNG432T0820	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	2952552	-	-
CNGN120412T01020	CNG433T0420	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	-	3869579	-
CNGN120412T02020	CNG433T0820	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	2952603	-	-
CNGN120712T01020	CNG453T0420	12,70	1/2	12,90	.508	7,94	5/16	1,2	.047	-	3869581	-
CNGN120712T02020	CNG453T0820	12,70	1/2	12,90	.508	7,94	5/16	1,2	.047	2952605	-	2952115

Ceramic Inserts • CNGA



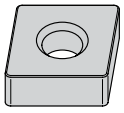


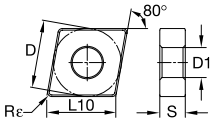
● first choice
○ alternate choice

P														
M														
K											●		●	
N														
S												●		
H											●			

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	CW2015	CW3020	CW5025
CNGA120404T02020	CNGA431T0820	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	5,16	.203	2952526	-	-
CNGA120408T02020	CNGA432T0820	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	2952527	-	2952159
CNGA120412T02020	CNGA433T0820	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,16	.203	2952528	-	2952161
CNGA120416T02020	CNGA434T0820	12,70	1/2	12,90	.508	4,76	3/16	1,6	.063	5,16	.203	-	-	2952173
CNGA160612T02020	CNGA543T0820	15,88	5/8	16,12	.635	6,35	1/4	1,2	.047	6,35	.250	2952529	-	-
CNGA160616T02020	CNGA544T0820	15,88	5/8	16,12	.635	6,35	1/4	1,6	.063	6,35	.250	-	-	2952175

Ceramic Inserts • CNGA-FW



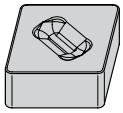


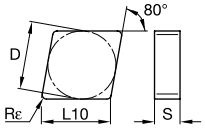
● first choice
○ alternate choice

P														
M														
K											●		●	
N														
S												●		
H											●			

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	CW2015	CW3020	CW5025
CNGA120412T01020FW	CNGA433T0420FW	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,16	.203	-	-	2952160

Ceramic Inserts • CNGX



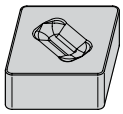


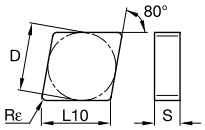
● first choice
○ alternate choice

P	M	K	N	S	H
		●			●
				●	
		●			

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
CNGX120712T02020	CNGX453T0820	12,70	1/2	12,90	.508	7,94	5/16	1,2	.047	ı	ı	2952119

Ceramic Inserts • CNMX



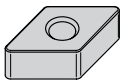


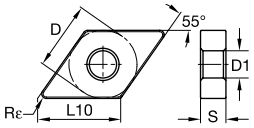
● first choice
○ alternate choice

P	M	K	N	S	H
		●			●
				●	
		●			

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
CNMX120712T02020	CNMX453T0820	12,70	1/2	12,90	.508	7,94	5/16	1,2	.047	ı	ı	2952122
CNMX120716T02020	CNMX454T0820	12,70	1/2	12,90	.508	7,94	5/16	1,6	.063	ı	ı	2952123

Ceramic Inserts • DNGA



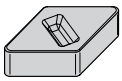


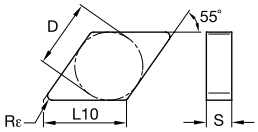
● first choice
○ alternate choice

P														
M														
K												●		●
N														
S													●	
H												●		

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	CW2015	CW3020	CW5025
DNGA150404T02020	DNGA431T0820	12,70	1/2	15,50	.610	4,76	3/16	0,4	.016	5,16	.203	2952532	-	-
DNGA150408T02020	DNGA432T0820	12,70	1/2	15,50	.610	4,76	3/16	0,8	.031	5,16	.203	2952533	-	-
DNGA150412T02020	DNGA433T0820	12,70	1/2	15,50	.610	4,76	3/16	1,2	.047	5,16	.203	2952534	-	-
DNGA150604T02020	DNGA441T0820	12,70	1/2	15,50	.610	6,35	1/4	0,4	.016	5,16	.203	2952535	-	-
DNGA150608T02020	DNGA442T0820	12,70	1/2	15,50	.610	6,35	1/4	0,8	.031	5,16	.203	2952536	-	-
DNGA150612T02020	DNGA443T0820	12,70	1/2	15,50	.610	6,35	1/4	1,2	.047	5,16	.203	2952537	-	2952185

Ceramic Inserts • DNGX



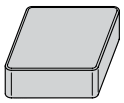


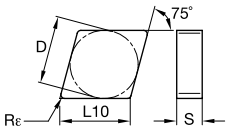
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
DNGX120712T02020	DNGX120712T02020	10,00	.3937	12,21	.481	7,94	5/16	1,2	.047	●	●	2952124
DNGX150712T02020	DNGX453T0820	12,70	1/2	15,50	.610	7,94	5/16	1,2	.047	●	●	2952127
DNGX150716T02020	DNGX454T0820	12,70	1/2	15,50	.610	7,94	5/16	1,6	.063	●	●	2952128

Ceramic Inserts • ENGN/ENG



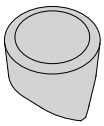


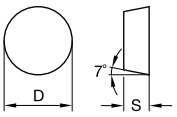
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
ENGN130712T02020	ENG453T0820	12,70	1/2	13,15	.518	7,94	5/16	1,2	.047	2952613	●	●

Ceramic Inserts • RCGX/RCGV



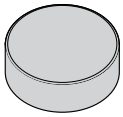


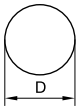
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	CW2015	CW3020	CW5025
RCGX060400T01020	RCGV23T0420	6,35	1/4	4,76	3/16	-	3869746	-
RCGX090700T02020	RCGV35T0820	9,53	3/8	7,92	5/16	2952694	-	-
RCGX090700T07015	RCGV35T2815	9,53	3/8	7,92	5/16	2952695	-	-
RCGX090700T01020	RCGV35T0420	9,53	3/8	7,94	5/16	2952693	3869747	-
RCGX120700T01020	RCGV45T0420	12,70	1/2	7,92	5/16	-	3869748	-
RCGX120700T02020	RCGV45T0820	12,70	1/2	7,92	5/16	2952697	-	-
RCGX120700T20015	RCGV45T8015	12,70	1/2	7,92	5/16	2952698	-	-

Ceramic Inserts • RNGN/RNG



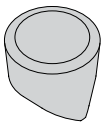


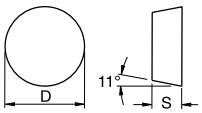
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	CW2015	CW3020	CW5025
RNGN090300T01020	RNG32T0420	9,53	3/8	3,18	1/8	-	3869749	-
RNGN090400T02020	RNG33T0820	9,53	3/8	4,76	3/16	2952615	-	-
RNGN120400T01020	RNG43T0420	12,70	1/2	4,76	3/16	-	3869750	-
RNGN120400T02020	RNG43T0820	12,70	1/2	4,76	3/16	2952616	-	2952131
RNGN120700T01020	RNG45T0420	12,70	1/2	7,94	5/16	-	3869751	-
RNGN120700T02020	RNG45T0820	12,70	1/2	7,94	5/16	2952617	-	-
RNGN120700T10015	RNG45T4015	12,70	1/2	7,94	5/16	2952618	-	-
RNGN120700T20015	RNG45T8015	12,70	1/2	7,94	5/16	2952619	-	-

Ceramic Inserts • RPGX/RPGV



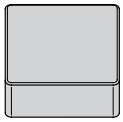


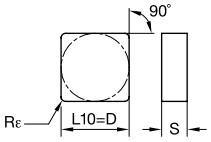
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	CW2015	CW3020	CW5025
RPGX060400T01020	RPGV23T0420	6,35	1/4	4,78	3/16	-	3869753	-
RPGX090700T01020	RPGV35T0420	9,53	3/8	7,92	5/16	-	3869754	-
RPGX120700T01020	RPGV45T0420	12,70	1/2	7,94	5/16	-	3869755	-

Ceramic Inserts • SNGN/SNG



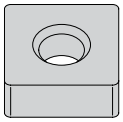


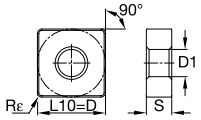
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
SNGN120408T00520	SNG432T0220	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	2952750	-	-
SNGN120408T02020	SNG432T0820	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	2952751	-	-
SNGN120412T01020	SNG433T0420	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	-	3869756	-
SNGN120412T02020	SNG433T0820	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	2952752	-	2952136
SNGN120708T02020	SNG452T0820	12,70	1/2	12,70	.500	7,94	5/16	0,8	.031	2952825	-	-
SNGN120712T02020	SNG453T0820	12,70	1/2	12,70	.500	7,94	5/16	1,2	.047	2952826	-	-
SNGN120716T00520	SNG454T0220	12,70	1/2	12,70	.500	7,94	5/16	1,6	.063	2953340	-	-
SNGN190720K20015	SNG655K8015	19,05	3/4	19,05	.750	7,94	5/16	2,0	.079	2952832	-	-

Ceramic Inserts • SNGA



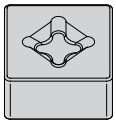


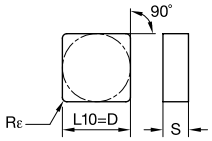
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	CW2015	CW3020	CW5025
SNGA120408T02020	SNGA432T0820	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	5,16	.203	2952538	▮	▮
SNGA120412T02020	SNGA433T0820	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	5,16	.203	2952539	▮	▮

Ceramic Inserts • SNGX



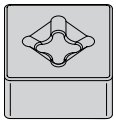


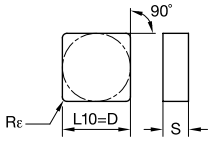
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
SNGX120712T02020	SNGX453T0820	12,70	1/2	12,70	.500	7,94	5/16	1,2	.047	▮	▮	2952142

Ceramic Inserts • SNMX



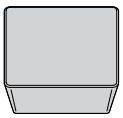


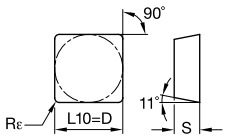
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
SNMX120712T02020	SNMX453T0820	12,70	1/2	12,70	.500	7,94	5/16	1,2	.047	'	'	2952069
SNMX120716T02020	SNMX454T0820	12,70	1/2	12,70	.500	7,94	5/16	1,6	.063	'	'	2952070

Ceramic Inserts • SPGN/SPG



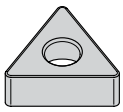


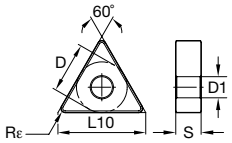
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
SPGN120308T01020	SPG422T0420	12,70	1/2	12,70	.500	3,18	1/8	0,8	.031	2952702	'	'

Ceramic Inserts • TNGA



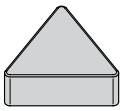


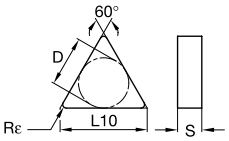
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	CW2015	CW3020	CW5025
TNGA160408T02020	TNGA332T0820	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	3,81	.150	2952541	-	2952195
TNGA160412T02020	TNGA333T0820	9,53	3/8	16,50	.650	4,76	3/16	1,2	.047	3,81	.150	2952542	-	-
TNGA220408T02020	TNGA432T0820	12,70	1/2	22,00	.866	4,76	3/16	0,8	.031	5,16	.203	2952544	-	-

Ceramic Inserts • TNGN/TNG



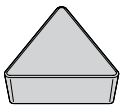


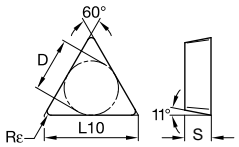
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015	CW3020	CW5025
TNGN160404T02020	TNG331T0820	9,53	3/8	16,50	.650	4,76	3/16	0,4	.016	2952835	-	-
TNGN160408T01020	TNG332T0420	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	-	3869761	-
TNGN160408T02020	TNG332T0820	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	2952836	-	-
TNGN160712T02020	TNG353T0820	9,53	3/8	16,50	.650	7,94	5/16	1,2	.047	2952840	-	-
TNGN220408T02020	TNG432T0820	12,70	1/2	22,00	.866	4,76	3/16	0,8	.031	2952841	-	-

Ceramic Inserts • TPGN/TPG



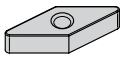


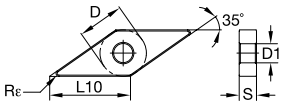
● first choice
○ alternate choice

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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	CW2015 2952706	CW3020	CW5025
TPGN110304T01020	TPG221T0420	6,35	1/4	11,00	.433	3,18	1/8	0,4	.016	●		●
TPGN110308T01020	TPG222T0420	6,35	1/4	11,00	.433	3,18	1/8	0,8	.031	●		●
TPGN160304T00520	TPG321T0220	9,53	3/8	16,50	.650	3,18	1/8	0,4	.016	2952709 ●		●
TPGN160304T01020	TPG321T0420	9,53	3/8	16,50	.650	3,18	1/8	0,4	.016	2952710 ●		●
TPGN160308T00520	TPG322T0220	9,53	3/8	16,50	.650	3,18	1/8	0,8	.031	2952711 ●		●
TPGN160308T01020	TPG322T0420	9,53	3/8	16,50	.650	3,18	1/8	0,8	.031	2952712 ●		●

Ceramic Inserts • VNGA



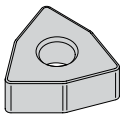


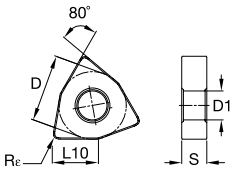
● first choice
○ alternate choice

P	M	K	N	S	H
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		●			

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	CW2015	CW3020	CW5025
VNGA160404T02020	VNGA331T0820	9,53	3/8	16,61	.654	4,76	3/16	0,4	.016	3,81	.150	2952545	▪	▪
VNGA160408T02020	VNGA332T0820	9,53	3/8	16,61	.654	4,76	3/16	0,8	.031	3,81	.150	2952546	▪	▪
VNGA160412T02020	VNGA333T0820	9,53	3/8	16,61	.654	4,76	3/16	1,2	.047	3,81	.150	2952547	▪	▪

Ceramic Inserts • WNGA



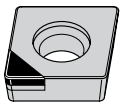


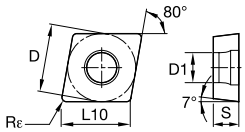
● first choice
○ alternate choice

P	M	K	N	S	H
		●			●
				●	
		●			

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	CW2015	CW3020	CW5025
WNGA080408T02020	WNGA432T0820	12,70	1/2	8,69	.342	4,76	3/16	0,8	.031	5,16	.203	▪	▪	2952199
WNGA080412T02020	WNGA433T0820	12,70	1/2	8,69	.342	4,76	3/16	1,2	.047	5,16	.203	▪	▪	2952200

Polycrystalline Diamond Inserts (PCD) • CCGW-FST



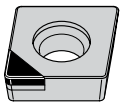


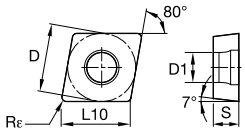
● first choice
○ alternate choice

P	M	K	N	S	H
			●	●	
				●	

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
CCGW060204FST	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	5885722	3898746
CCGW09T304FST	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	5885723	3898749
CCGW09T308FST	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	5885724	3898750

Polycrystalline Diamond Inserts (PCD) • CCMW-FST



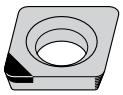


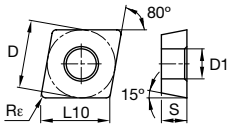
● first choice
○ alternate choice

P	M	K	N	S	H
			●	●	
				●	

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
CCMW09T304FST	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173		3883134
CCMW09T308FST	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173		3883136

Polycrystalline Diamond Inserts (PCD) • CDHB-FST



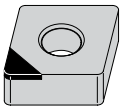


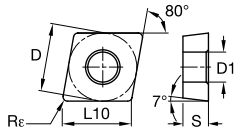
● first choice
○ alternate choice

P			
M			
K			
N		●	●
S		●	
H			

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
CDHBS4T0X0FST	3,97	5/32	4,03	.159	1,02	.040	0,1	.002	2,13	.084	▪	3898745
CDHBS4T002FST	3,97	.1562	4,03	.159	1,02	.040	0,2	.007	2,13	.084	▪	3898744

Polycrystalline Diamond Inserts (PCD) • CNGA-FST



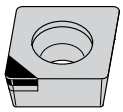


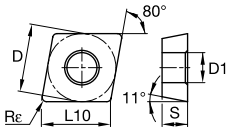
● first choice
○ alternate choice

P			
M			
K			
N		●	●
S		●	
H			

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
CNGA120404FST	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	5,16	.203	▪	3898726
CNGA120408FST	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	5885726	3898727

Polycrystalline Diamond Inserts (PCD) • CPGW-FWST



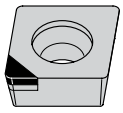


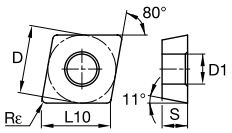
● first choice
○ alternate choice

P	M	K	N	S	H
			●	●	
				●	

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
CPGW060204FWST	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	5885758	-

Polycrystalline Diamond Inserts (PCD) • CPGW-FST



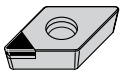


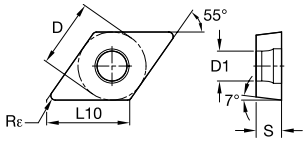
● first choice
○ alternate choice

P	M	K	N	S	H
			●	●	
				●	

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
CPGW060204FST	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	-	3898752
CPGW060208FST	6,35	1/4	6,45	.254	2,38	3/32	0,8	.031	2,80	.110	-	3898753

Polycrystalline Diamond Inserts (PCD) • DCGW-FST



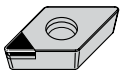


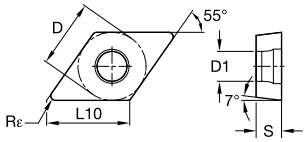
● first choice
○ alternate choice

P		
M		
K		
N	●	●
S	●	
H		

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
DCGW070204FST	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,80	.110	▪	3898761
DCGW11T304FST	9,53	3/8	11,63	.458	3,97	5/32	0,4	.016	4,40	.173	▪	3898762

Polycrystalline Diamond Inserts (PCD) • DCMW-FST



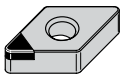


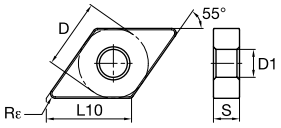
● first choice
○ alternate choice

P		
M		
K		
N	●	●
S	●	
H		

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
DCMW070204FST	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,80	.110	▪	3883142
DCMW11T304FST	9,53	3/8	11,63	.458	3,97	5/32	0,4	.016	4,40	.173	▪	3883122
DCMW11T308FST	9,53	3/8	11,63	.458	3,97	5/32	0,8	.031	4,40	.173	▪	3883143

Polycrystalline Diamond Inserts (PCD) • DNGA-FST



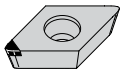


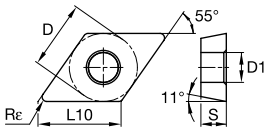
● first choice
○ alternate choice

P	M	K	N	S	H
			●	●	
				●	

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
DNGA150408FST	12,70	1/2	15,50	.610	4,76	3/16	0,8	.031	5,16	.203	5885775	3898731

Polycrystalline Diamond Inserts (PCD) • DPGW-FST



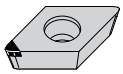


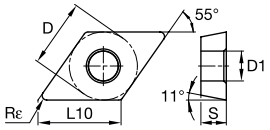
● first choice
○ alternate choice

P	M	K	N	S	H
			●	●	
				●	

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
DPGW070202FST	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,80	.110	5885778	-

Polycrystalline Diamond Inserts (PCD) • DPGW-FWST



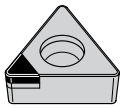


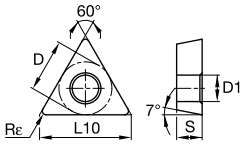
● first choice
○ alternate choice

	P	M	K	N	S	H
WDN00U				●	●	
WDN25U				●		

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
DPGW11T304FWST	9,53	3/8	11,63	.458	3,97	5/32	0,4	.016	4,40	.173	5885791	-

Polycrystalline Diamond Inserts (PCD) • TCGW-FST



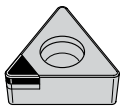


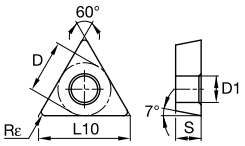
● first choice
○ alternate choice

	P	M	K	N	S	H
WDN00U				●	●	
WDN25U				●		

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
TCGW110204FST	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	-	3898768
TCGW16T304FST	9,53	3/8	16,50	.650	3,97	5/32	0,4	.016	4,40	.173	-	3898769

Polycrystalline Diamond Inserts (PCD) • TCMW-FST



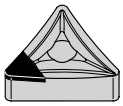


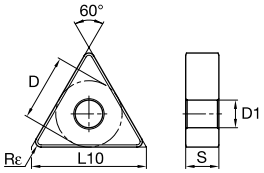
● first choice
○ alternate choice

P	M	K	N	S	H
			●	●	
				●	

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
TCMW110204FST	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	'	3883144

Polycrystalline Diamond Inserts (PCD) • TNMS-FST





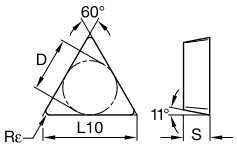
● first choice
○ alternate choice

P	M	K	N	S	H
			●	●	
				●	

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
TNMS160404FST	9,53	3/8	16,50	.650	4,76	3/16	0,4	.016	3,81	.150	'	3898734

Polycrystalline Diamond Inserts (PCD) • TPGN/TPG



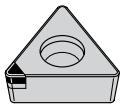


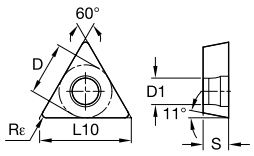
● first choice
○ alternate choice

P			
M			
K			
N	●	●	
S	●		
H			

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	WDN00U	WDN25U
TPGN160304F	TPG321F	9,53	3/8	16,50	.650	3,18	1/8	0,4	.016	▪	3898721

Polycrystalline Diamond Inserts (PCD) • TPGW-FST



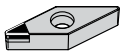


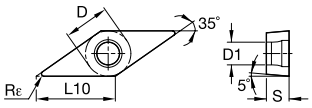
● first choice
○ alternate choice

P			
M			
K			
N	●	●	
S	●		
H			

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
TPGW16T304FST	9,53	3/8	16,50	.650	3,97	5/32	0,4	.016	4,40	.173	▪	3898772

Polycrystalline Diamond Inserts (PCD) • VBGW-FST



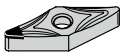


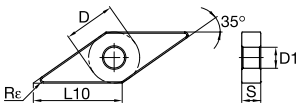
● first choice
○ alternate choice

P		
M		
K		
N	●	●
S	●	
H		

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
VBGW110304FST	6,35	1/4	11,07	.436	3,18	1/8	0,4	.016	2,80	.110	▪	3898774
VBGW160404FST	9,53	3/8	16,61	.654	4,76	3/16	0,4	.016	4,40	.173	▪	3898775

Polycrystalline Diamond Inserts (PCD) • VNMS-FST



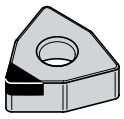


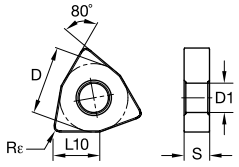
● first choice
○ alternate choice

P		
M		
K		
N	●	●
S	●	
H		

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
VNMS160408FST	9,53	3/8	16,61	.654	4,76	3/16	0,8	.031	3,81	.150	▪	3898739

Polycrystalline Diamond Inserts (PCD) • WNGA-FST



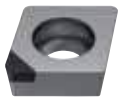


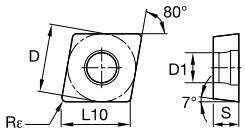
● first choice
○ alternate choice

P	M	K	N	S	H
			●	●	
				●	

ISO catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WDN00U	WDN25U
WNGA080408FST	12,70	1/2	8,69	.342	4,76	3/16	0,8	.031	5,16	.203	●	3898741

Cubic Boron Nitride (CBN) Inserts • CCGW-M



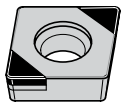


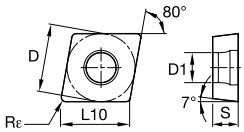
● first choice
○ alternate choice

P	M	K	N	S	H
		●		●	●
					●
				●	●
					●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
CCGW09T308S01015M	CCGW3252S0415M	9,53	3/8	9,67	.381	3,99	.157	0,8	.031	4,40	.173	●	6904774	●	●

Cubic Boron Nitride (CBN) Inserts • CCGW-MT



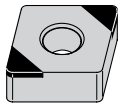


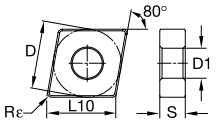
● first choice
○ alternate choice

	WBH10P	WBH20P	WBH30P	WBK40U
P				
M				
K			●	●
N				
S			●	
H	●	●	●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
CCGW09T304S01015MT	CCGW3251S0415MT	9,53	3/8	9,67	.381	3,99	.157	0,4	.016	4,40	.173	3883507	6904777	-	-
CCGW09T308S01015MT	CCGW3252S0415MT	9,53	3/8	9,67	.381	3,99	.157	0,8	.031	4,40	.173	3883508	6904776	6018004	-
CCGW120408S01015MT	CCGW432S0415MT	12,70	1/2	12,90	.508	4,78	.1883	0,8	.031	5,50	.216	-	6904775	-	-

Cubic Boron Nitride (CBN) Inserts • CNGA-EMT



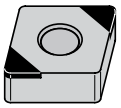


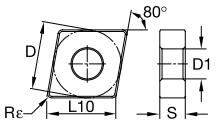
● first choice
○ alternate choice

	WBH10P	WBH20P	WBH30P	WBK40U
P				
M				
K			●	●
N				
S			●	
H	●	●	●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
CNGA120408EMT	CNGA432EMT	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	-	6904778	-	-

Cubic Boron Nitride (CBN) Inserts • CNGA-MT





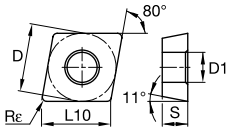
● first choice
○ alternate choice

P																
M																
K														●	●	
N																
S														●		
H		●	●	●	●											

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
CNGA120404S01025MT	CNGA431S0425MT	12,70	1/2	12,90	.508	4,78	.1883	0,4	.016	5,16	.203	3883509	6904779	-	-
CNGA120408S01025MT	CNGA432S0425MT	12,70	1/2	12,90	.508	4,78	.1883	0,8	.031	5,16	.203	3883510	6904780	6018008	-
CNGA120412S01020MT	CNGA433S0420MT	12,70	1/2	12,90	.508	4,78	.1883	1,2	.047	5,16	.203	-	-	6018009	-
CNGA120412S01025MT	CNGA433S0425MT	12,70	1/2	12,90	.508	4,78	.1883	1,2	.047	5,16	.203	-	6904821	6018010	-

Cubic Boron Nitride (CBN) Inserts • CPGW-C



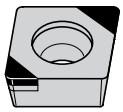


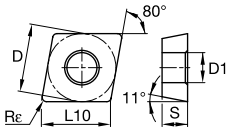
● first choice
○ alternate choice

P																
M																
K														●	●	
N																
S														●		
H		●	●	●	●											

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
CPGW060204S01015C	CPGW2151S0415C	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	-	-	6018082	-

Cubic Boron Nitride (CBN) Inserts • CPGW-MT



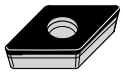


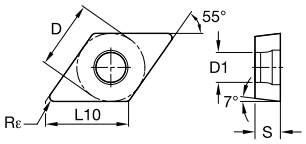
● first choice
○ alternate choice

P	M	K	N	S	H
		●		●	●
		●		●	●
				●	●
					●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
CPGW09T308S01015MT	CPGW3252S0415MT	9,53	3/8	9,67	.381	3,99	.157	0,8	.031	4,40	.173	●	●	6018085	●

Cubic Boron Nitride (CBN) Inserts • DCGW-C



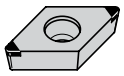


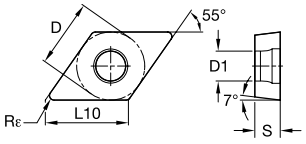
● first choice
○ alternate choice

P	M	K	N	S	H
		●		●	●
		●		●	●
				●	●
					●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
DCGW070202S01015C	DCGW21505S0415C	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,80	.110	3883528	●	●	●
DCGW070204S01015C	DCGW2151S0415C	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,80	.110	3883529	●	●	●

Cubic Boron Nitride (CBN) Inserts • DCGW-MT



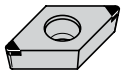


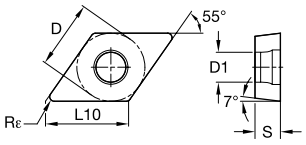
● first choice
○ alternate choice

P															
M															
K													●	●	
N															
S													●		
H												●	●	●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
DCGW11T304S01015MT	DCGW3251S0415MT	9,53	3/8	11,63	.458	3,99	.157	0,4	.016	4,40	.173	3883530	6904823	6018088	-
DCGW11T308S01015MT	DCGW3252S0415MT	9,53	3/8	11,63	.458	3,99	.157	0,8	.031	4,40	.173	3883531	6904824	-	-

Cubic Boron Nitride (CBN) Inserts • DCMW-MT





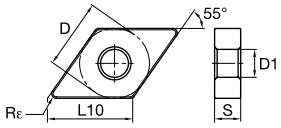
● first choice
○ alternate choice

P															
M															
K													●	●	
N															
S													●		
H												●	●	●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
DCMW070204S01020MT	DCMW2151S0420MT	6,35	1/4	7,74	.305	2,38	3/32	0,4	.016	2,80	.110	-	6904822	-	-

Cubic Boron Nitride (CBN) Inserts • DNGA-EMT





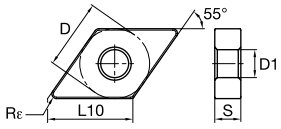
● first choice
○ alternate choice

P															
M															
K													●	●	
N															
S													●		
H												●	●	●	●

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH20P	WBH30P	WBK40U
		mm	in	mm	in	mm	in	mm	in	mm	in				
DNGA150408EMT	DNGA432EMT	12,70	1/2	15,50	.610	4,76	3/16	0,8	.031	5,16	.203	●	6904825	●	●
DNGA150412EMT	DNGA433EMT	12,70	1/2	15,50	.610	4,76	3/16	1,2	.047	5,16	.203	●	6904826	●	●

Cubic Boron Nitride (CBN) Inserts • DNGA-MT



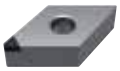


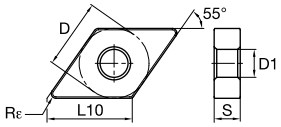
● first choice
○ alternate choice

P															
M															
K													●	●	
N															
S													●		
H												●	●	●	●

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH20P	WBH30P	WBK40U
		mm	in	mm	in	mm	in	mm	in	mm	in				
DNGA150404S01025MT	DNGA431S0425MT	12,70	1/2	15,50	.610	4,78	.1883	0,4	.016	5,16	.203	3883532	6904828	●	●
DNGA150408S01025MT	DNGA432S0425MT	12,70	1/2	15,50	.610	4,78	.1883	0,8	.031	5,16	.203	3883533	6904829	5108479	●
DNGA150608S01225MT	DNGA442S0525MT	12,70	1/2	15,50	.610	6,37	–	0,8	.031	5,16	.203	●	6904830	●	●

Cubic Boron Nitride (CBN) Inserts • DNMA-ST





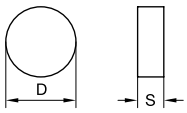
● first choice
○ alternate choice

P	M	K	N	S	H
		●		●	●
		●		●	●
		●		●	●
		●		●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
DNMA150604S01020ST	DNMA441S0420ST	12,70	1/2	15,50	.610	6,35	1/4	0,4	.016	5,16	.203	-	6904827	-	-

Cubic Boron Nitride (CBN) Inserts • RNGN/RNG





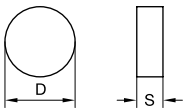
● first choice
○ alternate choice

P	M	K	N	S	H
		●		●	●
		●		●	●
		●		●	●
		●		●	●

ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	WBH10P	WBH20P	WBH30P	WBK40U
RNGN120400S01020	RNG43S0420	12,70	1/2	4,76	3/16	-	6904851	-	-

Cubic Boron Nitride (CBN) Inserts • RNMN/RNM





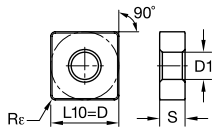
● first choice
○ alternate choice

P		
M		
K		● ●
N		
S		●
H	●	● ● ●

ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	WBH10P	WBH20P	WBH30P	WBK40U
RNMN090300S02020	RNM32S0820	9,53	3/8	3,18	1/8	▮	▮	▮	3883315
RNMN120300S02020	RNM42S0820	12,70	1/2	3,18	1/8	▮	▮	▮	3883316
RNMN120400S02020	RNM43S0820	12,70	1/2	4,76	3/16	▮	▮	▮	3883317

Cubic Boron Nitride (CBN) Inserts • SNGA-MT



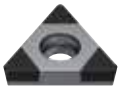


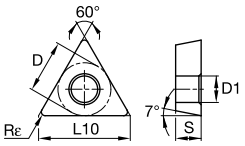
● first choice
○ alternate choice

P		
M		
K		● ●
N		
S		●
H	●	● ● ●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
SNGA120408S01025MT	SNGA432S0425MT	12,70	1/2	12,70	.500	4,78	.1883	0,8	.031	5,16	.203	▮	6904852	▮	▮

Cubic Boron Nitride (CBN) Inserts • TCGW-MT



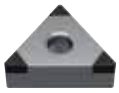


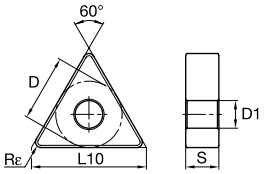
● first choice
○ alternate choice

P	M	K	N	S	H
		●		●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
TCGW110204S01015MT	TCGW2151S0415MT	6,35	1/4	11,00	.433	2,40	.0945	0,4	.016	2,80	.110	-	6904853	-	-
TCGW110208S01015MT	TCGW2152S0415MT	6,35	1/4	11,00	.433	2,40	.0945	0,8	.031	2,80	.110	-	6904854	-	-
TCGW16T308S01015MT	TCGW3252S0415M	9,53	3/8	16,50	.650	3,99	.157	0,8	.031	4,40	.173	-	6904855	-	-

Cubic Boron Nitride (CBN) Inserts • TNGA-MT





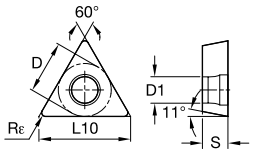
● first choice
○ alternate choice

P	M	K	N	S	H
		●		●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
TNGA160404S01025MT	TNGA331S0425MT	9,53	3/8	16,50	.650	4,78	.1883	0,4	.016	3,81	.150	-	6904856	-	-
TNGA160408S01025MT	TNGA332S0425MT	9,53	3/8	16,50	.650	4,78	.1883	0,8	.031	3,81	.150	-	6904857	-	-
TNGA160412S01225MT	TNGA333S0525MT	9,53	3/8	16,50	.650	4,78	.1883	1,2	.047	3,81	.150	-	6904865	-	-

Cubic Boron Nitride (CBN) Inserts • TPGW-C



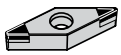


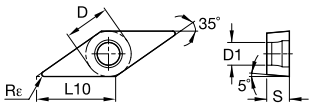
● first choice
○ alternate choice

P															
M															
K														●	●
N															
S														●	
H			●	●										●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
TPGW110204S01015C	TPGW2151S0415C	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	▮	▮	6018092	▮
TPGW110208S01015C	TPGW2152S0415C	6,35	1/4	11,00	.433	2,38	3/32	0,8	.031	2,80	.110	▮	▮	6018093	▮

Cubic Boron Nitride (CBN) Inserts • VBGW-MT





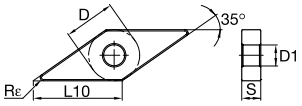
● first choice
○ alternate choice

P															
M															
K														●	●
N															
S														●	
H			●	●										●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
VBGW160404S01015MT	VBGW331S0415MT	9,53	3/8	16,61	.654	4,78	.1883	0,4	.016	4,40	.173	3883536	▮	6018094	▮
VBGW160408S01015MT	VBGW332S0415MT	9,53	3/8	16,61	.654	4,78	.1883	0,8	.031	4,40	.173	3883537	▮	6018095	▮

Cubic Boron Nitride (CBN) Inserts • VNGA-MT



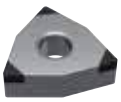


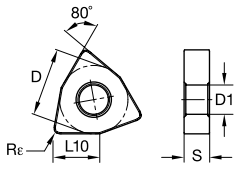
● first choice
○ alternate choice

	WBH10P	WBH20P	WBH30P	WBK40U
P				
M				
K			●	●
N				
S			●	
H	●	●	●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
VNGA160404S01025MT	VNGA331S0425MT	9,53	3/8	16,61	.654	4,78	.1883	0,4	.016	3,81	.150	3883538	6904868	6018096	-
VNGA160408S01025MT	VNGA332S0425MT	9,53	3/8	16,61	.654	4,78	.1883	0,8	.031	3,81	.150	-	-	6018097	-
VNGA160408S01225MT	VNGA332S0525MT	9,53	3/8	16,61	.654	4,78	.1883	0,8	.031	3,81	.150	-	6904869	-	-

Cubic Boron Nitride (CBN) Inserts • WNGA-MT

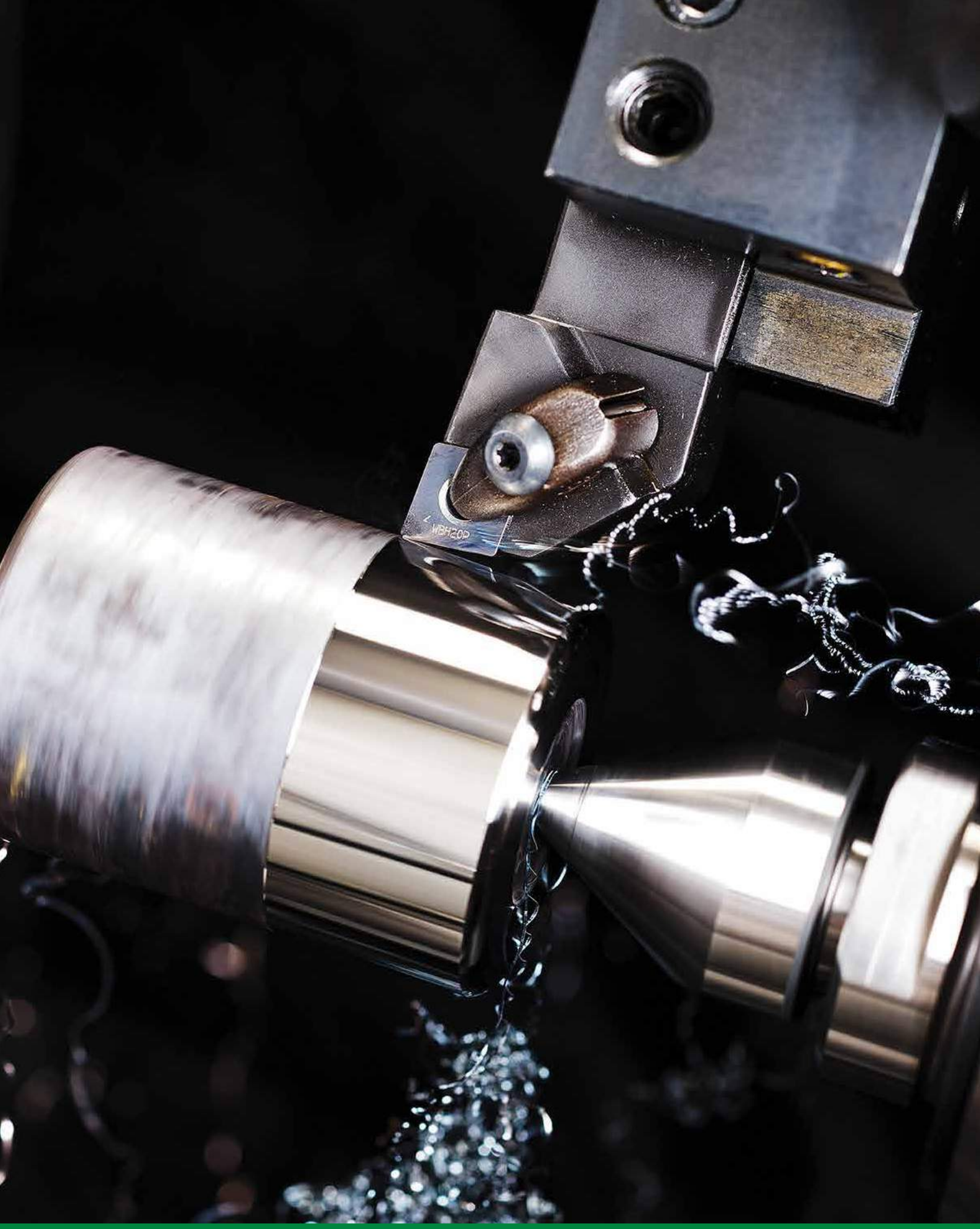




● first choice
○ alternate choice

	WBH10P	WBH20P	WBH30P	WBK40U
P				
M				
K			●	●
N				
S			●	
H	●	●	●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WBH10P	WBH20P	WBH30P	WBK40U
WNGA080404S01015MT	WNGA4310415MT	12,70	1/2	8,69	.342	4,78	.1883	0,4	.016	5,16	.203	-	6904870	-	-
WNGA080408S01225MT	WNGA4320525MT	12,70	1/2	8,69	.342	4,78	.1883	0,8	.031	5,16	.203	-	6904871	-	-



widia.com

WIDIA™

Tools for External Turning

External Toolholder

WIDIA™ offers an extensive range of toolholders for external turning to meet even the most exacting production demands across a broad spectrum of workpieces, shapes, and sizes.



The complete program includes toolholders for pin-, screw-, or clamp-type holding to produce light finishing cuts at high cutting speeds or heavy roughing applications.

TOOLS FOR EXTERNAL TURNING

D-STYLE CLAMPING

- Used for negative style inserts.
- Clamp assembly contains clamp, screw, and retaining ring.
- Quick insert indexing.
- Ensures insert repeatability and seating.
- Reduced chatter and extended tool life.

P-STYLE CLAMPING

- Lever-type clamping system for negative indexable inserts.
- No interference to chip flow.
- Fast insert changes.
- P-style available in metric sizes only.

S-STYLE CLAMPING

- Screw clamping system for positive indexable inserts.
- Compact design for high reliability and cost efficiency.
- Carbide shim for additional tool protection.

C-STYLE CLAMPING

- Height-adjustable clamp permits use of additional chipbreakers.
- Universal clamping system for positive and negative flat top inserts.
- Robust engineering makes it easy to handle.
- Carbide shim for extra tool protection.

APPLICATIONS



TURNING FACING PROFILING CHAMFERING

INDUSTRY

GENERAL ENGINEERING

TRANSPORTATION

ENERGY

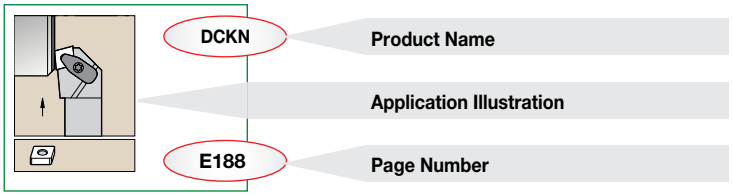
AEROSPACE

MEDICAL



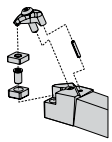
Toolholder Selection Guide

Each unique clamping system offers product options to fill your specific toolholder needs. Find the illustration that fits your application and navigate to the corresponding page to get the correct solution.



D-Style Clamping

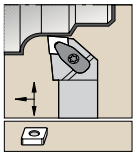
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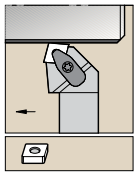
One-piece clamp assembly holder for use with negative style inserts. An extremely rigid clamping system. The tool is protected by a carbide shim.



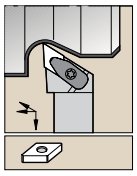
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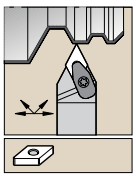
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E188



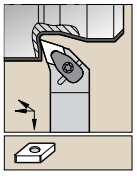
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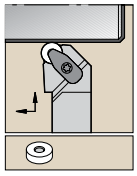
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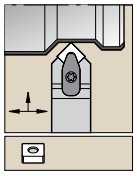
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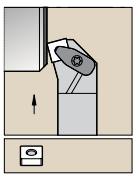
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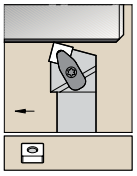
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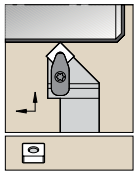
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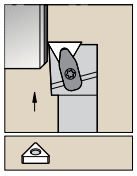
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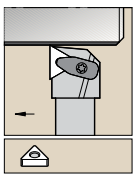
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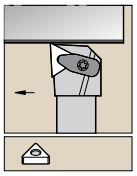
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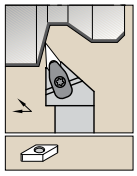
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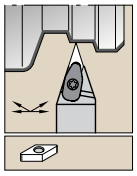
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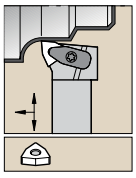
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DVJN
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E193



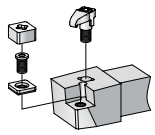
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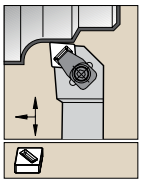
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C-Style Clamping

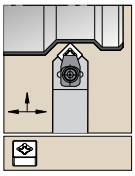
C



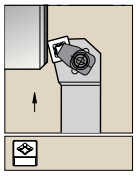
Top clamping system for negative and positive indexable inserts to DIN 4968. This universal clamping system is robust and easy to handle. Some height-adjustable clamps enable the use of additional chipbreakers. A carbide shim provides additional tool protection. Toolholders with cutting edge heights upwards of .625" and insert iCs greater than .250".



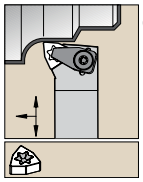
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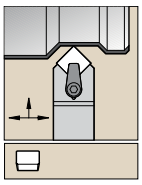
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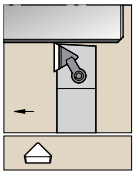
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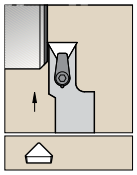
CWLN-MX
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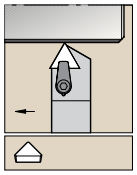
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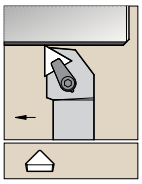
CTAP
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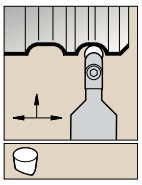
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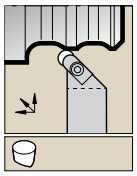
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CTGP
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CRDP*
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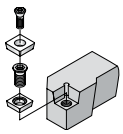


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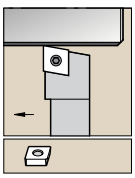
**Exact Clamping System not shown.*

S-Style Clamping

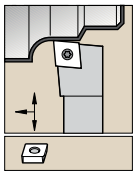
S



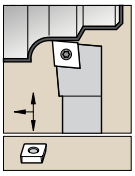
Screw clamping system for positive indexable inserts with countersunk hole to DIN 4967. Compact design using a minimum of spare parts for high reliability and cost efficiency. A carbide shim provides additional tool protection. Toolholders with cutting edge heights upwards of .625" and insert iCs from .375" are secured by means of a threaded bushing.



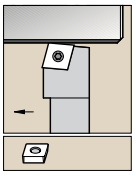
SCGP
0°
Page: E201



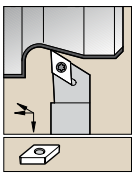
SCLC
-5°
Page: E201



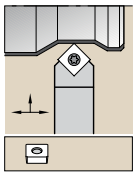
SCLP
-5°
Page: E202



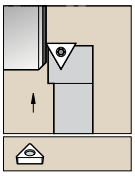
SCRP
15°
Page: —



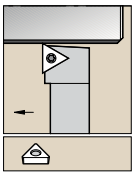
SDJC
-3°
Page: E202



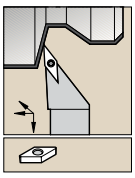
SSDC
45°
Page: E203



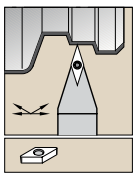
STFP
0°
Page: E233



STGP
0°
Page: E203



SVJB
-3°
Page: E204



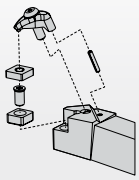
SVVB
17.5°
Page: E204

Catalog Numbering System

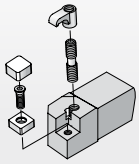
Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

D — Insert Holding Method

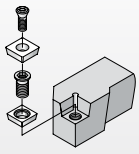
D



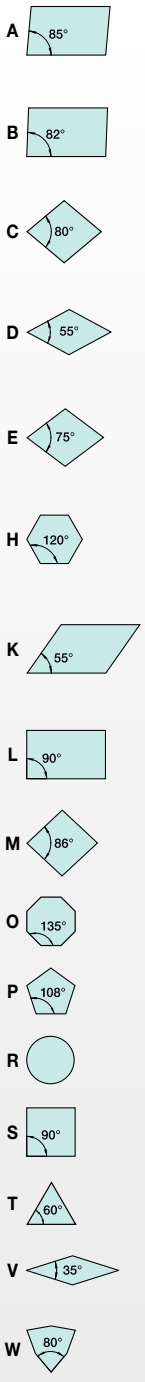
C



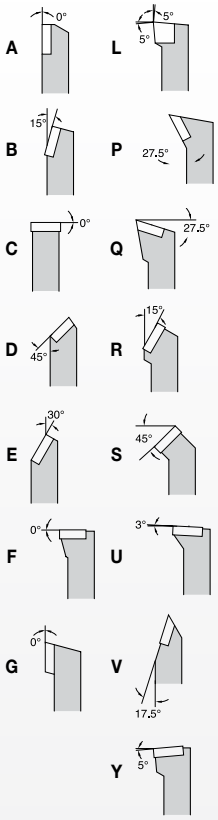
S



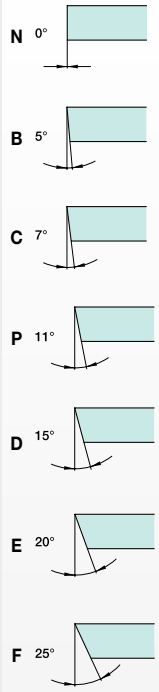
C — Insert Shape



L — Tool Style or Lead Angle



N — Insert Clearance Angle



R — Hand of Tool

R =

Right hand

L =

Left hand

N =

Neutral

Additional Information

C =

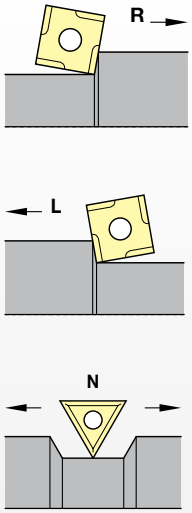
Deep pocket for ceramic insert

S =

Single pocket locating wall

F =

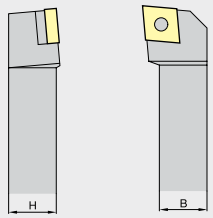
Straight shank, no offset



Catalog Numbering System

(continued)

1	6	4	D	KC	3
Shank Dimensions		Insert Size	Qualified Surface and Length	Additional Information	Insert Thickness (optional)



This two-digit number indicates the holder cross section.

- For shanks 5/8" square and larger, the number represents the number of sixteenths of width and height.
- For shanks under 5/8" square, the number of sixteenths of cross-section are preceded by zero.
- For rectangular holders, the first digit represents the number of eighths of width "B" and the second digit the number of quarters of height "H", except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.

Insert iC

Number of 1/8ths of "D"

A = Qualified back and end, 4" long
B = Qualified back and end, 4.5" long
C = Qualified back and end, 5" long
D = Qualified back and end, 6" long
E = Qualified back and end, 7" long
F = Qualified back and end, 8" long
G* = Qualified back and end, 5.5" long
H* = Qualified back and end, 5.625" long
I* = Qualified back and end, 3" long
J* = Qualified back and end, 5.3" long
K* = Qualified back and end, 14" long
L* = Qualified back and end, 6.8" long
M = Qualified front and end, 4" long
N = Qualified front and end, 4.5" long
P = Qualified front and end, 5" long
R = Qualified front and end, 6" long
S = Qualified front and end, 7" long
T = Qualified front and end, 8" long
U* = Qualified front and end, 5.5" long
V* = Qualified back and end, 3.5" long
W* = Qualified front and end, 3.5" long
Y* = Qualified back and end, 3.75" long
Z* = Qualified back and end, 3.250" long

* WIDIA™ standard only.

R =
Radial clearance for 4" minimum bore

S =
3.00 minimum bore

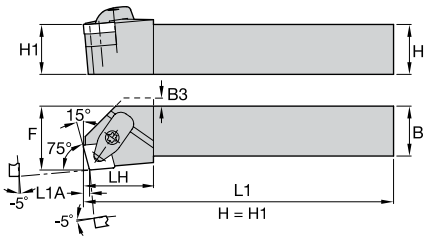
KC =
D-Style Clamping

3 = .188"
4 = .250"

DCKN 15°

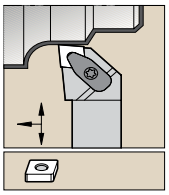


See pages E28-E42, E148, E171-E172 for inserts.

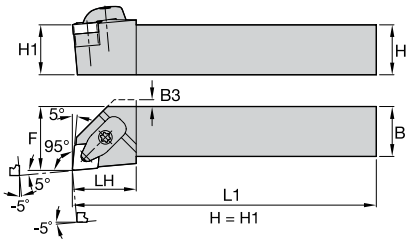


order number	catalog number	H	B	F	L1	LH	L1A	gage insert
right hand								
5696522	**DCKNR164DKC3**	1.00	1.00	1.250	6.00	1.25	.122	CN..432
5696524	**DCKNR205DKC4**	1.25	1.25	1.500	6.00	1.25	.150	CN..543
left hand								
5696308	**DCKNL164DKC3**	1.00	1.00	1.250	6.00	1.25	.122	CN..432

DCLN -5°

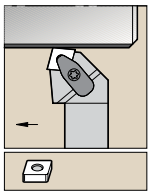


See pages E28-E42, E148, E171-E172 for inserts.

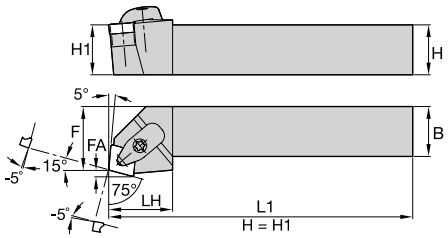


order number	catalog number	H	B	F	L1	LH	B3	gage insert
right hand								
5564319	**DCLNR124BKC3**	.75	.75	1.000	4.50	1.25	.15	CN..432
5564321	**DCLNR164DKC3**	1.00	1.00	1.250	6.00	1.25	–	CN..432
5564322	**DCLNR165DKC4**	1.00	1.00	1.250	6.00	1.38	–	CN..543
5564323	**DCLNR166DKC4**	1.00	1.00	1.250	6.00	1.38	–	CN..643
5564324	**DCLNR204DKC3**	1.25	1.25	1.500	6.00	1.25	–	CN..432
5564325	**DCLNR205DKC4**	1.25	1.25	1.500	6.00	1.38	–	CN..543
5564326	**DCLNR206DKC4**	1.25	1.25	1.500	6.00	1.63	–	CN..643
5564327	**DCLNR244DKC3**	1.50	1.50	2.000	6.00	1.25	–	CN..432
5564328	**DCLNR245DKC4**	1.50	1.50	2.000	6.00	1.38	–	CN..543
left hand								
5564295	**DCLNL123BKC3**	.75	.75	1.000	4.50	1.12	.06	CN..322
5564296	**DCLNL124BKC3**	.75	.75	1.000	4.50	1.25	.15	CN..432
5564298	**DCLNL164DKC3**	1.00	1.00	1.250	6.00	1.25	–	CN..432
5564299	**DCLNL165DKC4**	1.00	1.00	1.250	6.00	1.38	–	CN..543
5564310	**DCLNL166DKC4**	1.00	1.00	1.250	6.00	1.63	–	CN..643
5564311	**DCLNL204DKC3**	1.25	1.25	1.500	6.00	1.25	–	CN..432
5564312	**DCLNL205DKC4**	1.25	1.25	1.500	6.00	1.38	–	CN..543
5564313	**DCLNL206DKC4**	1.25	1.25	1.500	6.00	1.63	–	CN..643
5564315	**DCLNL244DKC3**	1.50	1.50	2.000	6.00	1.25	–	CN..432
5564316	**DCLNL245DKC4**	1.50	1.50	2.000	6.00	1.38	–	CN..543

DCRN 15°

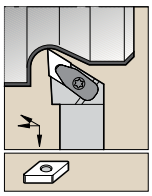


See pages E28-E42, E148, E171-E172 for inserts.

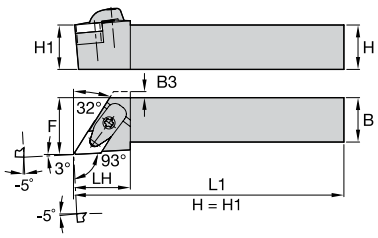


order number	catalog number	H	B	F	L1	LH	FA	gage insert
right hand								
5696532	**DCRNR164DKC3**	1.00	1.00	1.128	6.00	1.25	.12	CN..432

DDJN -3°

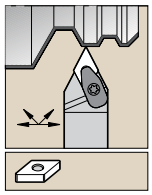


See pages E49-E60, E150, E165, E175-E176 for inserts.

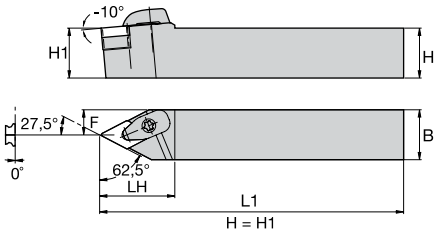


order number	catalog number	H	B	F	L1	LH	B3	gage insert
right hand								
5696544	**DDJNR123BKC3**	.75	.75	1.000	4.50	1.25	.06	DN..332
5696545	**DDJNR163DKC3**	1.00	1.00	1.250	6.00	1.25	–	DN..332
5696546	**DDJNR164DKC3**	1.00	1.00	1.250	6.00	1.25	–	DN..432
5696549	**DDJNR204DKC3**	1.25	1.25	1.500	6.00	1.25	–	DN..432
left hand								
5696538	**DDJNL164DKC3**	1.00	1.00	1.250	6.00	1.25	–	DN..432
5696541	**DDJNL204DKC3**	1.25	1.25	1.500	6.00	1.25	–	DN..432

DDPN 27.5°

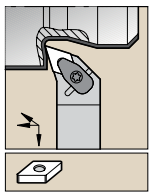


See pages E49-E60, E150, E165, E175-E176 for inserts.

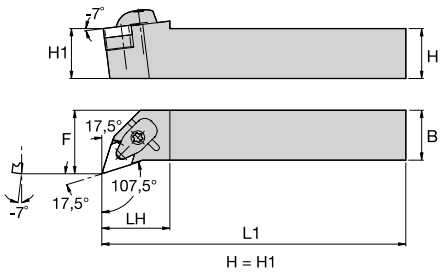


order number	catalog number	H	B	F	L1	LH	gage insert
neutral hand							
5696552	**DDPNN164DKC3**	1.00	1.00	.497	6.00	1.62	DN..432

DDQN -17.5°

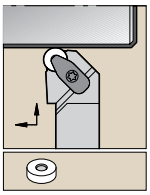


See pages E49-E60, E150, E165, E175-E176 for inserts.

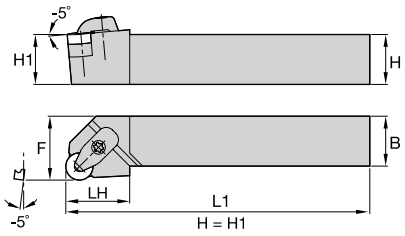


order number	catalog number	H	B	F	L1	LH	gage insert
right hand							
5564339	**DDQNR164CKC3**	1.00	1.00	1.250	5.00	1.38	DN..432
left hand							
5564337	**DDQNL164DKC3**	1.00	1.00	1.250	6.00	1.38	DN..432
5564338	**DDQNL204DKC3**	1.25	1.25	1.500	6.00	1.38	DN..432

DRGN

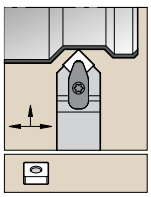


See page E63 for inserts.

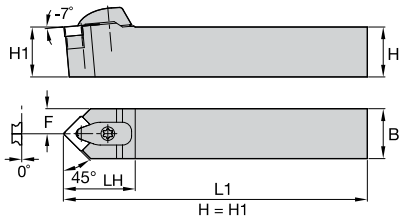


order number	catalog number	H	B	F	L1	LH	gage insert
left hand							
5697731	**DRGNL164DKC3**	1.00	1.00	1.250	6.00	1.25	RN..43
5697733	**DRGNL204DKC3**	1.25	1.25	1.500	6.00	1.25	RN..43

DSDN 45°

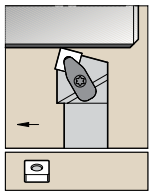


See pages E67-E78, E156, E177 for inserts.

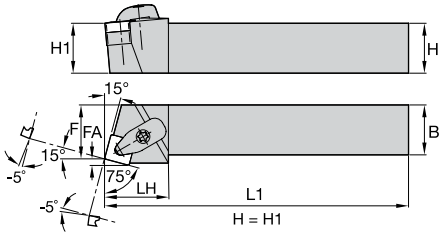


order number	catalog number	H	B	F	L1	LH	gage insert
neutral hand							
5697740	**DSDNN124KC3**	.75	.75	.375	4.50	1.44	SN..432
5697741	**DSDNN164KC3**	1.00	1.00	.500	6.00	1.44	SN..432
5697742	**DSDNN204KC3**	1.25	1.25	.625	6.00	1.44	SN..432

DSRN 15°

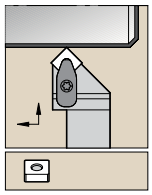


See pages E67-E78, E156, E177 for inserts.

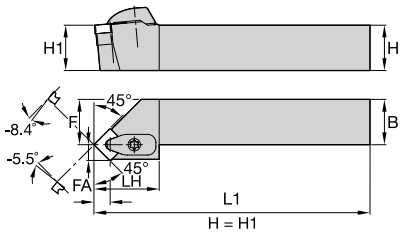


order number	catalog number	H	B	F	L1	LH	FA	gage insert
left hand								
5564342	**DSRNL206DKC4**	1.25	1.25	1.321	6.00	1.50	.18	SN..643

DSSN 45°

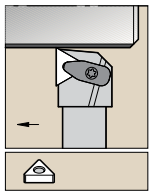


See pages E67-E78, E156, E177 for inserts.

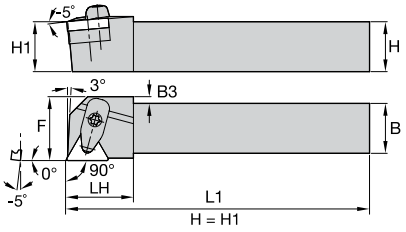


order number	catalog number	H	B	F	L1	LH	FA	gage insert
right hand								
5697754	**DSSNR164DKC3**	1.00	1.00	.912	6.00	1.50	.34	SN..432
left hand								
5697753	**DSSNL164DKC3**	1.00	1.00	.912	6.00	1.50	.34	SN..432

DTGN 0°

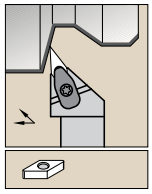


See pages E86-E95, E158, E167, E178 for inserts.

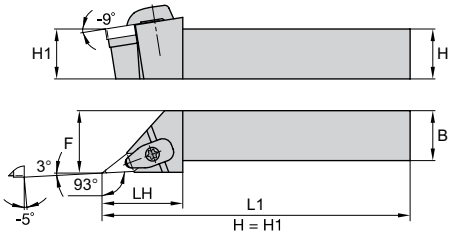


order number	catalog number	H	B	F	L1	LH	B3	gage insert
right hand								
5697764	**DTGNR123BKC3**	.75	.75	1.000	4.50	1.12	.25	TN..332
5697766	**DTGNR164DKC3**	1.00	1.00	1.250	6.00	1.25	.09	TN..432
left hand								
5697763	**DTGNL164DKC3**	1.00	1.00	1.250	6.00	1.25	.09	TN..432

DVJN 3°

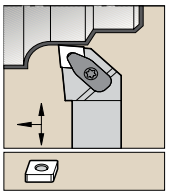


See pages E102-E108, E160, E169, E180 for inserts.

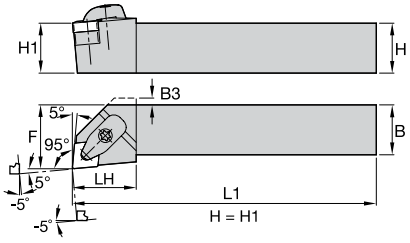


order number	catalog number	H	B	F	L1	LH	gage insert
right hand							
5697781	**DVJNR123CKC3**	.75	.75	1.000	5.00	1.82	VN..332
5564346	**DVJNR163DKC3**	1.00	1.00	1.250	6.00	1.82	VN..332
5564347	**DVJNR164DKC3**	1.00	1.00	1.250	6.00	2.15	VN..432
5697782	**DVJNR853DKC3**	1.25	1.00	1.250	6.00	1.82	VN..332
5697783	**DVJNR854DKC3**	1.25	1.00	1.250	6.00	2.15	VN..432
left hand							
5697768	**DVJNL123CKC3**	.75	.75	1.000	5.00	1.82	VN..332
5564344	**DVJNL163DKC3**	1.00	1.00	1.250	6.00	1.82	VN..332
5564345	**DVJNL164DKC3**	1.00	1.00	1.250	6.00	2.15	VN..432
5697769	**DVJNL853DKC3**	1.25	1.00	1.250	6.00	1.82	VN..332
5697780	**DVJNL854DKC3**	1.25	1.00	1.250	6.00	2.15	VN..432

DCLN 5°

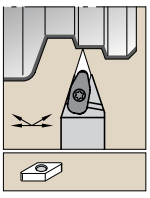


See pages E28-E42, E148, E171-E172 for inserts.

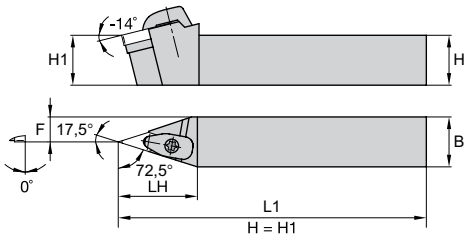


order number	catalog number	H	B	F	L1	LH	B3	gage insert
right hand								
5564319	**DCLNR124BKC3**	.75	.75	1.000	4.50	1.25	.15	CN..432
5564321	**DCLNR164DKC3**	1.00	1.00	1.250	6.00	1.25	–	CN..432
5564322	**DCLNR165DKC4**	1.00	1.00	1.250	6.00	1.38	–	CN..543
5564323	**DCLNR166DKC4**	1.00	1.00	1.250	6.00	1.38	–	CN..643
5564324	**DCLNR204DKC3**	1.25	1.25	1.500	6.00	1.25	–	CN..432
5564325	**DCLNR205DKC4**	1.25	1.25	1.500	6.00	1.38	–	CN..543
5564326	**DCLNR206DKC4**	1.25	1.25	1.500	6.00	1.63	–	CN..643
5564333	**DCLNR3225P12KC04**	1.26	.98	1.260	6.69	1.26	–	CN..120408
5564327	**DCLNR244DKC3**	1.50	1.50	2.000	6.00	1.25	–	CN..432
5564328	**DCLNR245DKC4**	1.50	1.50	2.000	6.00	1.38	–	CN..543
left hand								
5564295	**DCLNL123BKC3**	.75	.75	1.000	4.50	1.12	.06	CN..322
5564296	**DCLNL124BKC3**	.75	.75	1.000	4.50	1.25	.15	CN..432
5564298	**DCLNL164DKC3**	1.00	1.00	1.250	6.00	1.25	–	CN..432
5564299	**DCLNL165DKC4**	1.00	1.00	1.250	6.00	1.38	–	CN..543
5564310	**DCLNL166DKC4**	1.00	1.00	1.250	6.00	1.63	–	CN..643
5564311	**DCLNL204DKC3**	1.25	1.25	1.500	6.00	1.25	–	CN..432
5564312	**DCLNL205DKC4**	1.25	1.25	1.500	6.00	1.38	–	CN..543
5564313	**DCLNL206DKC4**	1.25	1.25	1.500	6.00	1.63	–	CN..643
5564315	**DCLNL244DKC3**	1.50	1.50	2.000	6.00	1.25	–	CN..432
5564316	**DCLNL245DKC4**	1.50	1.50	2.000	6.00	1.38	–	CN..543

DVVN 17.5°

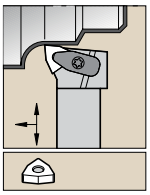


See pages E102-E108, E160, E169, E180 for inserts.

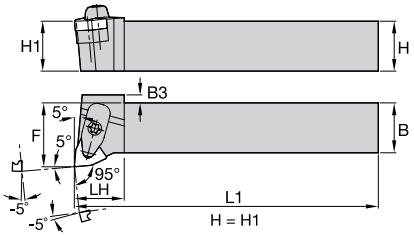


order number	catalog number	H	B	F	L1	LH	gage insert
neutral hand							
5564348	**DVVNN163DKC3**	1.00	1.00	.496	6.00	1.97	VN..332

DWLN -5°

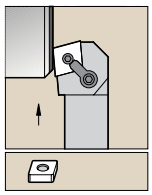


See pages E108-E116, E160, E170, E180 for inserts.

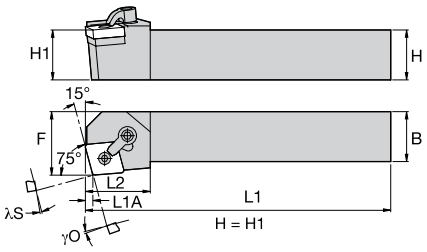


order number	catalog number	H	B	F	L1	LH	B3	gage insert
right hand								
5697789	**DWLNR123BKC3**	.75	.75	1.000	4.50	1.00	.28	WN..332
5697790	**DWLNR163DKC3**	1.00	1.00	1.250	6.00	1.00	.06	WN..332
5697791	**DWLNR164CKC3**	1.00	1.00	1.250	5.00	1.00	.15	WN..432
5697792	**DWLNR164DKC3**	1.00	1.00	1.250	6.00	1.00	.15	WN..432
left hand								
5697787	**DWLNL164DKC3**	1.00	1.00	1.250	6.00	1.00	.15	WN..432

MCKN 15°

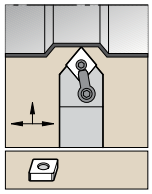


See pages E28-E42, E148, E171-E172 for inserts.

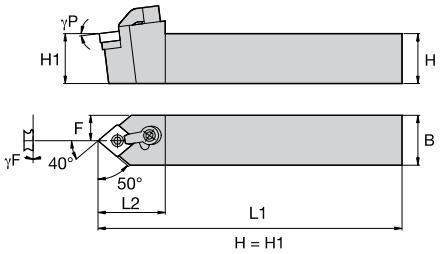


order number	catalog number	H	B	F	L1	L2	L1A	λS°	γO°	gage insert
right hand										
2951294	**MCKNR164C**	1.00	1.00	1.250	5.00	1.21	.12	-5.00	-5.0	CN..432

MCMN 40°

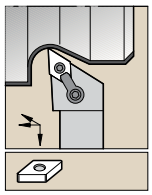


See pages E28-E42, E148, E171-E172 for inserts.

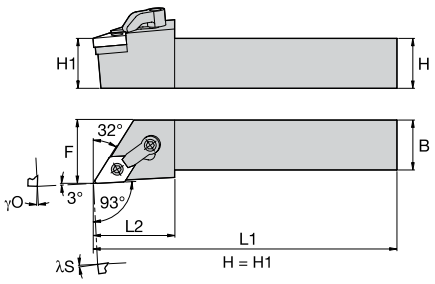


order number	catalog number	H	B	F	L1	L2	γP°	γF°	gage insert
neutral hand									
3851318	**MCMNN124B**	.75	.75	.375	4.50	1.39	-7.0	.0 deg	CN..432
3851319	**MCMNN164D**	1.00	1.00	.500	6.00	1.39	-7.0	.0 deg	CN..432

MDJN -3°

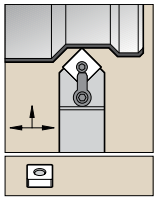


See pages E49-E60, E150, E165, E175-E176 for inserts.

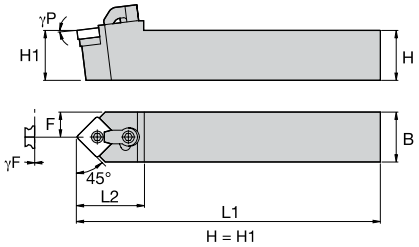


order number	catalog number	H	B	F	L1	L2	λS°	γO°	gage insert
right hand									
2953464	**MDJNR124B**	.75	.75	1.000	4.50	1.38	-5.00	-5.00	DN..432
2953465	**MDJNR164C**	1.00	1.00	1.250	5.00	1.24	-5.00	-5.00	DN..432

MSDN 45°

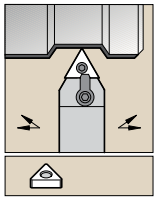


See pages E67-E78, E156, E177 for inserts.

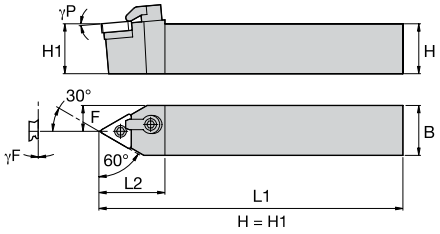


order number	catalog number	H	B	F	L1	L2	γP°	γF°	gage insert
neutral hand									
2953473	**MSDNN083**	.50	.50	.250	4.50	1.14	-7.0	.0	SN..322

MTEN-S 30°

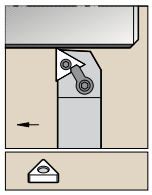


See pages E86-E95, E158, E167, E178 for inserts.

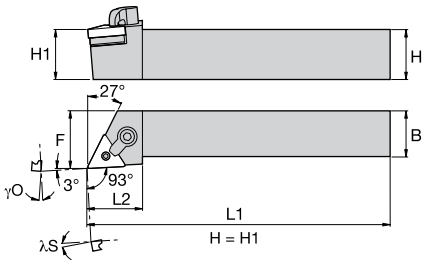


order number	catalog number	H	B	F	L1	L2	γP°	γF°	gage insert
neutral hand									
2951327	**MTENNS164**	1.00	1.00	.500	6.00	1.50	-10.0	.0	TN..432

MTJN-S -3°

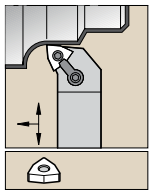


See pages E86-E95, E158, E167, E178 for inserts.

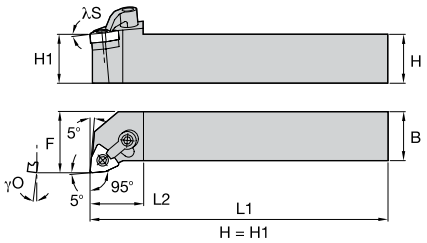


order number	catalog number	H	B	F	L1	L2	λS°	γO°	gage insert
right hand									
2951340	**MTJNRS123**	.75	.75	1.000	4.50	1.12	-5.00	-5.00	TN..332
2951341	**MTJNRS163**	1.00	1.00	1.250	6.00	1.12	-5.00	-5.00	TN..332
2951342	**MTJNRS164**	1.00	1.00	1.250	6.00	1.32	-5.00	-5.00	TN..432
left hand									
2951335	**MTJNLS123**	.75	.75	1.000	4.50	1.12	-5.00	-5.00	TN..332
2951337	**MTJNLS164**	1.00	1.00	1.250	6.00	1.32	-5.00	-5.00	TN..432

MWLN -5°

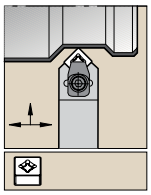


See pages E108-E116, E160, E170, E180 for inserts.

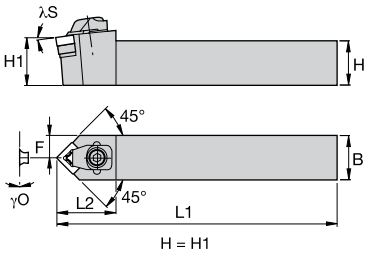


order number	catalog number	H	B	F	L1	L2	λS°	γO°	gage insert
right hand									
2951347	**MWLNR124B**	.75	.75	1.000	4.50	1.12	-5.00	-5.00	WN..432
left hand									
2951344	**MWLNL124B**	.75	.75	1.000	4.50	1.12	-5.00	-5.00	WN..432

CSDN-MX 45°

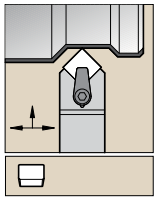


See pages E156-E157 for inserts.

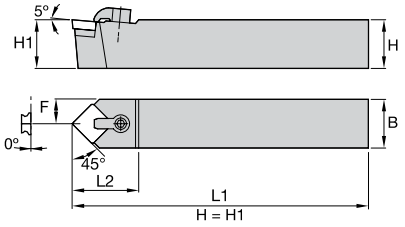


order number	catalog number	H	B	F	L1	L2	gage insert
neutral hand							
3093609	**CSDNN164DMX5**	1.00	1.00	.500	6.00	1.38	SN.X452

CSDP 45°

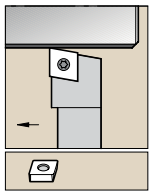


Steel shank with through coolant. See pages E79, E81-E82, E157 for inserts.

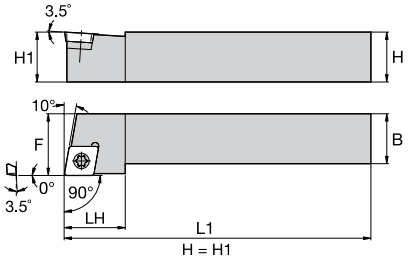


order number	catalog number	H	B	F	L1	L2	gage insert
neutral hand							
2951285	**CSDPN164**	1.00	1.00	.500	6.00	1.38	SP.422

SCGP 0°

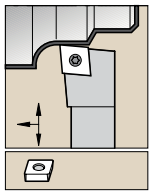


See pages E43, E163, E172-E173 for inserts.

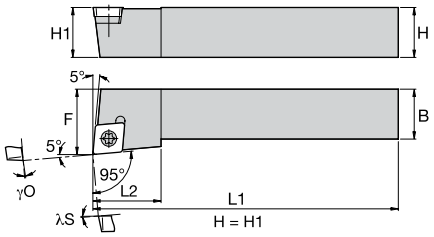


order number	catalog number	H	B	F	L1	L2	gage insert
right hand							
5094166	**SCGPR083V**	.50	.50	.625	3.50	.62	CP..3252

SCLC -5°

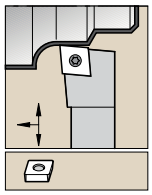


See pages E22-E27, E122, E161-E162, E170-E171 for inserts.

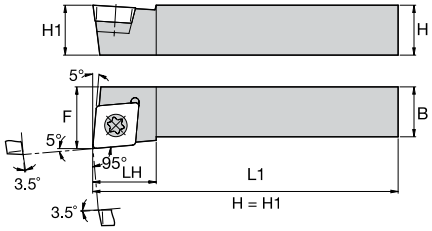


order number	catalog number	H	B	F	L1	L2	λS°	γO°	gage insert
right hand									
2951363	**SCLCR083**	.50	.50	.625	3.50	.63	.00	.00	CC..3252
2951364	**SCLCR103**	.63	.63	.750	4.00	.62	.00	.00	CC..3252
2951365	**SCLCR123**	.75	.75	1.000	4.50	.62	.00	.00	CC..3252
2951366	**SCLCR164D**	1.00	1.00	1.250	6.00	.75	.00	.00	CC..432
left hand									
2951350	**SCLCL062**	.38	.38	.500	2.50	.50	.00	.00	CC..2151
2951351	**SCLCL083**	.50	.50	.625	3.50	.63	.00	.00	CC..3252

SCLP -5°

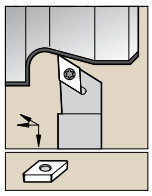


See pages E43, E163, E172-E173 for inserts.

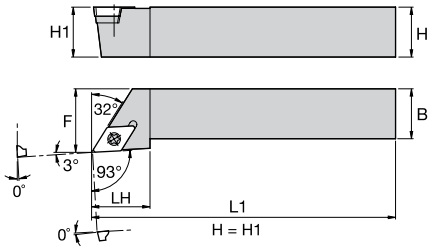


order number	catalog number	H	B	F	L1	L2	gage insert
right hand							
5094214	**SCLPR062**	.38	.38	.500	2.50	.44	CP..2151

SDJC -3°

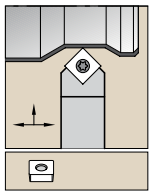


See pages E44-E48, E123, E164, E173-E174 for inserts.

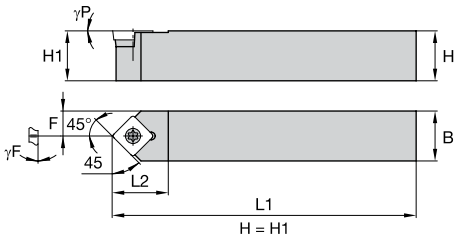


order number	catalog number	H	B	F	L1	L2	λS°	γO°	gage insert
right hand									
2951370	**SDJCR123**	.75	.75	1.000	4.50	.88	.00	.00	DC..3252
2951371	**SDJCR163**	1.00	1.00	1.250	6.00	.88	.00	.00	DC..3252
left hand									
2951367	**SDJCL102**	.63	.63	.750	4.00	.62	.00	.00	DC..2151

SSDC 45°

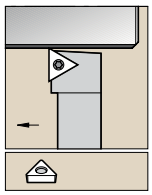


See pages E64-E67 for inserts.

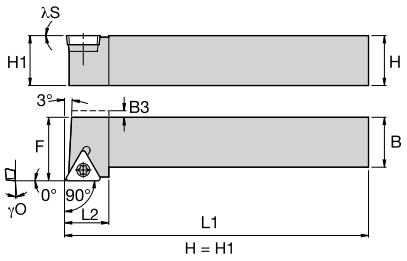


order number	catalog number	H	B	F	L1	L2	γF°	γP°	gage insert
neutral hand									
2951372	**SSDCN083**	.50	.50	.250	3.50	.63	0.0	0.0	SC..3252

STGP 0°

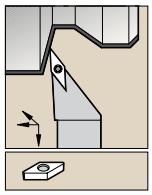


See pages E97, E168, E179 for inserts.

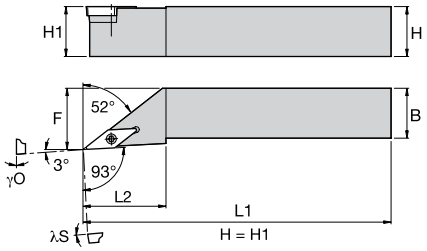


order number	catalog number	H	B	F	L1	L2	λS°	γO°	gage insert
right hand									
5094259	**STGPR082V**	.50	.50	.625	3.50	.56	5.00 deg	.00 deg	TP..2151

SVJB -3°

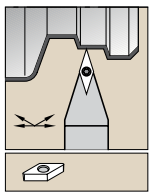


See pages E99-E101, E125, E169, E179 for inserts.

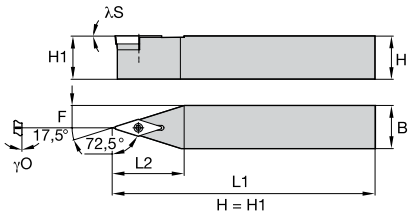


order number	catalog number	H	B	F	L1	L2	λS°	γO°	gage insert
right hand									
2951375	**SVJBR123**	.75	.75	1.000	4.50	1.38	.00	.00	VB..332
2951376	**SVJBR163**	1.00	1.00	1.250	6.00	1.38	.00	.00	VB..332
left hand									
2951373	**SVJBL123**	.75	.75	1.000	4.50	1.38	.00	.00	VB..332
2951374	**SVJBL163**	1.00	1.00	1.250	6.00	1.38	.00	.00	VB..332

SVVB 17.5°



See pages E99-E101, E125, E169, E179 for inserts.



order number	catalog number	H	B	F	L1	L2	λS°	γO°	gage insert
neutral hand									
2951377	**SVVBN163**	1.00	1.00	.500	6.00	1.31	.00	.00	VB..332



widia.com

WIDIA™

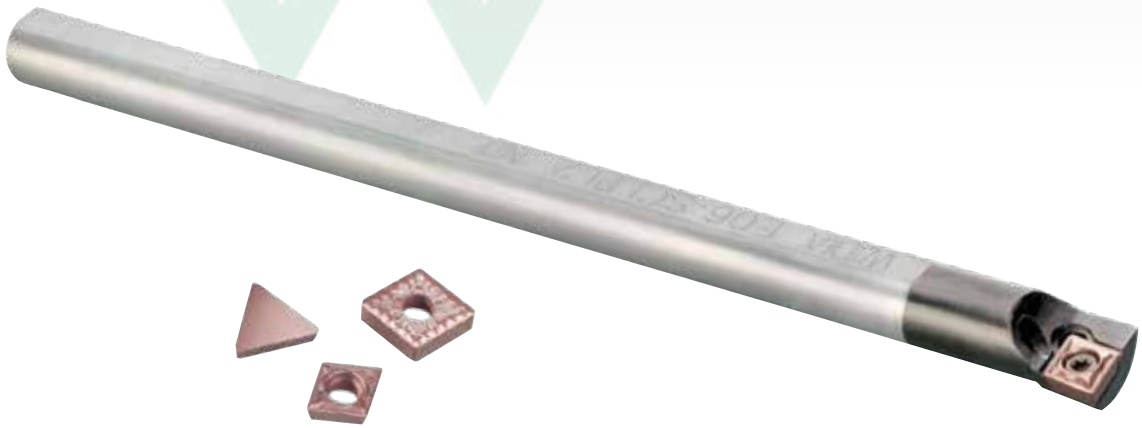
Tools for Internal Boring

Boring Bars

WIDIA™ offers an extensive range of toolholders for internal boring to meet even the most precise production demands across a broad spectrum of workpiece shapes and sizes.



WIDIA boring bars, available with both a conventional steel shank or a vibration-resistant carbide shank and coolant hole, guarantee consistent results and enhanced production reliability.



TOOLS FOR INTERNAL BORING

D-STYLE CLAMPING

- Used for negative style inserts.
- Clamp assembly contains clamp, screw, and retaining ring.
- Quick insert indexing.
- Ensures insert repeatability and seating.
- Reduced chatter and extended tool life.

P-STYLE CLAMPING

- Lever-type clamping system for negative indexable inserts.
- No interference to chip flow.
- Fast insert changes.
- P-style available in metric sizes only.

S-STYLE CLAMPING

- Screw clamping system for positive indexable inserts.
- Compact design for high reliability and cost efficiency.
- Carbide shim for additional tool protection.

C-STYLE CLAMPING

- Height-adjustable clamp permits use of additional chipbreakers.
- Universal clamping system for positive and negative flat top inserts.
- Robust engineering makes it easy to handle.
- Carbide shim for extra tool protection.

APPLICATIONS



BORING

INDUSTRY







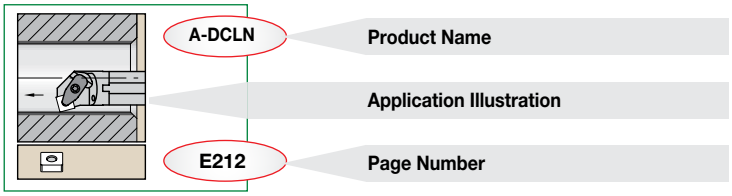






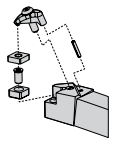
Boring Bar Selection Guide

Each unique clamping system offers product options to fill your specific toolholder needs. Find the illustration that fits your application and navigate to the corresponding page to get the correct solution.

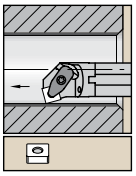


D-Style Clamping

D



One-piece clamp assembly holder for use with negative style inserts. An extremely rigid clamping system. The tool is protected by a carbide shim.

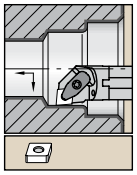


A-DCFN

0°

Page:

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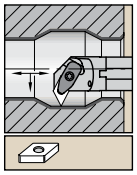


A-DCLN

-5°

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E212

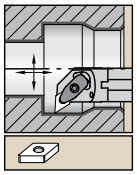


A-DDPN

27.5°

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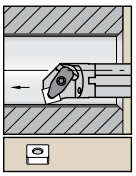


A-DDUN

-3°

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A-DSKN

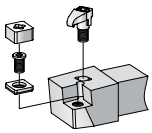
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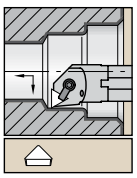
–

C-Style Clamping

C



Top clamping system for negative and positive indexable inserts to DIN 4968. This universal clamping system is robust and easy to handle. Some height-adjustable clamps enable the use of additional chipbreakers. A carbide shim provides additional tool protection. Toolholders with cutting edge heights upwards of .625" and insert iCs greater than .250".



A-CTFP

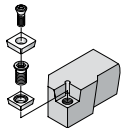
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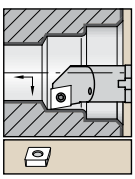
E215

S-Style Clamping

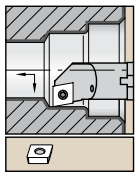
S



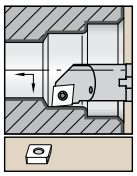
Screw clamping system for positive indexable inserts with countersunk hole to DIN 4967. Compact design using a minimum of spare parts for high reliability and cost efficiency. A carbide shim provides additional tool protection. Toolholders with cutting edge heights upwards of .625" and insert iCs from .375" are secured by means of a threaded bushing.



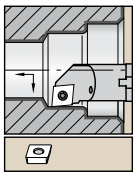
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Page:
E216



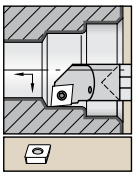
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E216



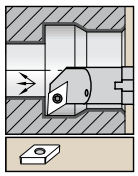
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Page:
E217



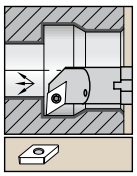
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E218



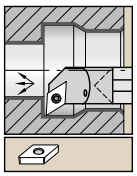
E-SCLP
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E218



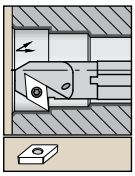
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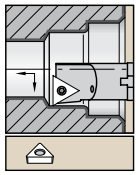
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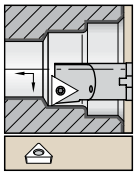
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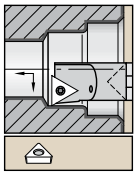
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E220



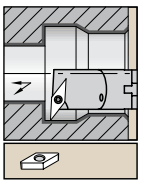
A-STFC
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Page:
E221



A-STFP
0°
Page:
E221



E-STFP
0°
Page:
E222



A-SVUB
-3°
Page:
E222

Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

A — Bar Type

A

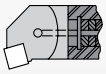
Steel bar with coolant

S

Steel bar without coolant

C

Carbide bar

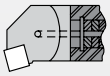
D

DeVibrator bar with coolant

D

Tunable bar with coolant

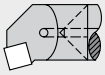
E

Carbide bar with coolant

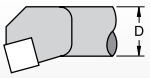
B

DeVibrator

H

Interchangeable head

L

Heavy metal bar with coolant

32 — Bar Diameter



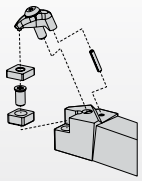
Inch:
A two-digit number indicates the bar diameter in 1/16" increments

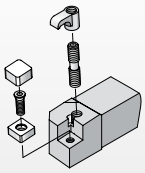
V — Bar Length**

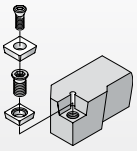
3	=	F
3.5	=	G
4	=	H
4.5	=	J
5	=	K
5.5	=	L
6	=	M
6.5	=	N
7	=	Q
8	=	R
10	=	S
12	=	T
14	=	U
16	=	V
18	=	W
20	=	Y

**Used only when more than one length is available or a special length is required.

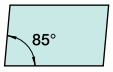
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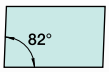
D


C


S


C — Insert Shape

A


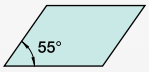
B


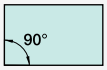
C


D


E


H


K


L


M

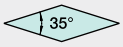

O


P


R


S


T

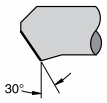

V


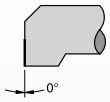
W

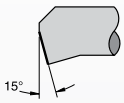

Catalog Numbering System

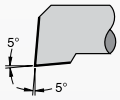
(continued)

L
Bar Style or Lead Angle

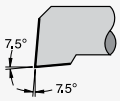
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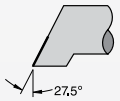
F


K


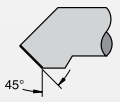
L


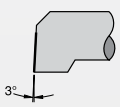
(E-style inserts)

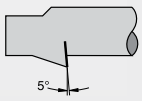
L


P


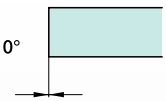
Q

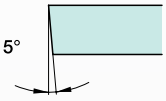

S


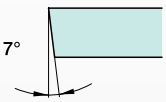
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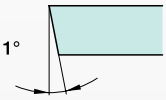
X


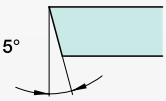
N
Insert Clearance Angle

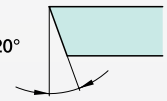
N 0°


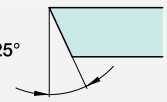
B 5°


C 7°


P 11°


D 15°


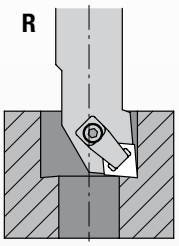
E 20°


F 25°


R
Hand of Tool

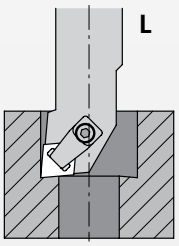
R =

Right-hand boring bar



L =

Left-hand boring bar



5
Insert Size

Insert iC

Number of 1/8ths of “D”

KC4
Additional Information

M... =

TNT/MTS clamping systems for ceramic and PcBN inserts

D =

Dual pocket

AP5 =

Axil positive

KC =

D-Style

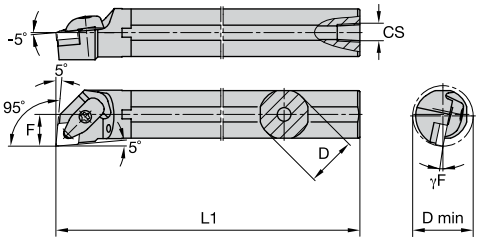
+ =

Insert thickness

A-DCLN -5°

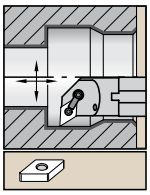


Steel shank with through coolant.
See pages E28-E42, E148, E171-E172 for inserts.

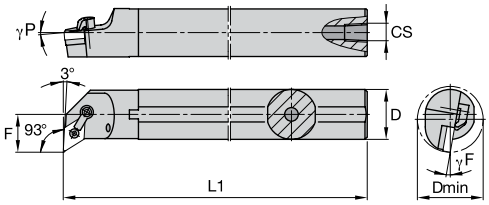


order number	catalog number	D	D min	F	L1	CS	γF°	gage insert
right hand								
5696297	**A16TDCLNR4KC3**	1.000	1.200	.640	12.00	1/4-18 NPT	-12.0	CN..432
5696298	**A20UDCLNR4KC3**	1.250	1.470	.765	14.00	1/4-18 NPT	-12.0	CN..432
5696299	**A24UDCLNR4KC3**	1.500	1.760	.890	14.00	1/4-18 NPT	-12.0	CN..432
5696300	**A24UDCLNR5KC4**	1.500	1.760	.890	14.00	1/4-18 NPT	-14.0	CN..543
5696302	**A32VDCLNR4KC3**	2.000	2.400	1.281	16.00	1/4-18 NPT	-12.0	CN..432
5696305	**A40VDCLNR4KC3**	2.500	3.030	1.531	16.00	1/4-18 NPT	-8.0	CN..432
5696306	**A40VDCLNR6KC4**	2.500	3.030	1.531	16.00	1/4-18 NPT	-10.0	CN..643
left hand								
5696286	**A16TDCLNL4KC3**	1.000	1.200	.640	12.00	1/4-18 NPT	-12.0	CN..432
5696287	**A20UDCLNL4KC3**	1.250	1.470	.765	14.00	1/4-18 NPT	-12.0	CN..432
5696288	**A24UDCLNL4KC3**	1.500	1.760	.890	14.00	1/4-18 NPT	-12.0	CN..432
5696291	**A32VDCLNL4KC3**	2.000	2.400	1.281	16.00	1/4-18 NPT	-12.0	CN..432

A-MDUN -3°

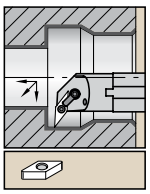


Steel shank with through coolant. See pages E49-E60, E150, E165, E175-E176 for inserts.

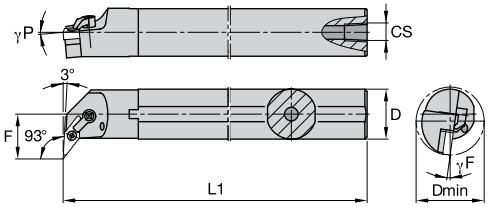


order number	catalog number	D	D min	F	L1	CS	γF°	γP°	gage insert
right hand									
2951412	**A24UMDUNR4**	1.500	2.000	1.120	14.00	1/4-18 NPT	-10.0	-5.0	DN..432
2951423	**A32VMDUNR4**	2.000	2.500	1.370	16.00	1/4-18 NPT	-8.0	-5.0	DN..432

A-MVUN -3°

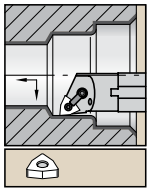


Steel shank with through coolant. See pages E102-E108, E160, E169, E180 for inserts.

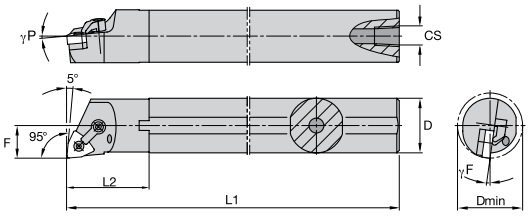


order number	catalog number	D	D min	F	L1	CS	γF°	γP°	gage insert
right hand									
3883412	**A20UMVUNR3**	1.250	1.705	1.000	14.00	1/4-18 NPT	-12.0	-5.0	VN..332

A-MWLN -5°

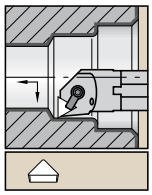


Steel shank with through coolant. See pages E108-E116, E160, E170, E180 for inserts.

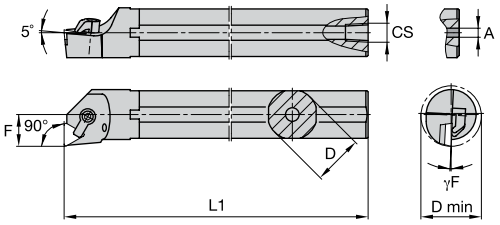


order number	catalog number	D	D min	F	L1	CS	γF°	γP°	gage insert
right hand									
2951390	**A12SMWLNR3**	.750	.930	.500	10.00	1/8-27 NPT	-14.0	-5.0	WN..332
2951398	**A16TMWLNR4**	1.000	1.220	.640	12.00	1/4-18 NPT	-12.0	-5.0	WN..432
2951407	**A20UMWLNR4**	1.250	1.470	.765	14.00	1/4-18 NPT	-14.0	-5.0	WN..432

A-CTFP 0°

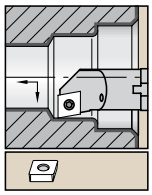


Steel shank with through coolant. See pages E96-E98, E159, E168 for inserts.

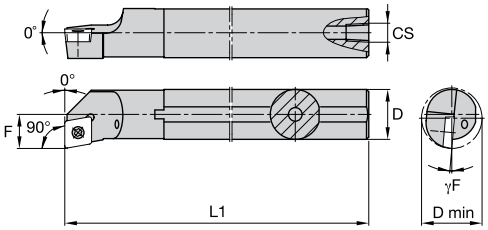


order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert
right hand									
2951400	**A20UCTFPR3**	1.250	1.470	.765	14.00	6,35	1/4-18 NPT	-3.0	TP.322

A-SCFC 0°

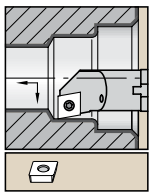


Steel shank with through coolant.
See pages E22-E27, E122, E161-E162, E170-E171 for inserts.



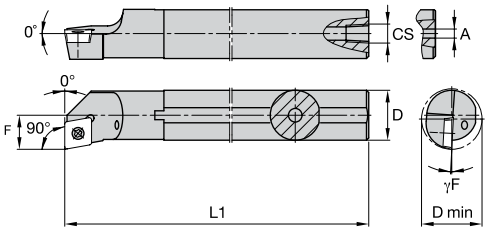
order number	catalog number	D	D min	F	L1	CS	γF°	gage insert
right hand								
3883416	**A08RSCFCR2**	.500	.600	.312	8.00	1/16-27 NPT	-7.0	CC..2151
3883421	**A12SSCFCR3**	.750	.930	.500	10.00	1/8-27 NPT	-5.0	CC..3252

A-SCFP 0°



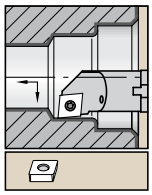
Steel shank with through coolant.

See pages E43, E163, E172-E173 for inserts.

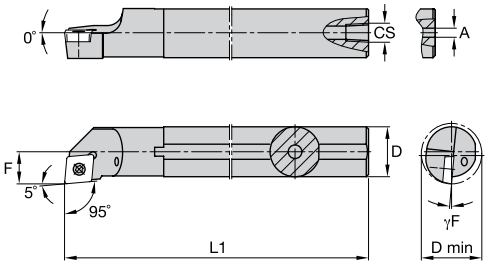


order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert
right hand									
5077440	**A06MSCFPR2**	.375	.480	.250	6.00	.13	—	-4.0	CP..2151
5077445	**A08RSCFPR2**	.500	.600	.312	8.00	—	1/16-27 NPT	-2.0	CP..2151
5077499	**A12SSCFPR3**	.750	.930	.500	10.00	—	1/8-27 NPT	-2.0	CP..3252

A-SCLC -5°



Steel shank with through coolant. See pages E22-E27, E122, E161-E162, E170-E171 for inserts.

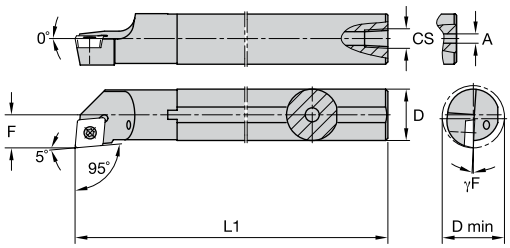


order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert
right hand									
2951383	**A06MSCLCR2**	.375	.480	.250	6.00	.13	—	-8.0	CC..2151
2951386	**A08RSCLCR2**	.500	.600	.312	8.00	—	1/16-27 NPT	-7.0	CC..2151
2951388	**A10SSCLCR2**	.625	.770	.406	10.00	—	1/8-27 NPT	-5.0	CC..2151
2951392	**A12SSCLCR3**	.750	.930	.500	10.00	—	1/8-27 NPT	-5.0	CC..3252
2951399	**A16TSCLCR3**	1.000	1.200	.640	12.00	—	1/4-18 NPT	-4.0	CC..3252
2951408	**A20USCLCR4**	1.250	1.470	.765	14.00	—	1/4-18 NPT	-5.0	CC..432
2951418	**A24USCLCR4**	1.500	1.760	.890	14.00	—	1/4-18 NPT	-4.0	CC..432
left hand									
2951391	**A12SSCLCL3**	.750	.930	.500	10.00	—	1/8-27 NPT	-5.0	CC..3252

A-SCLP -5°



See pages E43, E163, E172-E173 for inserts.
Steel shank with through coolant.

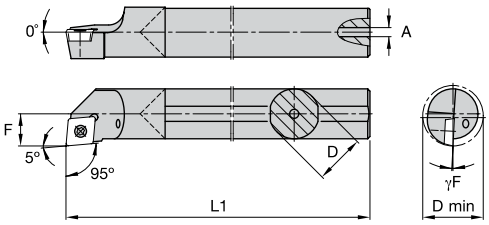


order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert
right hand									
5077618	**A06MSCLPR2**	.375	.480	.250	6.00	.13	—	-6.0	CP..2151
5077643	**A08RSCLPR2**	.500	.600	.312	8.00	.16	1/16-27 NPT	-3.0	CP..2151
5077648	**A10SSCLPR2**	.625	.770	.406	10.00	—	1/8-27 NPT	-2.0	CP..2151
5077649	**A10SSCLPR3**	.625	.770	.406	10.00	.16	1/8-27 NPT	-2.0	CPMT3252
5077686	**A12SSCLPR3**	.750	.930	.500	10.00	—	1/8-27 NPT	-2.0	CP..3252
5077699	**A16TSCLPR3**	1.000	1.200	.640	12.00	—	1/4-18 NPT	.0	CP..3252
left hand									
5077616	**A06MSCLPL2**	.375	.480	.250	6.00	.13	—	-6.0	CP..2151
5077682	**A12SSCLPL3**	.750	.930	.500	10.00	—	1/8-27 NPT	-2.0	CP..3252

E-SCLP -5°

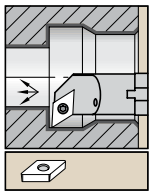


See pages E43, E163, E172-E173 for inserts.
Carbide shank with through coolant.

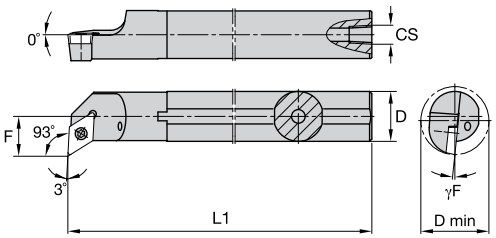


order number	catalog number	D	D min	F	L1	A	γF°	gage insert
right hand								
5093183	**E16TSCLPR3**	.312	1.200	.640	12.000	.281	.0	CP..3252
5093092	**E06MSCLPR2**	.375	.480	.250	6.000	.125	-6.0	CP..2151
5093096	**E08RSCLPR2**	.500	.600	.312	8.000	.187	-2.0	CP..2151
5093142	**E10SSCLPR3**	.625	.770	.406	10.000	.218	-3.0	CP..3252
5093148	**E12SSCLPR3**	.750	.930	.500	10.000	.281	-2.0	CP..3252
left hand								
5093095	**E08RSCLPL2**	.500	.600	.312	8.000	.187	-2.0	CP..2151

A-SDUC -3°



Steel shank with through coolant.
See pages E44-E48, E123, E164, E173-E174 for inserts.

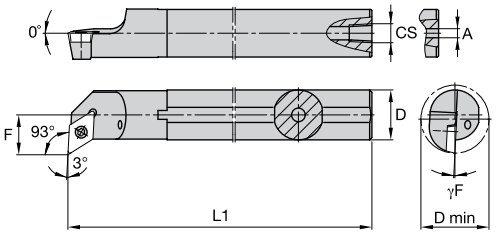


order number	catalog number	D	D min	F	L1	CS	γF°	gage insert
right hand								
2951394	**A12SSDUCR3**	.750	.980	.562	10.00	1/8-27 NPT	-5.0	DC..3252
left hand								
2951393	**A12SSDUCL3**	.750	.980	.562	10.00	1/8-27 NPT	-5.0	DC..3252

A-SDUP -3°

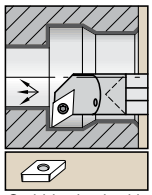


See pages E165, E166 for inserts.
Steel shank with through coolant.



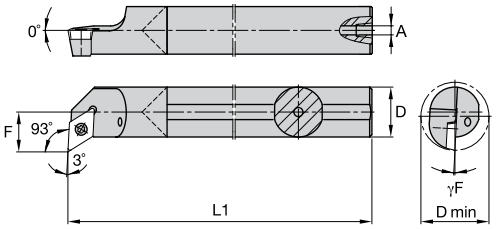
order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert
right hand									
5078324	**A06MSDUPR2**	.375	.600	.375	6.000	.125	—	-3.0	DP..2151
5078326	**A08RSDUPR2**	.500	.730	.437	8.000	.156	1/16-27 NPT	.0	DP..2151
5078366	**A16TSDUPR3**	1.000	1.300	.750	12.000	.250	1/4-18 NPT	.0	DP..3252

E-SDUP -3°



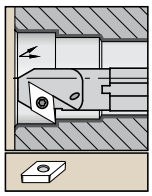
Carbide shank with through coolant.

See pages E165, E166 for inserts.



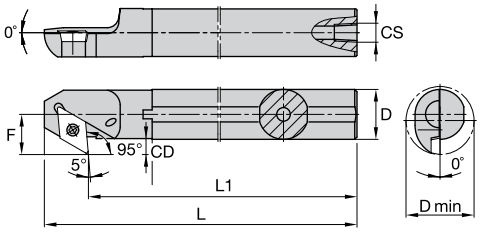
order number	catalog number	D	D min	F	L1	A	γF°	gage insert
right hand								
5093424	**E08RSDUPR2**	.500	.730	.437	8.000	.187	.0	DP..2151

A-SDXP -5°



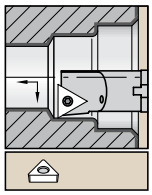
See pages E165, E166 for inserts.

Steel shank with through coolant.



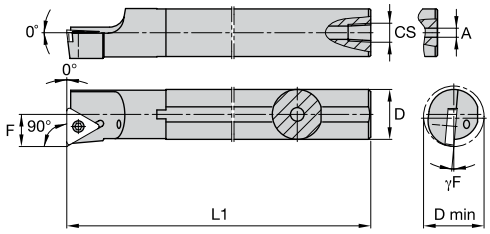
order number	catalog number	D	D min	F	L1	L	CD	CS	gage insert
left hand									
5078402	**A12SSDXPL3**	.750	.980	.562	10.00	10.63	.187	1/8-27 NPT	DP..3252

A-STFC 0°



Steel shank with through coolant.

See pages E82-E85, E124, E166-E167, E178 for inserts.

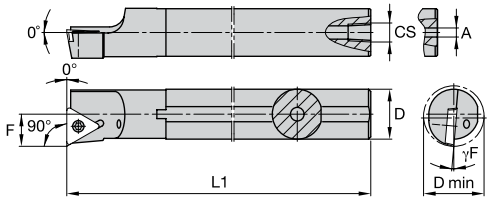


order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert
right hand									
2951385	**A06MSTFCR2**	.375	.480	.250	6.00	.13	—	-8.0	TC..2151
2951387	**A08RSTFCR2**	.500	.600	.312	8.00	.16	1/16-27 NPT	-7.0	TC..2151
2951389	**A10SSTFCR2**	.625	.770	.406	10.00	.16	1/8-27 NPT	-5.0	TC..2151
2951395	**A12SSTFCR2**	.750	.930	.500	10.00	.16	1/8-27 NPT	-5.0	TC..2151

A-STFP -0°

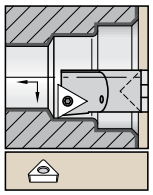


See pages E97, E168, E179 for inserts.
Steel shank with through coolant.



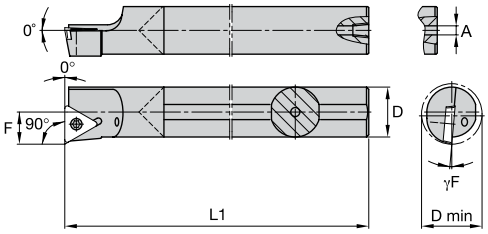
order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert
right hand									
5086723	**A06MSTFPR2**	.375	.480	.250	6.000	.125	—	-4.0	TP..2151
5086728	**A08RSTFPR2**	.500	.600	.312	8.000	.160	—	-2.0	TP..2151
5086804	**A12SSTFPR3**	.750	.930	.500	10.000	.156	1/8-27 NPT	-2.0	TPMT3252

E-STFP -0°



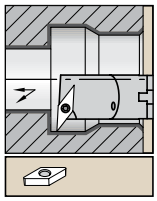
Carbide shank with through coolant.

See pages E97, E168, E179 for inserts.



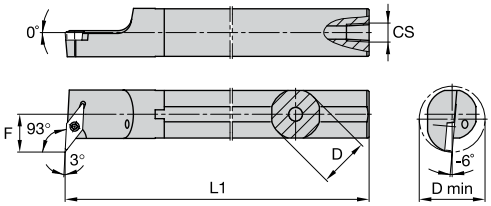
order number	catalog number	D	D min	F	L1	A	γF°	gage insert
right hand								
5093698	**E08RSTFPR2**	.500	.600	.312	8.000	.187	-2.0	TP..2151

A-SVUB -3°



Steel shank with through coolant.

See pages E99-E101, E125, E169, E179 for inserts.



order number	catalog number	D	D min	F	L1	CS	gage insert
right hand							
3883423	**A12SSVUBR2**	.750	.980	.562	10.00	1/8-27 NPT	VB..221
3883425	**A16TSVUBR3**	1.000	1.300	.750	12.00	1/4-18 NPT	VB..332
left hand							
3883422	**A12SSVUBL2**	.750	.980	.562	10.00	1/8-27 NPT	VB..221
3883424	**A16TSVUBL3**	1.000	1.300	.750	12.00	1/4-18 NPT	VB..332



widia.com

WIDIA

WIDIA

Cartridges

Cartridges for Negative and Positive Inserts

Standard WIDIA™ cartridges are ideal for turning tools with one or several cutting edges. A wide range of cartridge sizes and styles provides numerous combinations and application possibilities.

Same clamping systems as standard turning toolholders.

Overall sizes to DIN and ISO are ideal for single- and multi-tooth turning, boring, and spotting tools.

Precise axial and radial positioning by adjustment screws.



CARTRIDGES

P-STYLE CLAMPING

- Lever-type clamping system for negative indexable inserts with hole to DIN 4988 and positive round inserts more than 20mm in diameter.
- Inserts with one- and two-side chip control geometries have positive rakes from 6° to 18°.
- Advantages of this system are fast insert changes and no interference with chip flow.
- P-style available in metric sizes only.

S-STYLE CLAMPING

- Screw clamping system for positive indexable inserts with countersunk hole to DIN 4967.
- Compact design using a minimum of spare parts for high reliability and cost efficiency.
- A carbide shim provides additional tool protection.
- Toolholders with cutting edge heights upwards of 16mm (.625") and insert iCs from 9,52mm (.375") are secured by means of a threaded bushing.

APPLICATIONS



BORING



I. D. CHAMFERING



I. D. FACING

INDUSTRY

GENERAL ENGINEERING

TRANSPORTATION

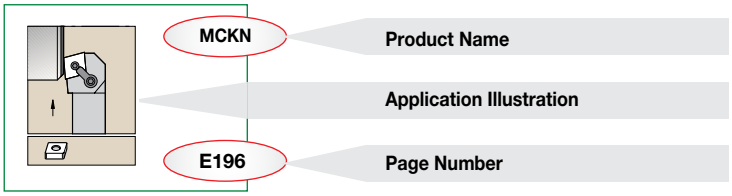
ENERGY

AEROSPACE

MEDICAL

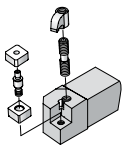


Each unique clamping system offers product options to fill your specific toolholder needs. Find the illustration that fits your application and navigate to the corresponding page to get the correct solution.

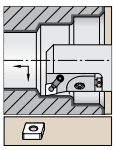


Clamping System M

M



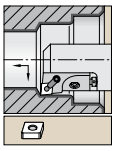
Combined pin/wedge clamp for negative inserts. An extremely sturdy clamping system, specially designed for interrupted cuts. The tool is protected by a carbide shim.



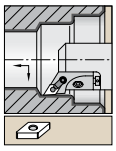
MCFN
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MCKN
15°
Page:
E196



MCLN
-5°
Page:
–



MDJN
-3°
Page:
E196



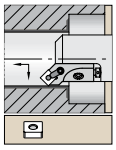
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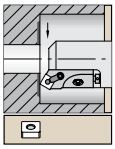
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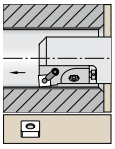
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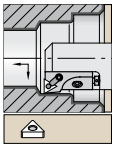
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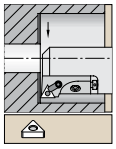
MSTN
30°
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MSYN
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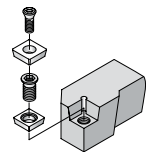
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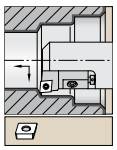
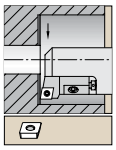
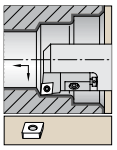
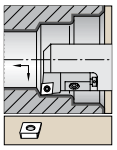
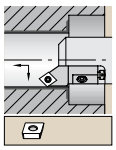
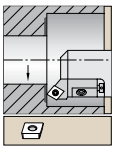
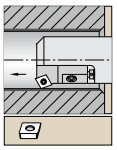
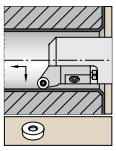
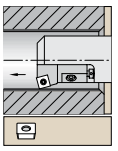
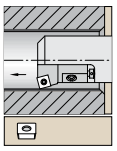
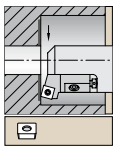
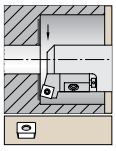
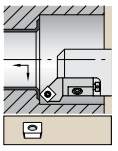
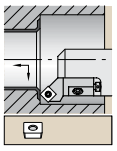
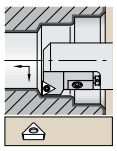
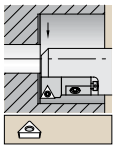
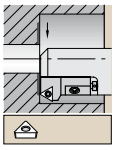
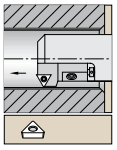
MTGN
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Clamping System S

S



Combined pin/wedge clamp for negative inserts. An extremely sturdy clamping system, specially designed for interrupted cuts. The tool is protected by a carbide shim.

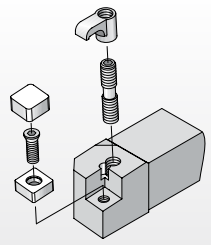
	**SCFP** 0° **Page:** **E230**		**SCGP** 0° **Page:** **E201**		**SCLC** -5° **Page:** **E201**		**SCLP** -5° **Page:** **E202**
	**SCRP** 15° **Page:** –		**SCSP** 45° **Page:** –		**SCTP** 30° **Page:** –		**SCWP** 30° **Page:** –
	**SDJP** -3° **Page:** –		**SRGC** **Page:** –		**SSKC** 15° **Page:** **E231**		**SSKP** 15° **Page:** –
	**SSRC** 15° **Page:** **E231**		**SSRP** 15° **Page:** –		**SSSC** 45° **Page:** **E232**		**SSSP** 45° **Page:** **E232**
	**STFP** 0° **Page:** **E233**		**STGP** 0° **Page:** **E203**		**STTP** 30° **Page:** –		**STWP** 30° **Page:** **E233**

Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

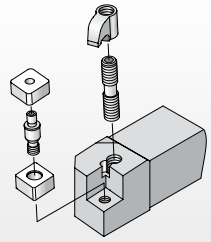
M
Insert Clamping System

C



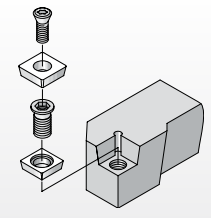
Top clamping by clamping finger for inserts without hole.

M



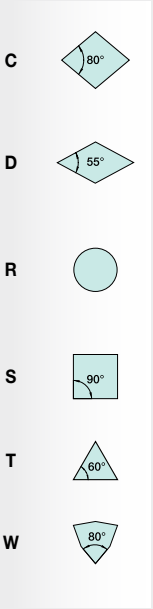
Top and hole clamping for inserts with hole.

S

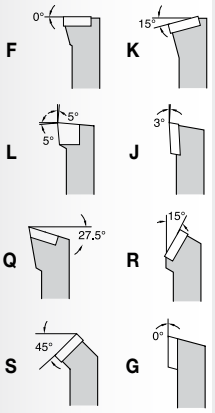


Center clamping by screw for inserts with hole.

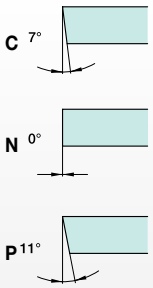
C
Insert Shape



F
Cartridge Style

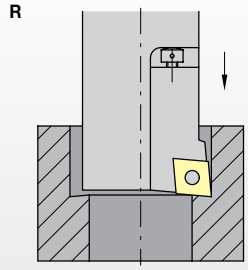


N
Insert Clearance Angle

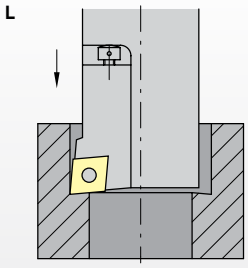


R
Hand of Tool

Right-hand cartridge



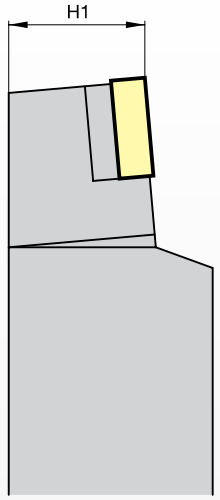
Left-hand cartridge



Catalog Numbering System

(continued)

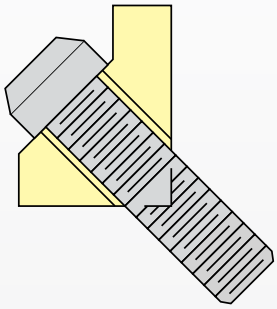
10	C	A	3	
Cartridge Size	Identifying Code of Cartridge	Mounting Design of Cartridge	Insert Size	Additional Information

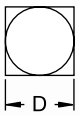


H1 = Cutting edge height of cartridge, in inches

C = Cartridge

A-design conforming to ISO 5611

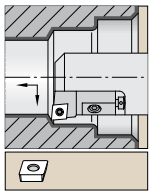




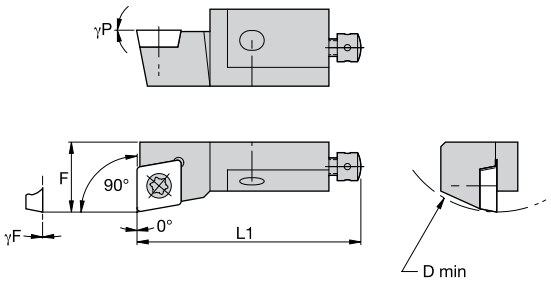
Insert iC

Number of 1/8ths of "D"

SCFP 0°

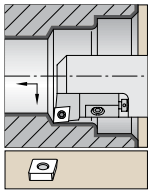


See pages E43, E163, E172-E173 for inserts.

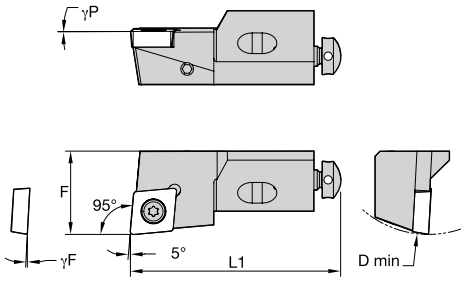


order number	catalog number	D min	F	L1	γF°	γP°	gage insert
right hand							
3871284	**SCFPR06CA05**	.787	.315	.98	.0	.0	CP..050204/CP..18151
3871283	**SCFPR08CA06**	.984	.394	1.26	.0	.0	CP..060204/CP..2151
3871272	**SCFPR10CA09**	1.575	.551	1.97	.0	.0	CP..09T308/CP..3252

SCLC -5°

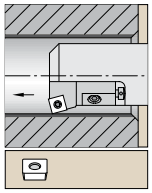


See pages E22-E27, E122, E161-E162, E170-E171 for inserts.

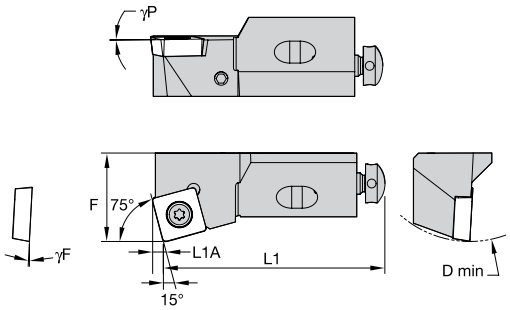


order number	catalog number	D min	F	L1	γF°	γP°	gage insert
left hand							
3871267	**SCLCL12CA12**	1.969	.787	2.17	-3.0	.0	CC..120408/CC..432

SSKC 15°

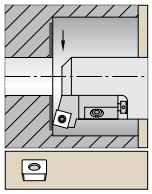


See pages E64-E67 for inserts.

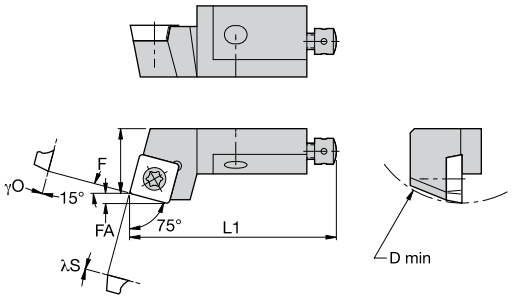


order number	catalog number	D min	F	L1	L1A	γF°	γP°	gage insert
right hand								
3871191	**SSKCR12CA12**	1.969	.787	2.17	.12	-3.0	.0	SC..120408/SC..432

SSRC 15°

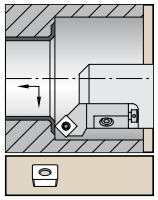


See pages E64-E67 for inserts.

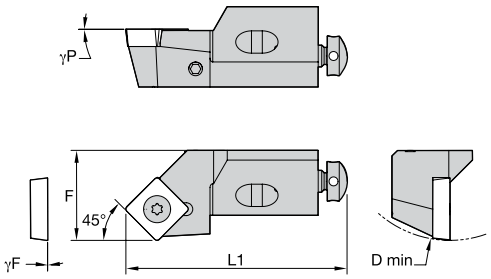


order number	catalog number	D min	F	L1	FA	λS°	γO°	gage insert
left hand								
3870391	**SSRCL12CA12**	1.969	.787	2.17	.121	-3.0	.0	SC..120408/SC..432

SSSC 45°

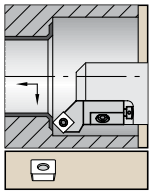


See pages E64-E67 for inserts.

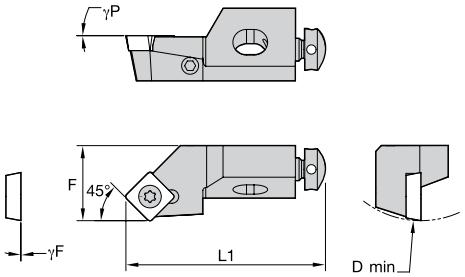


order number	catalog number	D min	F	L1	γF°	γP°	gage insert
right hand							
3870385	**SSSCR12CA12**	1.969	.787	1.85	-3.0	.0	SC..120408/SC..432

SSSP 45°

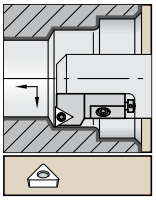


See page E80 for inserts.

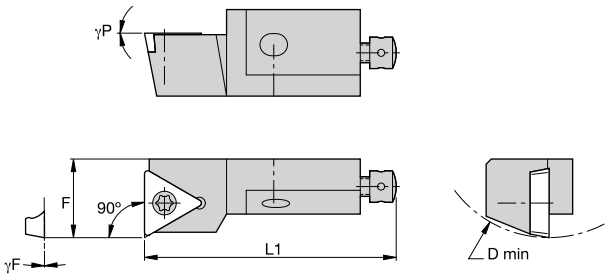


order number	catalog number	D min	F	L1	γF°	γP°	gage insert
right hand							
3870382	**SSSPR10CA09**	1.575	.551	1.73	.0	.0	SP..09T308/SP..3252

STFP 0°

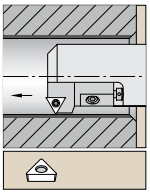


See pages E97, E168, E179 for inserts.

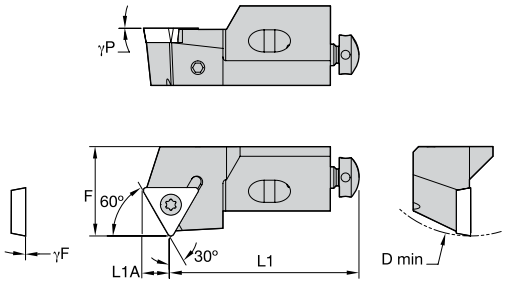


order number	catalog number	D min	F	L1	γF°	γP°	gage insert
right hand							
3870378	**STFPR08CA09**	.984	.394	1.26	.0	.0	TP..090204/TP..18151

STWP 30°



See pages E97, E168, E179 for inserts.



order number	catalog number	D min	F	L1	L1A	γF°	γP°	gage insert
right hand								
3870364	**STWPR08CA09**	.984	.394	1.10	.17	.0	.0	TP..090204/TP..18151
left hand								
3870365	**STWPL12CA16**	1.969	.787	1.85	.28	.0	.0	TP..16T308/TP..3252

Railway Wheelset Reconditioning Tools

Wheel Reprofiling/Wheelset Turning

Toolholders and indexable inserts for all types of wheel lathes used in the railroad industry.



TOOLHOLDERS

- Robust lever clamping design with no top clamp to interfere with chip flow.
- Toolholders are made from heat-treated alloy steel, providing rigid support to the insert to withstand severe roughing cuts on work-hardened wheels.



INSERTS

- Upended inserts are neutral and common for either hand of the toolholder.
- Multiple chipbreaker profiles and highly wear-resistant coated carbide grades
- Grades are available to machine the wheels in a range of wear conditions.

WIDIA™ TOOLS FOR RAILWAY WHEEL MACHINING

WIDIA offers toolholders and indexable inserts for all types of wheel lathes being used in the Industry.

- The tooling for wheelset reprofiling/reconditioning has been developed in close cooperation with machine tool builders and railway workshops.
- The wheel profile wears during usage and also due to skidding, mismatched wheels, etc.
- Different chipbreaker profiles and grades are available to machine the wheels with different wear conditions.
- The upended design of inserts enhances the insert strength and the chipbreakers are designed to provide optimum performance with efficient chipbreaking while machining the profile.
- The toolholders adopt the robust lever clamping system.

WIDIA tooling solutions for heavy-duty turning have a proven history of success in these extremely demanding applications around the world. Customers looking for maximum material removal and improved productivity can rely on WIDIA to provide the right tool, inserts, and grades for their workpiece, machine tool, and applications.

APPLICATIONS

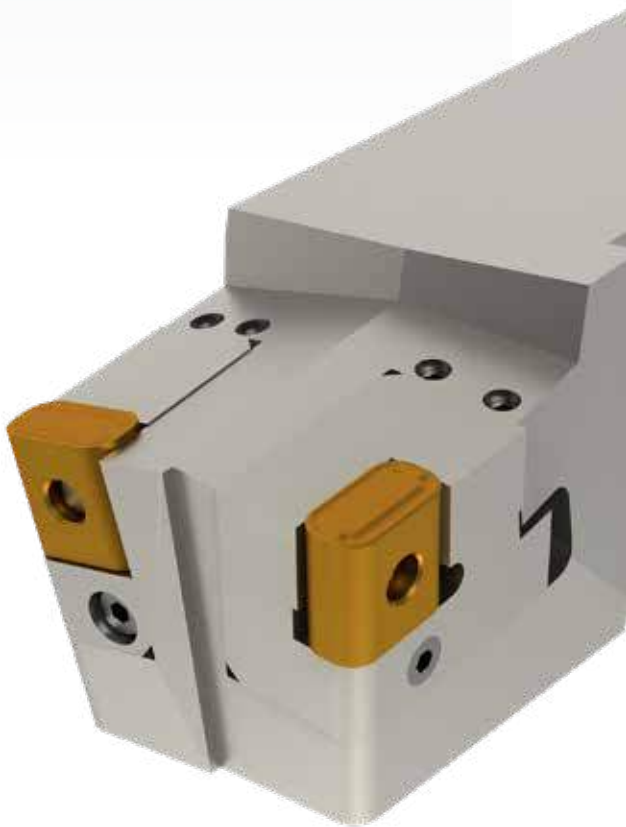


TURNING FACING PROFILING

INDUSTRY

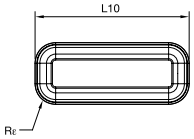


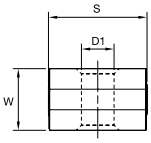
TRANSPORTATION



Railway Wheel Reprofiling Inserts • LNUX-16





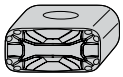


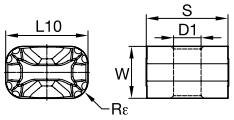
● first choice
○ alternate choice

P	○	●
M		
K	●	○
N		
S		
H		

ISO catalog number	ANSI catalog number	W mm	W in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WK20CT	WP15CT
LNUX30194016	LNUX30194016	12,00	.472	30,00	1.181	19,05	3/4	4,0	.158	6,35	.250	-	6128295

Railway Wheel Reprofiling Inserts • LNUX-13





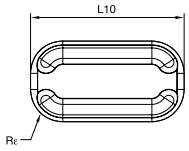
● first choice
○ alternate choice

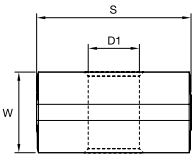
P	○	●
M		
K	●	○
N		
S		
H		

ISO catalog number	ANSI catalog number	W mm	W in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WK20CT	WP15CT
LNUX19194013	LNUX19194013	10,00	.394	19,05	.750	19,05	3/4	4,0	.158	6,35	.250	4170966	-
LNUX30194013	LNUX30194013	12,00	.472	30,00	1.181	19,05	3/4	4,0	.158	6,35	.250	4170968	-

Railway Wheel Reprofiling Inserts • LNUX-T





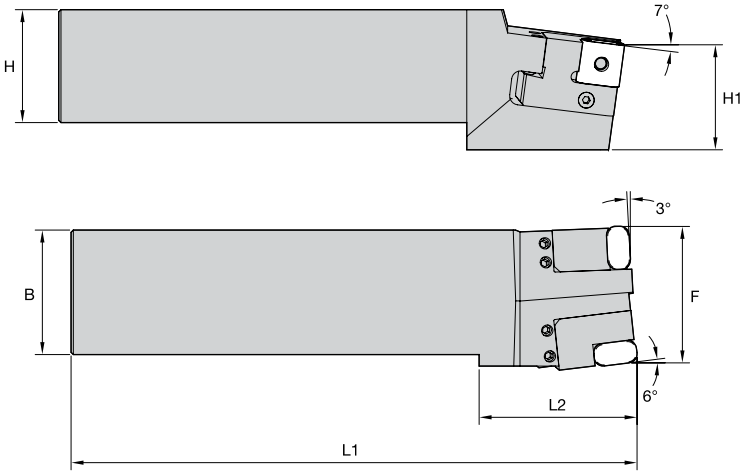


● first choice
○ alternate choice

		W		L10		S		Rε		D1			
ISO catalog number	ANSI catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	WK20CT	WP15CT
LNUX191940T	LNUX191940T	10,00	.394	19,05	.750	19,05	3/4	4,0	.158	6,35	.250	4170967	6128294
LNUX301940T	LNUX301940T	12,00	.472	30,00	1.181	19,05	3/4	4,0	.158	6,35	.250	4170969	-

Railway Toolholder • Wheel Turning Lathe • Left Hand • LNUX19 Inserts

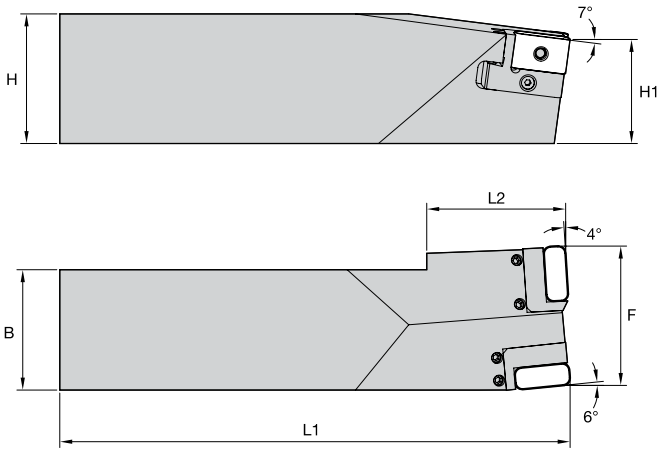




order number	catalog number	B mm	B in	F mm	F in	H mm	H in	H1 mm	H1 in	L1 mm	L1 in	L2 mm	L2 in
left hand													
2552320	6939143120	55,00	2.161	60,00	2.362	50,00	1.969	46,00	1.339	250,00	9.843	70,00	2.756

Railway Toolholder • Wheel Turning Lathe • Left Hand • LNUX30 Inserts

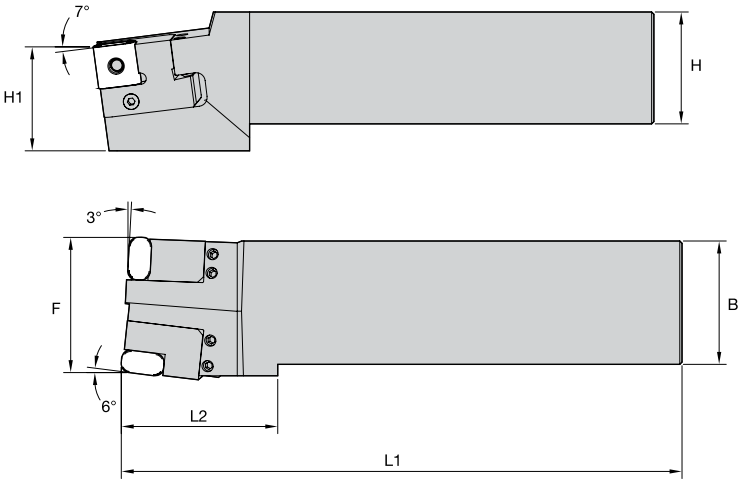




order number	catalog number	B mm	B in	F mm	F in	H mm	H in	H1 mm	H1 in	L1 mm	L1 in	L2 mm	L2 in
left hand													
2552318	6939145820	65,00	2.559	75,00	2.953	70,00	2.756	56,00	2.205	276,00	10.866	77,78	3.062

Railway Toolholder • Wheel Turning Lathe • Right Hand • LNUX19 Inserts

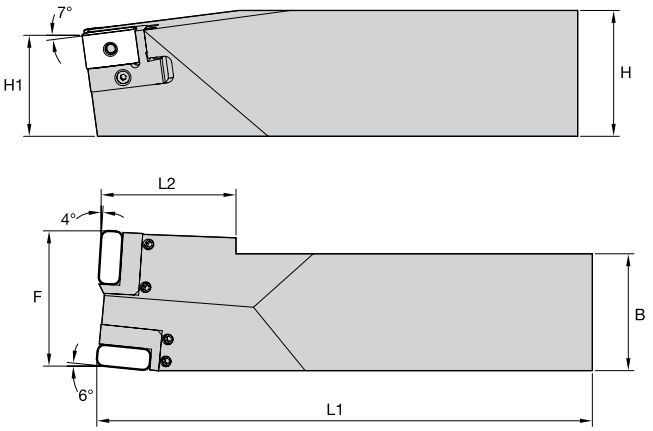




order number	catalog number	B mm	B in	F mm	F in	H mm	H in	H1 mm	H1 in	L1 mm	L1 in	L2 mm	L2 in
right hand													
2552321	**6939143110**	55,00	2.162	60,00	2.362	50,00	1.969	46,00	1.339	250,00	9.845	70,00	2.756

Railway Toolholder • Wheel Turning Lathe • Right Hand • LNUX30 Inserts

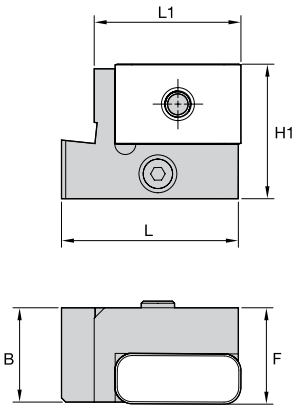




order number	catalog number	B mm	B in	F mm	F in	H mm	H in	H1 mm	H1 in	L1 mm	L1 in	L2 mm	L2 in
right hand													
2552319	**6939145810**	65,00	2.559	75,00	2.953	70,00	2.760	56,00	2.205	276,00	10.866	77,78	3.062

Railway Turning Cassette • Wheel Turning Lathe • Left Hand • LNUX30 Inserts

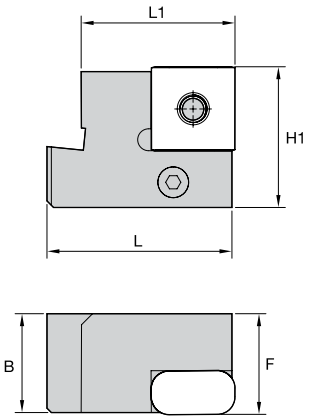




		B		F		L		L1		H1		
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	gage insert
left hand												
2035331	6939318620	22,50	.886	23,00	.905	42,20	1.661	35,00	1.378	32,10	1.264	LNUX301940

Railway Turning Cassette • Wheel Turning Lathe • Left Hand • LNUX30 Inserts

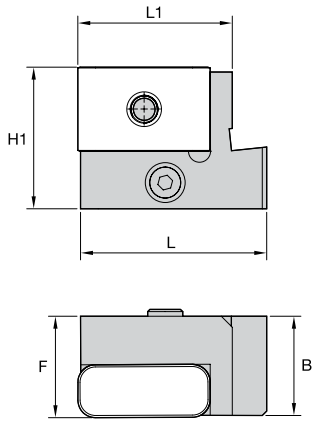




		B		F		L		L1		H1		
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	gage insert
left hand												
2276948	6939318820	22,55	.888	23,00	.906	42,20	1.661	35,00	1.378	32,00	1.260	LNUX191940

Railway Turning Cassette • Wheel Turning Lathe • Right Hand • LNUX19 Inserts

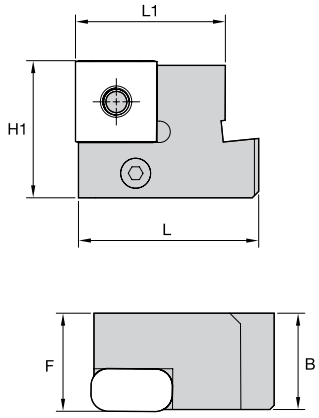




		B		F		L		L1		H1		
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	gage insert
right hand												
2039208	**6939318610**	22,50	.886	23,00	.905	42,20	1.661	35,00	1.378	32,00	1.264	LNUX301940

Railway Turning Cassette • Wheel Turning Lathe • Right Hand • LNUX30 Inserts

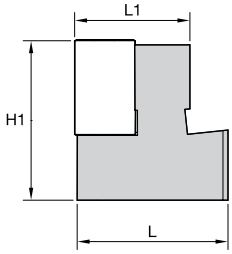


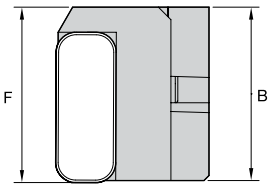


		B		F		L		L1		H1		
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	gage insert
right hand												
2276947	**6939318710**	22,55	.888	23,00	.906	42,20	1.661	35,00	1.378	32,00	1.260	LNUX191940

Railway Facing Cassette • Wheel Turning Lathe • Left Hand • LNUX19 Inserts



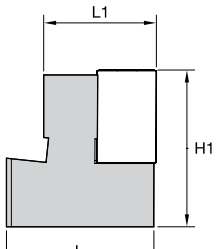


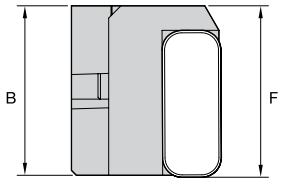


order number	catalog number	B mm	B in	F mm	F in	L mm	L in	L1 mm	L1 in	H1 mm	H1 in	gage insert
left hand												
2403738	**6939322020**	34,60	1.362	35,00	1.378	30,10	1.185	23,00	.906	32,00	1.260	LNUX301940

Railway Facing Cassette • Wheel Turning Lathe • Right Hand • LNUX19 Inserts





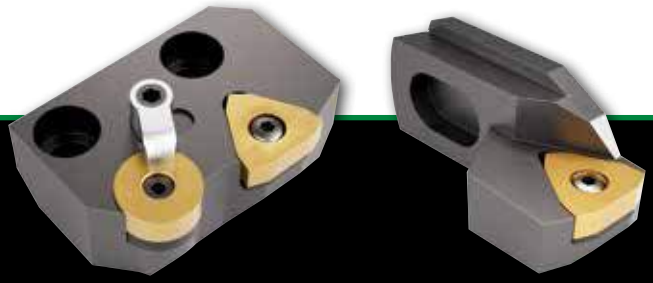


order number	catalog number	B mm	B in	F mm	F in	L mm	L in	L1 mm	L1 in	H1 mm	H1 in	gage insert
right hand												
2403739	**6939322110**	34,60	1.362	35,00	1.378	30,10	1.185	23,00	.906	32,00	1.260	LNUX301940

WIDIA™ Tools for Bar Peeling Applications

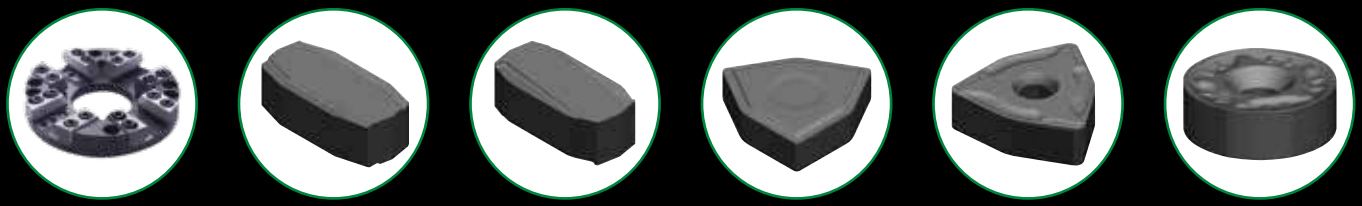
Bar peeling is a unique and economical machining operation for the production of cylindrical surfaces on blank bars (e.g., round bars, wires, blocks, and pipes) with high surface finishes and dimensional accuracies.

During the bar peeling process, scales, cracks, and sand inclusion are removed. Bar peeling is faster than conventional turning. It is used when high volumes, high quality, and high productivity with good surface finish are required.



New bar peeling machines demand high performance from cutting tools. WIDIA offers a wide variety of inserts in different grades for cost-effective bar peeling operations in different types of steels, stainless steels, etc. WIDIA also offers toolholders and cartridges for bar peeling as a custom solution.

- Ideal in high feed rate applications, WIDIA bar peeling tools enable economical machining operations for the production of cylindrical surfaces on bright bars.
- High surface finishes, dimensional accuracy, and most efficient removal of scales, cracks, sand enclosures, and other errors.



Application Range of WIDIA Bar Peeling Tools

Bar peeling machines require a high level of utilization and demand high performance from the cutting tools. WIDIA offers specially developed tools with indexable inserts for bar peeling, which are capable of meeting these demands, making manufacturing more cost-efficient.

WIDIA Victory™ CVD-Coated Grades

WP15CT

Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Good balance of wear resistance and toughness properties. High productivity machining on smooth to lightly interrupted cuts. For steels.

WP25CT

Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Good toughness properties. Excellent first choice for steel machining. Provides high-productivity metal removal for all but the harshest interrupted cuts.

WP35CT

Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Proven on all roughing and heavy roughing operations, wet or dry, on interrupted and uninterrupted cuts.

WM25CT

Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Good balance of wear resistance and toughness properties. Light and medium machining. For austenitic stainless steel AISI series.

For more information on heavy-duty tooling, contact your local sales representative.

Small Hole Boring

Micro Boring Bars

The WIDIA™ line of micro boring bars provides accurate holemaking tooling in diameters as small as 4,57mm. These economical, indexable inserts are available in both steel and carbide shanks and are stocked in both metric and inch sizes. Ideal for a wide range of applications, including precision micro boring.



Inserts are available in multiple styles and grades, including polycrystalline diamond tipped, for all machining applications.

I.D. INDEXABLE INSERT TOOLING



80° DIAMOND INSERT BORING BARS

- Available in shanks as small as 4mm to bore >4,57mm diameter.
- Positive rake geometry for free cutting.
- Superior, unobstructed chip evacuation.
- Stocked in multiple grades to bore a wide range of materials.



THREADING AND GROOVING BORING BARS

- Easy insert changes for threading and grooving.
- Thread down to a 48 TPI, 1,3mm TP (pitch).
- Thread and groove capabilities to an inside bore diameter of 6,91mm.



TRIANGLE INSERT BORING BARS

- Designed for less obstruction and greater chip evacuation.
- Positive rake geometry to bore holes >6,98mm diameter.
- Stocked in all grades, including diamond-tipped and borazon-tipped styles.
- Stocked in shanks as small as 6mm for 7,06mm minimum bore diamter.

APPLICATIONS

BORING

INDUSTRY

GENERAL ENGINEERING

TRANSPORTATION

ENERGY

AEROSPACE

MEDICAL



Choosing the Correct Small Hole Boring Bar

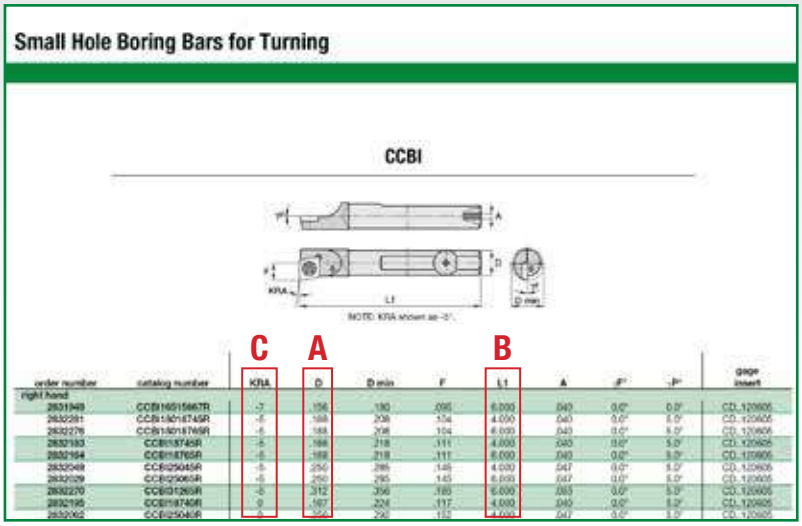
1 Check the Hole Size to be bored (D min) in the component.
(To check suitability of the product platform)

2 Determine boring bar (D).

A Select shank size (D) based on your machine's requirements.

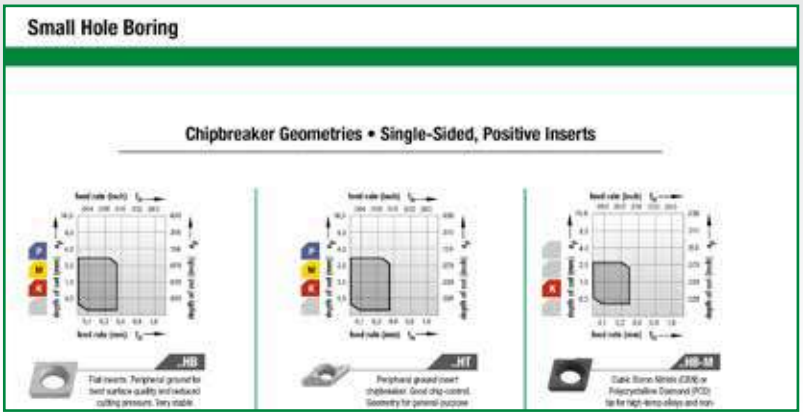
B Determine bore depth (how far the boring bar extends from the holder). Multiply bar diameter by 4. If bore depth is less, use a steel bar. If bore depth exceeds 4:1 ratio, use a carbide bar. Use L1 or L4 depending on bar selected. (See recommended maximum overhang chart on page E296.) For indexable tooling, go to step 3. For all other tooling systems, go directly to step 4.

C Determine lead angle (KRA). Zero degree lead angle is used when maximum stability is required. Lead angle may vary based on changing conditions, such as boring in a blind hole.



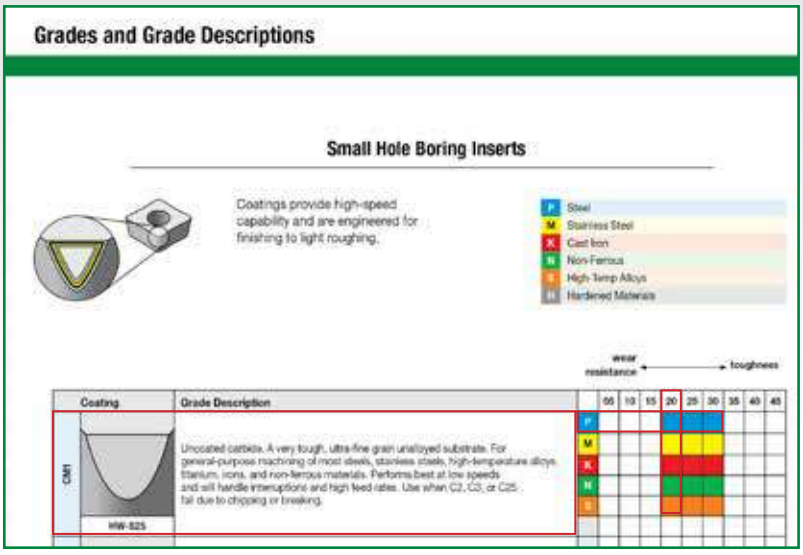
3 Determine which chipbreaker is best for the material to be machined.

Consult the Small Hole Boring Chipbreaker Geometry charts on pages E254.



4 Determine which grade is best for the material to be machined.

Consult the Grades and Grade Descriptions charts on pages E256–E257.



Choosing the Correct Small Hole Boring Bar

(continued)

5 Select the appropriate insert based on style, grade, and geometry.

Small Hole Boring • Positive Inserts

CDHB



ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Re mm	Re in	D1 mm	D1 in	max DOC mm	max DOC in	C2	C3	CG5	CP5	CP6	CP7	CP8	CP9	CP10
CDHBS4T0X0	CDHB120X0X	3.97	5/32	4.03	.159	1.02	.040	0.05	.002	2.13	.084	–	–	•	○	○	○	○	○	○	○	○
CDHBS4T0X0M	CDHB120X0XM	3.97	5/32	4.03	.159	1.02	.040	0.05	.002	2.13	.084	1.90	.075	•	○	○	○	○	○	○	○	○
CDHBS4T0X2	CDHB120X05	3.97	5/32	4.03	.159	1.02	.040	0.10	.007	2.13	.084	–	–	•	○	○	○	○	○	○	○	○
CDHBS4T0X2M	CDHB120X05M	3.97	5/32	4.03	.159	1.02	.040	0.10	.007	2.13	.084	0.90	.038	•	○	○	○	○	○	○	○	○
CDHBS4T0X4	CDHB12001	3.97	5/32	4.03	.159	1.02	.040	0.38	.015	2.13	.084	–	–	•	○	○	○	○	○	○	○	○

NOTE: Max DOC only applies to tipped inserts, which are designated with an "M" at the end of the catalog number.

6 Determine the Speed and Feed Chart with the appropriate cutting data.

A Based on grade and edge geometry, identify starting speed (vc) and feed (fz). The first choice starting feed is in bold.

B Use the corresponding speed located in the same column below the feed information.

Speed and Feed Chart

Positive Inserts • Inch

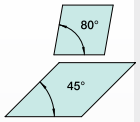
Cutting Speed – vc SFM

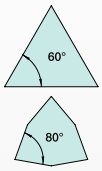
	Material Group	C2 min	C2 Start	C2 max	C25 min	C25 Start	C25 max	C3 min	C3 Start	C3 max	CG5 min	CG5 Start	CG5 max
P	ap [inch]	–	–	–	–	–	–	–	–	–	.002	–	.012
	f [inch]	–	–	–	–	–	–	–	–	–	.012	–	.001
	0/1	–	–	–	–	–	–	–	–	–	305	**380**	460
	2	–	–	–	–	–	–	–	–	–	200	**250**	300
	3	–	–	–	–	–	–	–	–	–	200	**250**	300
	4	–	–	–	–	–	–	–	–	–	155	**195**	235
	5	–	–	–	–	–	–	–	–	–	200	**250**	300
	6	–	–	–	–	–	–	–	–	–	135	**165**	200
M	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	.002	–	.012
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012
	1	180	**225**	270	205	**255**	310	205	**255**	310	240	**300**	360
	2	165	**205**	250	185	**230**	280	185	**230**	280	220	**270**	325
	3	120	**150**	185	140	**170**	210	140	**170**	210	160	**200**	245
K	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	.002	–	.012
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012
	1	170	**213**	256	190	**235**	285	190	**235**	285	195	**240**	295
	2	220	**270**	330	240	**300**	360	240	**300**	360	250	**310**	375
	3	160	**200**	240	180	**220**	265	180	**220**	265	180	**225**	270
N	ap [inch]	.002	–	.020	.002	–	.020	.002	–	.020	.002	–	.020
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012
	1	1320	**1650**	1980	1320	**1650**	1980	1320	**1650**	1980	1320	**1650**	1980
	2	970	**1210**	1450	970	**1215**	1460	970	**1215**	1460	970	**1215**	1460
	3	225	**280**	340	225	**280**	340	225	**280**	340	275	**340**	410
	4	1015	**1250**	1520	1010	**1270**	1520	1010	**1270**	1520	455	**570**	690
	5	480	**600**	720	480	**600**	720	480	**600**	720	580	**720**	865

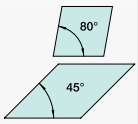
Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

C	S	B	I	
Series Type	Bar Type	Bar Style Designation	Units	Insert Shape (optional)

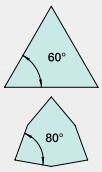
C


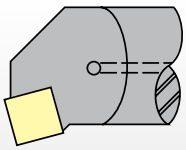
F


G


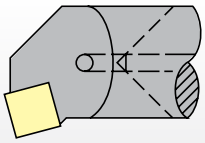
L


Q


S




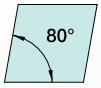
S = Steel (with coolant)



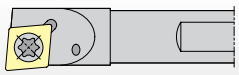
C = Carbide (with coolant)

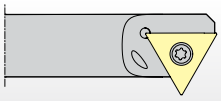
I = Inch

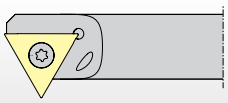
M = Metric

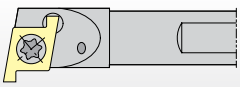
C


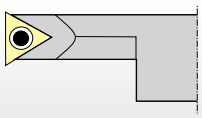
W

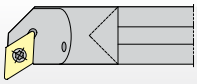

B
Boring Bar


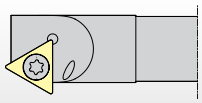
C
External Chamfering Bar


I
Internal Threading Bar


M
Offset Internal Grooving Bar


O
Offset Boring Bar


P
Profiling Bar


R
Reverse Chamfer or Back Chamfer Bar


Catalog Numbering System

(continued)

180

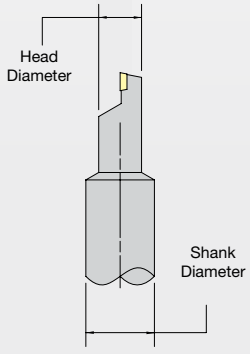
Head Diameter shown as "D2"

Inch

165 = .166"
180 = .180"/.189"
203 = .203"/.207"/.210"
250 = .260"/.258"
312 = .313"/.321"/322"/.323"
322 = .322"
375 = .375"/.385"/.390"
500 = .510"

Metric

7 = 6,60mm
8 = 8,18mm/8,20mm
10 = 9,78mm
13 = 12,70mm/12,95mm
45 = 4,57mm
48 = 4,80mm
52 = 5,16mm
53 = 5,30mm
64 = 6,60mm
66 = 6,55mm/6,60mm
82 = 8,15mm
95 = 9,50mm
99 = 9,91mm
159 = 15,88mm



NOTE: Only shown on stepped-style bars.

187

Shank Diameter shown as "D"

Inch

156 = .156"
187 = .187"/.188"
250 = .250"
312 = .312"/.313"
375 = .375"
500 = .500"
625 = .625"
750 = .750"
875 = .875"
1000 = 1.000"
1250 = 1.250"

Metric

4 = 4,00mm
5 = 5,00mm
6 = 6,00mm
8 = 8,00mm
10 = 10,00mm
12 = 12,00mm
16 = 16,00mm

25

Length/Depth shown as "L1/L4"

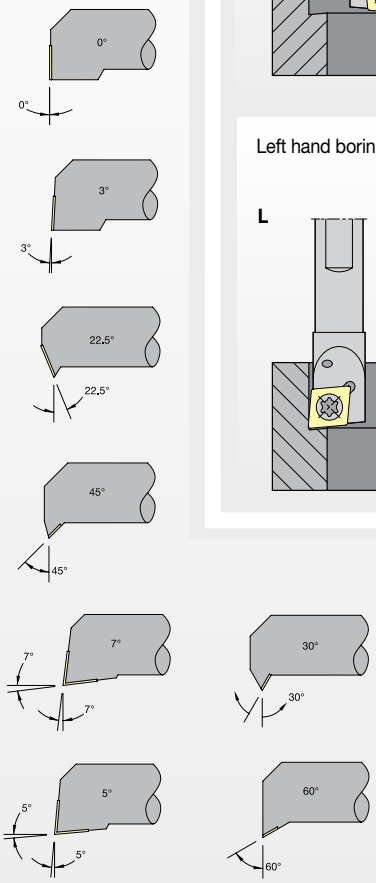
Bore Length for Step Bars
Thread Depth for Threading Bars
Overall Length for Straight Shank Bars

Inch	Metric
1 = 1.000"	**12** = 12,70mm
1125 = 1.125"	**19** = 19,05mm
125 = 1.250"	**22** = 22,23mm
15 = 1.500"	**25** = 25,40mm
1875 = 1.875"	**32** = 31,75mm
2 = 2.000"	**38** = 38,10mm
25 = 2.500"	**48** = 47,63mm
3125 = 3.125"	**51** = 50,80mm
35 = 3.500"	**63** = 63,50mm
4 = 4.000"	**64** = 64,00mm
45 = 4.500"	**76** = 76,00mm
5 = .500"/5.000"	**79** = 79,38mm
	100 = 100,58mm/101,50mm/101,60mm
6 = 6.000"	
7 = 7.000"/7.085"	**102** = 101,60mm
75 = .750"	**127** = 127,00mm
8 = 8.000"	**152** = 152,00mm 152,40mm
90 = .900"	
10 = 10.000"	**178** = 177,80mm 179,90mm
12 = 12.000"	
	203 = 203,20mm
	254 = 254,00mm

7

Lead Angle*

0 = 0° Used for Threading/Grooving Bars
3 = 3°
5 = 5°
7 = 7°
225 = 22.5°
30 = 30°
45 = 45°
60 = 60°



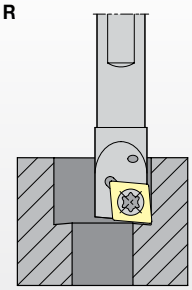
*NOTE: Shown as "KRI" for metric bars and "KRA" for inch bars.

R

Hand of Tool

R = Right hand
L = Left hand

Right hand boring bar



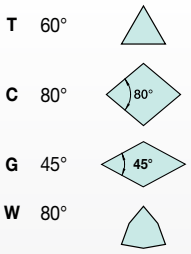
Left hand boring bar

Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

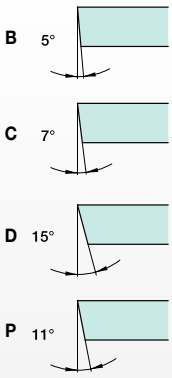
C

Insert Shape



D

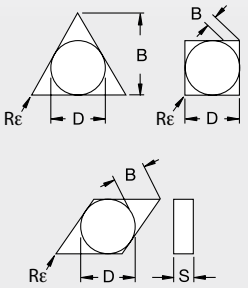
Insert Clearance Angle



H

Tolerance Class

Tolerances apply prior to edge prep and coating.

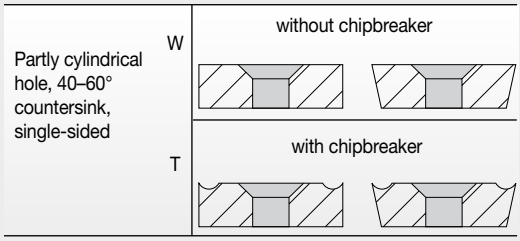


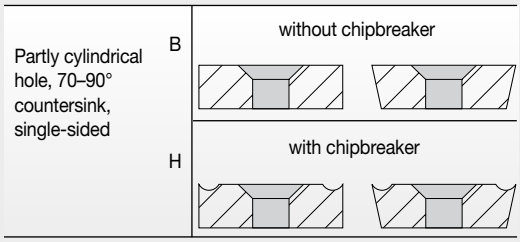
D = Theoretical diameter of the insert inscribed circle
S = Thickness
B = See figures below

tolerance class	tolerance on "D"	tolerance on "B"	tolerance on "S"
C	±.0010"	±.0005"	±.001"
H	±.0005"	±.0005"	±.001"
E	±.0010"	±.0010"	±.001"
G	±.0010"	±.0010"	±.005"
M	See tables on next page		±.005"
U	See tables on next page		±.005"

B

Insert Features





12

Size

"D" inch	Code for inch cutting edge length "L10" C	G	T	W
5/32	12	12	–	–
.160	–	–	13	–
3/16	–	15	–	15
1/4	2	–	2	2
3/8	3	–	3	3
.386	–	–	31	–

Catalog Numbering System

(continued)

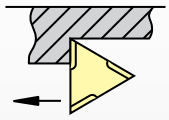
06	05			
Thickness	Corner Radius "Rε"	Hand of Insert *(optional)*	Cutting Edge Condition or Chip Control Features *(optional)*	Tip Style *(optional)*

symbol inch	thickness inch
06	.040
1	.0625
12	.0781
15	.0938
2	.1250
25	.1563

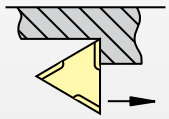
symbol inch	corner radius inch
X0	.0015
0	.004
05	.008
1	.0156
13	.021
2	.0313
24	.037
3	.0469
4	.0625

R = Right hand

L = Left hand



R



L

HP = High positive

LF = Light finishing

Symbol

M

Usage

Mini tip

"D" inch	± Tolerance on "D" Class M Tolerance Shapes S, T, C, R, & W inch	Shape D inch	Shape V inch	Class U Tolerance Shapes S, T, & C inch
5/32	.002	–	–	–
3/16	.002	–	–	.003
7/32	.002	.002	.002	.003
1/4	.002	.002	.002	.003
5/16	.002	.002	.002	.003
3/8	.002	.002	.002	.003
7/16	.003	.003	.003	.005
1/2	.003	.003	.003	.005
9/16	.003	.003	.003	.005
5/8	.004	.004	.004	.007
11/16	.004	.004	.004	.007
3/4	.004	.004	.004	.007
7/8	.005	–	–	.010
1	.005	–	–	.010
1 1/4	.006	–	–	.010

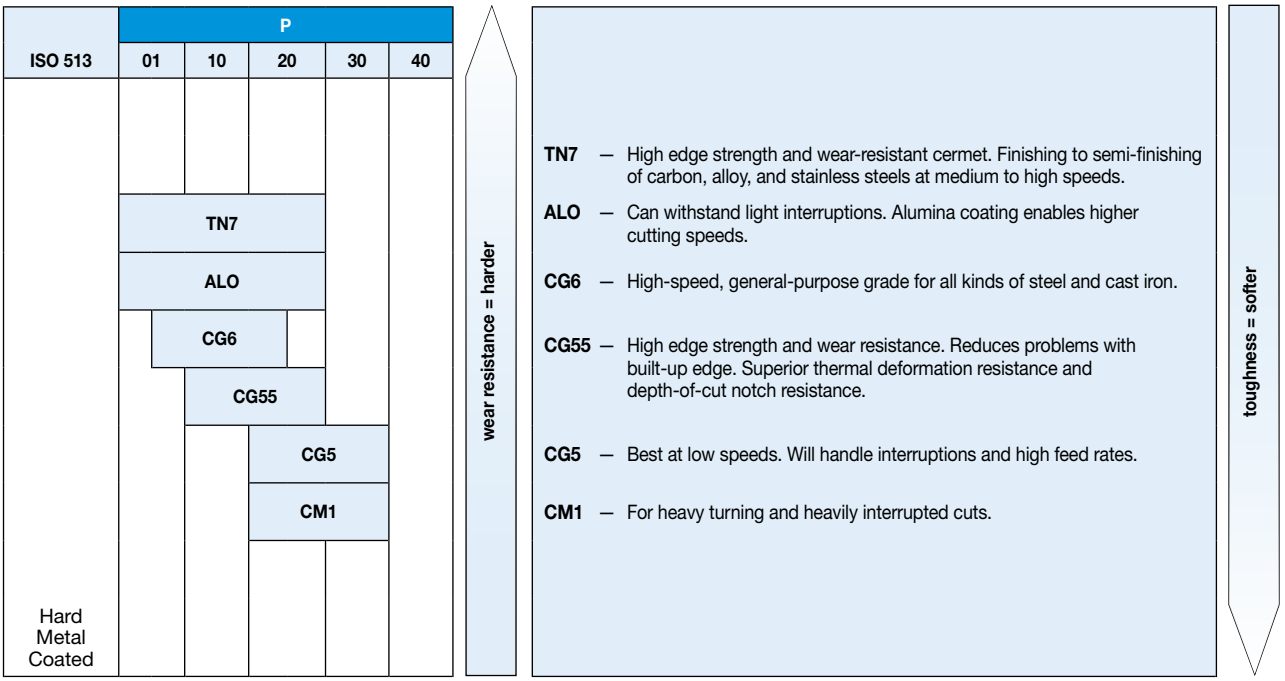
"D" inch	± Tolerance on "B" Class M Tolerance Shapes S, T, C, R, & W inch	Shape D inch	Shape V inch	Class U Tolerance Shapes S, T, & C inch
5/32	.003	–	–	–
3/16	.003	–	–	.005
7/32	.003	.004	–	.005
1/4	.003	.004	–	.005
5/16	.003	.004	–	.005
3/8	.003	.004	.007	.005
7/16	.005	.006	–	–
1/2	.005	.006	.010	.008
9/16	.005	.006	–	–
5/8	.006	.007	–	.011
11/16	.006	.007	–	.011
3/4	.006	.007	–	.011
7/8	.006	–	–	.015
1	.007	–	–	.015
1 1/4	.008	–	–	.015

The WIDIA™ three-step insert selection system makes choosing and applying the most productive tool easy. Tool recommendations are based on six workpiece material groups.

1 **Select the Insert Geometry:**
Based on the needed depth of cut and feed rate, choose the geometry that best matches your needs.

2 **Select the Grade:**
Determine your cutting conditions, and choose the proper grade.

TN7–CM1 for Steel



TN7 — High edge strength and wear-resistant cermet. Finishing to semi-finishing of carbon, alloy, and stainless steels at medium to high speeds.

ALO — Can withstand light interruptions. Alumina coating enables higher cutting speeds.

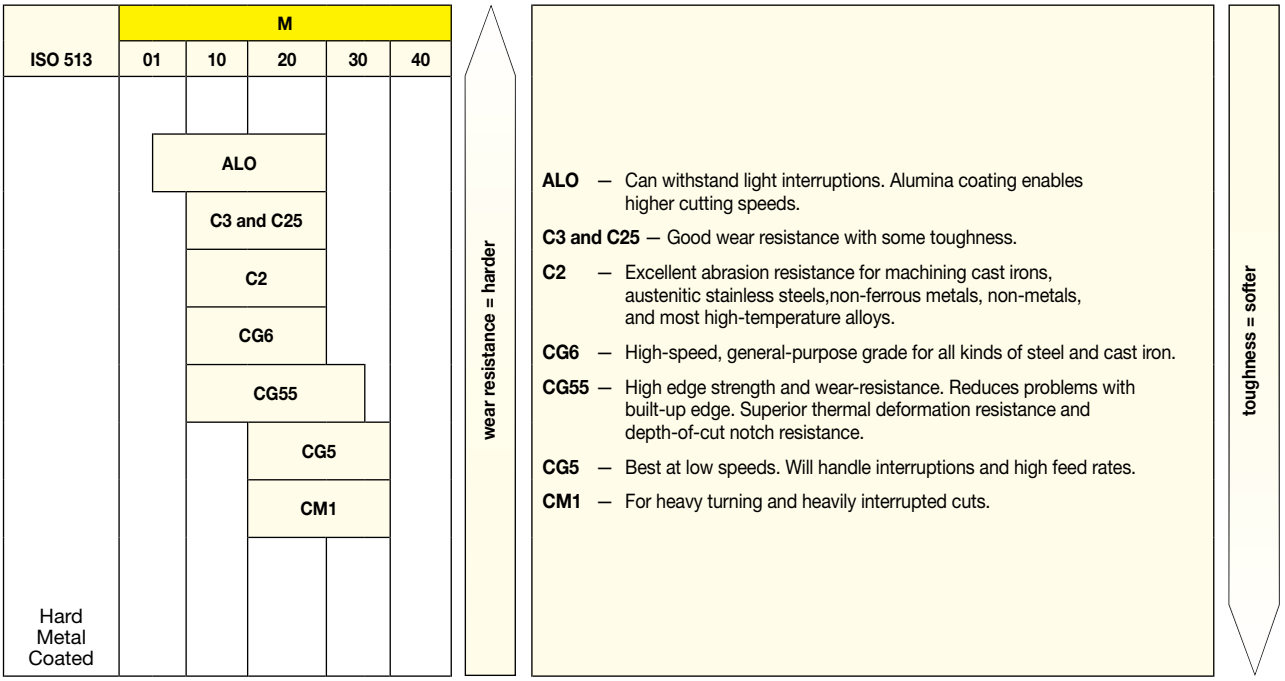
CG6 — High-speed, general-purpose grade for all kinds of steel and cast iron.

CG55 — High edge strength and wear resistance. Reduces problems with built-up edge. Superior thermal deformation resistance and depth-of-cut notch resistance.

CG5 — Best at low speeds. Will handle interruptions and high feed rates.

CM1 — For heavy turning and heavily interrupted cuts.

ALO–CM1 for Stainless Steel



ALO — Can withstand light interruptions. Alumina coating enables higher cutting speeds.

C3 and C25 — Good wear resistance with some toughness.

C2 — Excellent abrasion resistance for machining cast irons, austenitic stainless steels,non-ferrous metals, non-metals, and most high-temperature alloys.

CG6 — High-speed, general-purpose grade for all kinds of steel and cast iron.

CG55 — High edge strength and wear-resistance. Reduces problems with built-up edge. Superior thermal deformation resistance and depth-of-cut notch resistance.

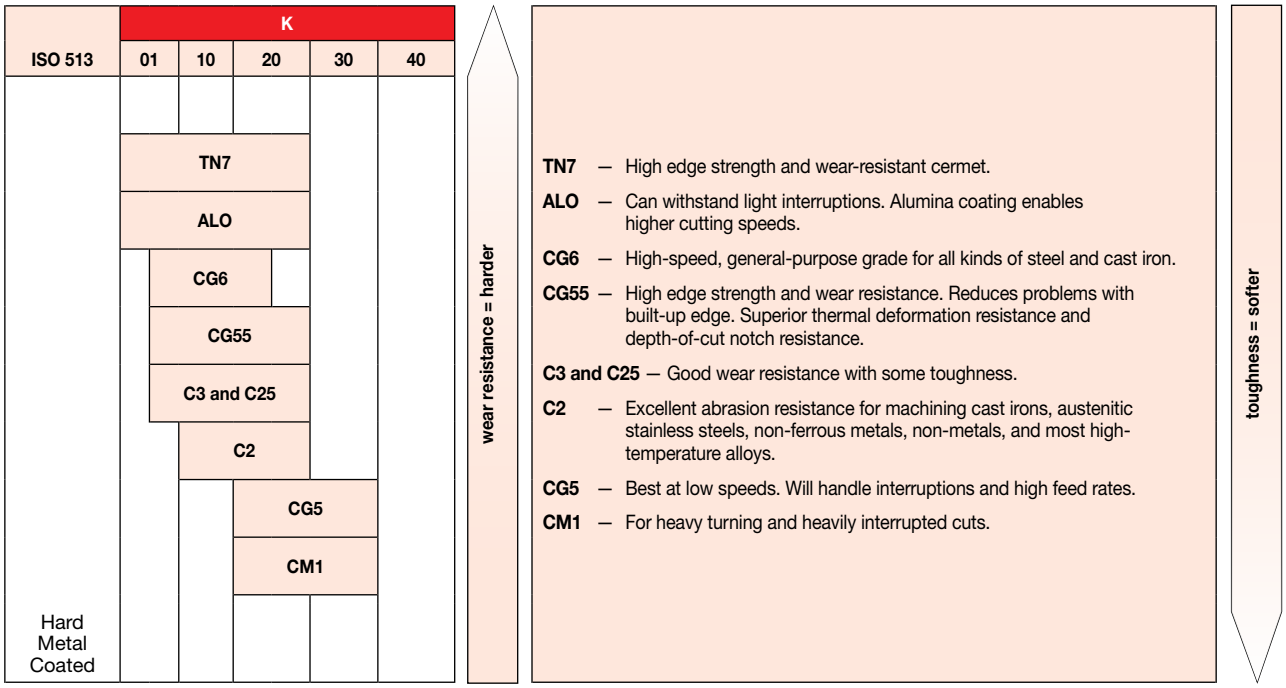
CG5 — Best at low speeds. Will handle interruptions and high feed rates.

CM1 — For heavy turning and heavily interrupted cuts.

3 Select the Cutting Speed:
In the foldout speed and feed chart, establish your cutting speed and obtain your optimal starting conditions and range.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

TN7–CM1 for Cast Iron



TN7 — High edge strength and wear-resistant cermet.

ALO — Can withstand light interruptions. Alumina coating enables higher cutting speeds.

CG6 — High-speed, general-purpose grade for all kinds of steel and cast iron.

CG55 — High edge strength and wear resistance. Reduces problems with built-up edge. Superior thermal deformation resistance and depth-of-cut notch resistance.

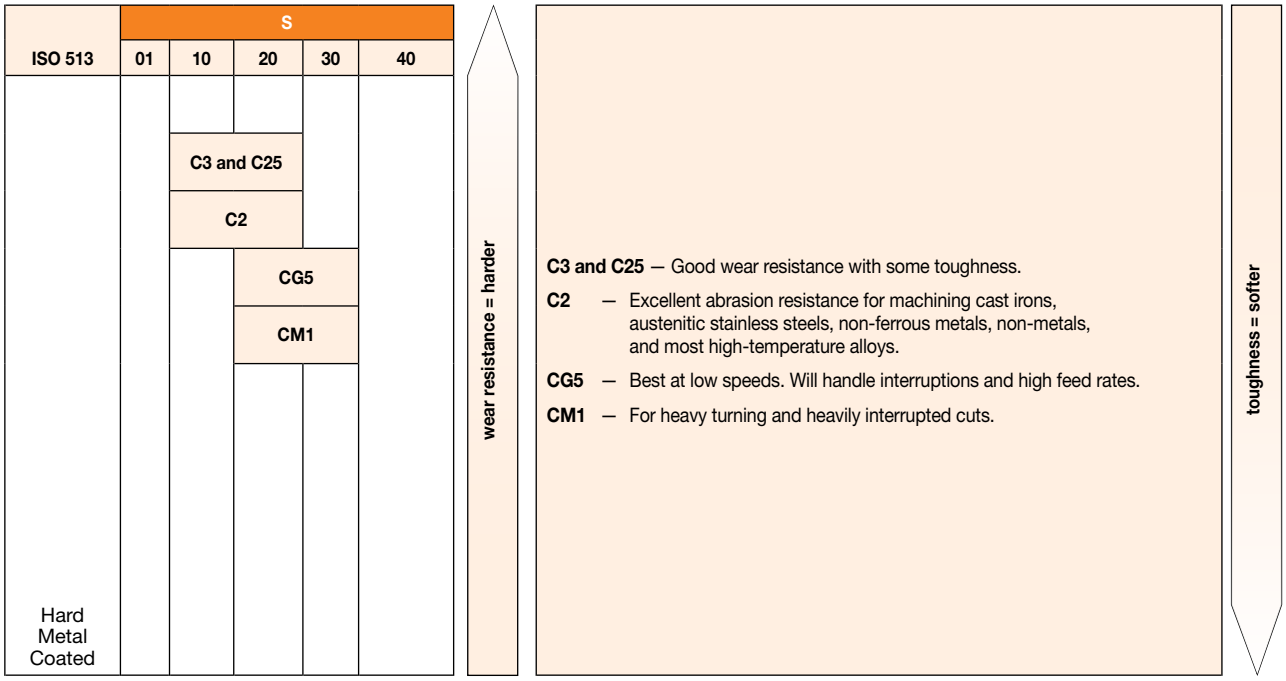
C3 and C25 — Good wear resistance with some toughness.

C2 — Excellent abrasion resistance for machining cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys.

CG5 — Best at low speeds. Will handle interruptions and high feed rates.

CM1 — For heavy turning and heavily interrupted cuts.

C3–CM1 for High-Temperature Alloys



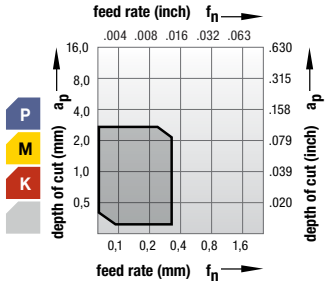
C3 and C25 — Good wear resistance with some toughness.

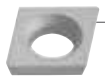
C2 — Excellent abrasion resistance for machining cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys.

CG5 — Best at low speeds. Will handle interruptions and high feed rates.

CM1 — For heavy turning and heavily interrupted cuts.

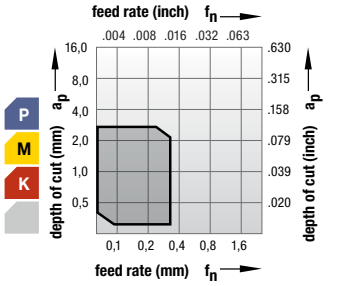
Chipbreaker Geometries • Single-Sided, Positive Inserts





..HB

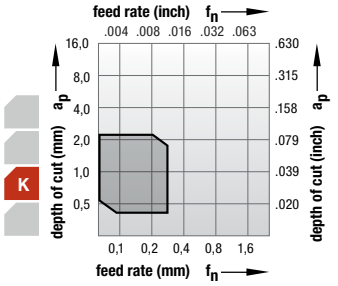
Flat inserts. Peripheral ground for best surface quality and reduced cutting pressure. Very stable cutting edge offers maximum rigidity.





..HT

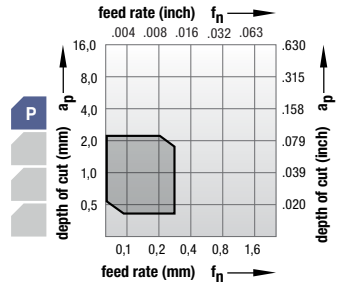
Peripheral ground insert chipbreaker. Good chip control. Geometry for general-purpose applications.





..HB-M

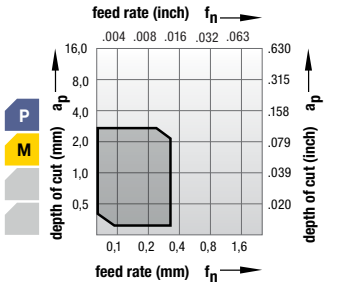
Cubic Boron Nitride (CBN) or Polycrystalline Diamond (PCD) tip for high-temp alloys and non-ferrous machining. Very stable cutting edge offers maximum rigidity.





..LF

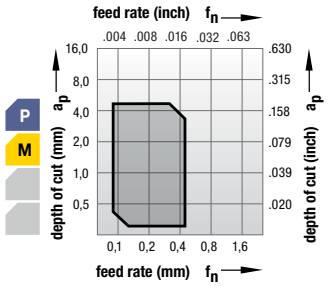
Geometry for general-purpose applications. Very good chip control. Recommended for general finish machining.





..HH

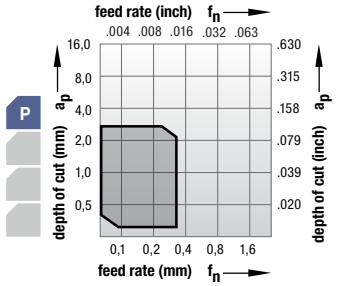
Peripheral ground for best surface quality and reduced cutting pressure. For fine to medium finishes.





HP

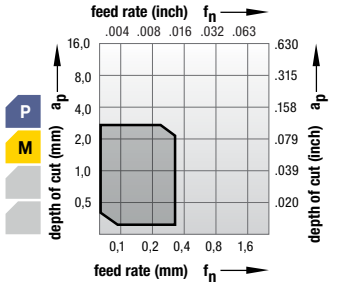
High positive-type chipbreaker. Peripheral ground for best surface quality and reduced cutting pressure. Recommended for high-temp alloys and non-ferrous machining.





..HH-R/L

Ground-in chipbreaker. Peripheral ground for best surface quality and reduced cutting pressure. *Right-hand inserts used in left-hand bars ONLY. Left-hand inserts used in right-hand bars ONLY.





..HW

Flat insert for profiling. Very stable cutting edge offers maximum rigidity.

Chipbreaker Geometries • Geometry Selection Criteria

Flat Top-Type Inserts

Chipbreaker Geometry ..HB, ..HB-M, ..HW

- Suitable for interrupted cuts.
- Use when chip control is not critical.

Pressed Chipbreaker-Type Inserts

Chipbreaker Geometry ..LF

- Suitable for moderate interruption of cuts.
- Use when chip control is a concern.

Pressed Chipbreaker-Type Inserts with Ground Periphery

Chipbreaker Geometry ..HH, ..HT, HP

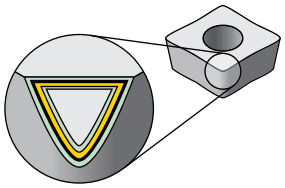
- Suitable for light to moderate interruption of cuts.
- Use when chip control is a concern.
- Superior surface finish and closer tolerance on workpiece.

Ground-In Chipbreaker-Type Inserts

Chipbreaker Geometry ..HH-R/L

- Suitable for smooth cuts.
- Use when chip control is a concern.
- Superior surface finish and closer tolerance on workpiece.

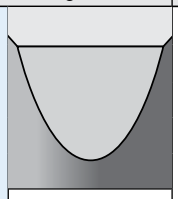
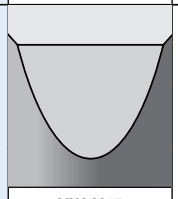
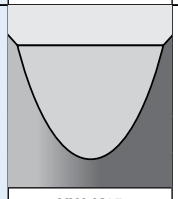
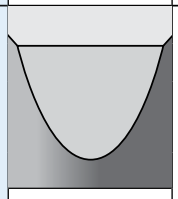
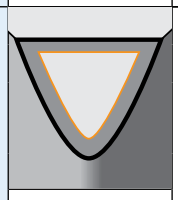
Small Hole Boring Inserts



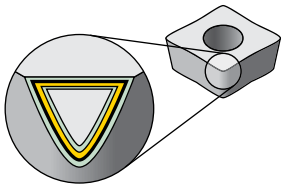
Coatings provide high-speed capability and are engineered for finishing to light roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45
Grade CM1	 HW-S25	Uncoated carbide. A very tough, ultra-fine grain unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Performs best at low speeds and will handle interruptions and high feed rates. Use when C2, C3, or C25 fail due to chipping or breaking.	P				■	■	■			
			M				■	■	■			
			K				■	■	■			
			N				■	■	■			
			S				■	■	■			
Grade C2	 HW-N15	Uncoated carbide. A hard, low binder content, unalloyed WC/Co fine-grained grade. General-purpose grade for non-ferrous materials. Has excellent abrasion resistance for machining cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys.	M		■	■	■					
			K	■	■	■	■					
			N		■	■	■					
			S		■	■	■					
Grade C3 and C25	 HW-K15	Uncoated carbide. Has excellent abrasion resistance for machining cast irons, aluminum, and non-ferrous metals. Good wear resistance with some toughness. Harder than C2, resulting in greater edge wear resistance. Suitable for finishing operations.	M		■	■	■					
			K	■	■	■	■					
			N		■	■	■					
			S		■	■	■					
TN7	 HT-P15	A highly wear-resistant (TiC/TiN-based) cermet grade. High edge strength and wear-resistant cermet offers improved tool life over uncoated/coated carbides and resists material build-up on cutting edge. Finishing to semi-finishing of carbon, alloy, and stainless steels at medium to high speeds. Can also be used on non-ferrous materials.	P	■	■	■	■					
			K	■	■	■	■					
ALO	 HC-K15	Coated carbide. CVD — TiCN-TiC-Al_2O_3. A thin alumina coating over a hard, deformation-resistant substrate. High-speed finishing of gray cast irons and medium-speed finishing of alloy steels that are in a hardness range of 35–50 HRC. Can withstand light interruptions. Alumina coating enables higher cutting speeds.	P	■	■	■	■					
			M	■	■	■	■					
			K	■	■	■	■					

Small Hole Boring Inserts

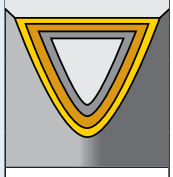
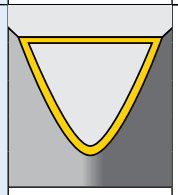
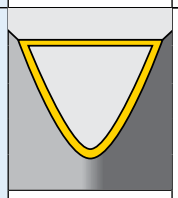
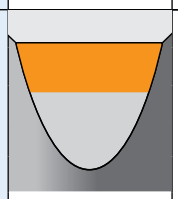
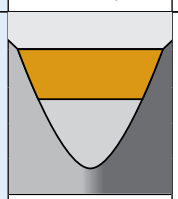


Coatings provide high-speed capability and are engineered for finishing to light roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade

Coating		Grade Description		05	10	15	20	25	30	35	40	45
CG6	 HC-P10	Coated carbide. CVD — TiC-TiCN-TiN. Tri-phase coating on a hard, low binder content, fine-grained grade. High-speed, general-purpose grade for all kinds of steel. Gold in color.	P	■	■	■						
			M		■	■	■					
			K	■	■	■						
CG5	 HC-S25	A PVD-TiN-coated grade. Straight 9.5% Co substrate. Submicron grain. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Performs best at low speeds and will handle interruptions and high feed rates.	P				■	■	■			
			M				■	■	■			
			K				■	■	■			
			N				■	■	■			
			S				■	■	■			
CG55	 HC-M20	A PVD-TiN coating over a very wear-resistant, unalloyed carbide substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Grade provides combination of high edge strength and wear resistance. Coating increases wear resistance and reduces problems with built-up edge. The substrate offers superior thermal deformation resistance and depth-of-cut notch resistance.	P		■	■	■					
			M		■	■	■	■				
			K	■	■	■	■					
			S		■	■	■					
CBN6	 BN-H25	PcBN tip brazed onto a carbide insert. Recommended for machining hardened steel (45–65 HRC). Use on bearing steel, hot and cold work tool steels, high-speed steels, die steels, case-hardened steels, carburized and nitrided irons, and some hard coatings. Can be run both dry and wet.										
			H			■	■	■	■			
CPD1	 DP-N10	Polycrystalline diamond (PCD) compact grade provides exceptional hardness and abrasion resistance. CPD1 is a superior finish boring grade that will significantly improve workpiece tolerances, surface finishes, and insert tool life in high-silicon aluminum, copper, aluminum carbon graphite, hard rubber, plastics, and/or wood.										
			N	■	■	■						

Positive Inserts • Inch

		Cutting Speed — vc SFM																	
		C2			C25			C3			CG5			CG55			CG6		
	Material Group	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	ap [inch]	–	–	–	–	–	–	–	–	–	.002	–	.012	.002	–	.012	.002	–	.012
	f [inch]	–	–	–	–	–	–	–	–	–	.012	–	.001	.012	–	.001	.012	–	.001
	0/1	–	–	–	–	–	–	–	–	–	305	**380**	460	340	**420**	505	415	**515**	620
	2	–	–	–	–	–	–	–	–	–	200	**250**	300	220	**275**	330	270	**335**	405
	3	–	–	–	–	–	–	–	–	–	200	**250**	300	220	**275**	330	270	**335**	405
	4	–	–	–	–	–	–	–	–	–	155	**195**	235	170	**215**	260	210	**260**	315
	5	–	–	–	–	–	–	–	–	–	200	**250**	300	220	**275**	330	270	**335**	405
	6	–	–	–	–	–	–	–	–	–	135	**165**	200	150	**185**	225	180	**220**	265
M	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	.002	–	.012	.002	–	.012	.002	–	.012
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012
	1	180	**225**	270	205	**255**	310	205	**255**	310	240	**300**	360	265	**330**	400	305	**380**	460
	2	165	**205**	250	185	**230**	280	185	**230**	280	220	**270**	325	240	**300**	360	280	**345**	415
	3	120	**150**	185	140	**170**	210	140	**170**	210	160	**200**	245	180	**220**	270	205	**255**	310
K	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	.002	–	.012	.002	–	.012	.002	–	.012
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012
	1	170	**213**	255	190	**235**	285	190	**235**	285	195	**240**	295	220	**270**	325	240	**300**	360
	2	220	**270**	330	240	**300**	360	240	**300**	360	250	**310**	375	275	**345**	415	305	**380**	460
	3	160	**200**	240	180	**220**	265	180	**220**	265	180	**225**	270	200	**250**	300	220	**275**	330
N	ap [inch]	.002	–	.020	.002	–	.020	.002	–	.020	.002	–	.020	.002	–	.020	–	–	–
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012	.001	–	.012	–	–	–
	1	1320	**1650**	1980	1320	**1650**	1980	1320	**1650**	1980	1320	**1650**	1980	1455	**1815**	2180	–	–	–
	2	970	**1210**	1450	970	**1215**	1460	970	**1215**	1460	970	**1215**	1460	1070	**1335**	1600	–	–	–
	3	225	**280**	340	225	**280**	340	225	**280**	340	275	**340**	410	300	**375**	450	–	–	–
	4	1015	**1250**	1520	1010	**1270**	1520	1010	**1270**	1520	455	**570**	690	505	**630**	760	–	–	–
	5	480	**600**	720	480	**600**	720	480	**600**	720	580	**720**	865	640	**795**	955	–	–	–
	6	460	**575**	690	460	**575**	690	460	**575**	690	555	**690**	830	610	**765**	920	–	–	–
	7	780	**975**	1170	780	**980**	1175	780	**980**	1175	800	**1000**	1200	875	**1100**	1320	–	–	–
S	ap [inch]	.001	–	.008	.001	–	.008	.001	–	.008	.001	–	.008	.001	–	.008	–	–	–
	f [inch]	.001	–	.005	.001	–	.005	.001	–	.005	.001	–	.005	.001	–	.005	–	–	–
	1	95	**120**	145	95	**120**	145	95	**120**	145	95	**120**	145	108	**133**	163	–	–	–
	2	75	**95**	115	75	**95**	120	75	**95**	120	75	**95**	120	87	**107**	130	–	–	–
	3	75	**95**	115	75	**95**	120	75	**95**	120	105	**130**	160	120	**145**	175	–	–	–
	4	80	**100**	120	80	**100**	120	80	**100**	120	–	–	–	–	–	–	–	–	–
H	ap [inch]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	f [inch]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.

Positive Inserts • Inch

		Cutting Speed — vc SFM														
		CM1			ALO			TN7			CBN6			CPD1		
	Material Group	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	–	–	–	–	–	–
	f [inch]	.012	–	.001	.012	–	.001	.012	–	.001	–	–	–	–	–	–
	0/1	180	**220**	265	540	**675**	810	650	**810**	975	–	–	–	–	–	–
	2	115	**140**	175	350	**440**	530	420	**525**	630	–	–	–	–	–	–
	3	115	**140**	175	350	**440**	530	420	**525**	630	–	–	–	–	–	–
	4	90	**110**	135	275	**340**	410	330	**410**	495	–	–	–	–	–	–
	5	115	**140**	175	350	**440**	525	420	**520**	628	–	–	–	–	–	–
	6	80	**95**	115	235	**290**	350	280	**350**	420	–	–	–	–	–	–
M	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	–	–	–	–	–	–
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	–	–	–	–	–	–
	1	180	**220**	265	345	**430**	520	340	**420**	505	–	–	–	–	–	–
	2	160	**200**	240	315	**390**	470	305	**380**	460	–	–	–	–	–	–
	3	120	**150**	180	235	**295**	355	225	**280**	340	–	–	–	–	–	–
K	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	–	–	–	–	–	–
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	–	–	–	–	–	–
	1	150	**190**	230	410	**510**	615	270	**340**	410	–	–	–	–	–	–
	2	190	**240**	290	520	**650**	780	345	**430**	520	–	–	–	–	–	–
	3	140	**175**	210	380	**470**	565	255	**315**	380	–	–	–	–	–	–
N	ap [inch]	.002	–	.020	–	–	–	.002	–	.020	–	–	–	.002	–	.020
	f [inch]	.001	–	.012	–	–	–	.001	–	.012	–	–	–	.001	–	.012
	1	1320	**1650**	1980	–	–	–	1320	**1650**	1980	–	–	–	2800	**3500**	4200
	2	970	**1215**	1460	–	–	–	970	**1210**	1455	–	–	–	2130	**2665**	3200
	3	225	**280**	340	–	–	–	265	**330**	400	–	–	–	1200	**1500**	1800
	4	330	**410**	490	–	–	–	635	**790**	955	–	–	–	1065	**1330**	1600
	5	480	**600**	720	–	–	–	640	**800**	960	–	–	–	1120	**1400**	1680
	6	460	**575**	690	–	–	–	580	**725**	870	–	–	–	1100	**1375**	1650
	7	780	**975**	1175	–	–	–	795	**990**	1195	–	–	–	1730	**2170**	2600
S	ap [inch]	.001	–	.008	–	–	–	–	–	–	.001	–	.008	–	–	–
	f [inch]	.001	–	.005	–	–	–	–	–	–	.001	–	.005	–	–	–
	1	85	**105**	130	–	–	–	–	–	–	290	**360**	435	–	–	–
	2	65	**80**	100	–	–	–	–	–	–	230	**280**	340	–	–	–
	3	90	**110**	135	–	–	–	–	–	–	320	**400**	480	–	–	–
	4	75	**90**	110	–	–	–	–	–	–	–	–	–	–	–	–
H	ap [inch]	–	–	–	–	–	–	–	–	–	.001	–	.008	–	–	–
	f [inch]	–	–	–	–	–	–	–	–	–	.001	–	.005	–	–	–
	1	–	–	–	–	–	–	–	–	–	360	**450**	540	–	–	–
	2	–	–	–	–	–	–	–	–	–	340	**420**	505	–	–	–
	3	–	–	–	–	–	–	–	–	–	320	**400**	480	–	–	–
	4	–	–	–	–	–	–	–	–	–	290	**360**	435	–	–	–

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.

Positive Inserts • Metric

Material Group		Cutting Speed — vc m/min																	
		C2			C25			C3			CG5			CG55			CG6		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	ap [mm]	–	–	–	–	–	–	–	–	–	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300
	f [mm/rev]	–	–	–	–	–	–	–	–	–	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300
	0/1	–	–	–	–	–	–	–	–	–	95	**115**	140	105	**130**	155	125	**155**	190
	2	–	–	–	–	–	–	–	–	–	60	**75**	90	65	**85**	100	80	**100**	125
	3	–	–	–	–	–	–	–	–	–	60	**75**	90	65	**85**	100	80	**100**	125
	4	–	–	–	–	–	–	–	–	–	45	**60**	70	50	**65**	80	65	**80**	95
	5	–	–	–	–	–	–	–	–	–	60	**75**	90	65	**85**	100	80	**100**	125
	6	–	–	–	–	–	–	–	–	–	40	**50**	60	45	**55**	70	55	**65**	80
M	ap [mm]	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300
	f [mm/rev]	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300
	1	55	**70**	80	60	**80**	95	60	**80**	95	75	**90**	110	80	**100**	120	95	**115**	140
	2	50	**60**	75	55	**70**	85	55	**70**	85	65	**80**	100	75	**90**	110	85	**105**	125
	3	35	**45**	55	45	**50**	65	45	**50**	65	50	**60**	75	55	**65**	80	60	**80**	95
K	ap [mm]	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300
	f [mm/rev]	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300
	1	50	**65**	80	60	**70**	85	60	**70**	85	60	**75**	90	65	**80**	100	75	**90**	110
	2	65	**80**	100	75	**90**	110	75	**90**	110	75	**95**	115	85	**105**	125	95	**115**	140
	3	50	**60**	75	55	**65**	80	55	**65**	80	55	**70**	80	60	**75**	90	65	**85**	100
N	ap [mm]	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	–	–	–
	f [mm/rev]	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	–	–	–
	1	400	**505**	605	400	**505**	605	400	**505**	605	400	**505**	605	445	**555**	665	–	–	–
	2	295	**370**	440	295	**370**	445	295	**370**	445	295	**370**	445	325	**405**	490	–	–	–
	3	70	**85**	105	70	**85**	105	70	**85**	105	85	**105**	125	90	**115**	135	–	–	–
	4	310	**380**	465	310	**385**	465	310	**385**	465	140	**175**	210	155	**190**	230	–	–	–
	5	145	**185**	220	145	**185**	220	145	**185**	220	175	**220**	265	195	**240**	290	–	–	–
	6	140	**175**	210	140	**175**	210	140	**175**	210	170	**210**	255	185	**235**	280	–	–	–
	7	240	**295**	355	240	**300**	360	240	**300**	360	245	**305**	365	265	**335**	400	–	–	–
S	ap [mm]	0,025	–	0,200	0,025	–	0,200	0,025	–	0,200	0,025	–	0,200	0,025	–	0,200	–	–	–
	f [mm/rev]	0,025	–	0,127	0,025	–	0,127	0,025	–	0,127	0,025	–	0,127	0,025	–	0,127	–	–	–
	1	30	**35**	45	30	**35**	45	30	**35**	45	30	**35**	45	35	**40**	50	–	–	–
	2	25	**30**	35	25	**30**	35	25	**30**	35	25	**30**	35	25	**35**	40	–	–	–
	3	25	**30**	35	25	**30**	35	25	**30**	35	30	**40**	50	35	**45**	55	–	–	–
	4	25	**30**	35	25	**30**	35	25	**30**	35	–	–	–	–	–	–	–	–	–
H	ap [mm]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	f [mm/rev]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

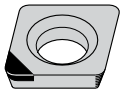
NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.

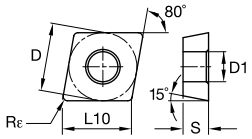
Positive Inserts • Metric

		Cutting Speed – vc m/min														
		CM1			ALO			TN7			CBN6			CPD1		
	Material Group	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	ap [mm]	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	–	–	–	–	–	–
	f [mm/rev]	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	–	–	–	–	–	–
	0/1	55	**65**	80	165	**205**	245	200	**245**	295	–	–	–	–	–	–
	2	35	**45**	55	105	**135**	160	130	**160**	190	–	–	–	–	–	–
	3	35	**45**	55	105	**135**	160	130	**160**	190	–	–	–	–	–	–
	4	25	**35**	40	85	**105**	125	100	**125**	150	–	–	–	–	–	–
	5	35	**45**	55	105	**135**	160	130	**160**	190	–	–	–	–	–	–
	6	25	**30**	35	70	**90**	105	85	**105**	130	–	–	–	–	–	–
M	ap [mm]	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	–	–	–	–	–	–
	f [mm/rev]	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	–	–	–	–	–	–
	1	55	**65**	80	105	**130**	160	105	**130**	155	–	–	–	–	–	–
	2	50	**60**	75	95	**120**	145	95	**115**	140	–	–	–	–	–	–
	3	35	**45**	55	70	**90**	110	70	**85**	105	–	–	–	–	–	–
K	ap [mm]	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	–	–	–	–	–	–
	f [mm/rev]	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	–	–	–	–	–	–
	1	45	**60**	70	125	**155**	185	80	**105**	125	–	–	–	–	–	–
	2	60	**75**	90	160	**200**	240	105	**130**	160	–	–	–	–	–	–
	3	45	**55**	65	115	**145**	170	80	**95**	115	–	–	–	–	–	–
N	ap [mm]	0,051	–	0,300	–	–	–	0,051	–	0,300	–	–	–	0,051	–	0,300
	f [mm/rev]	0,025	–	0,300	–	–	–	0,025	–	0,300	–	–	–	0,025	–	0,300
	1	400	**505**	605	–	–	–	400	**505**	605	–	–	–	855	**1065**	1280
	2	295	**370**	445	–	–	–	295	**370**	445	–	–	–	650	**810**	975
	3	70	**85**	105	–	–	–	80	**100**	120	–	–	–	365	**455**	550
	4	100	**125**	150	–	–	–	195	**240**	290	–	–	–	325	**405**	490
	5	145	**185**	220	–	–	–	195	**245**	295	–	–	–	340	**425**	510
	6	140	**175**	210	–	–	–	175	**220**	265	–	–	–	335	**420**	505
	7	240	**295**	360	–	–	–	240	**300**	365	–	–	–	525	**660**	790
S	ap [mm]	0,025	–	0,200	–	–	–	–	–	–	0,025	–	0,200	–	–	–
	f [mm/rev]	0,025	–	0,127	–	–	–	–	–	–	0,025	–	0,127	–	–	–
	1	25	**30**	40	–	–	–	–	–	–	90	**110**	135	–	–	–
	2	20	**25**	30	–	–	–	–	–	–	70	**85**	105	–	–	–
	3	25	**35**	40	–	–	–	–	–	–	100	**120**	145	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
H	ap [mm]	–	–	–	–	–	–	–	–	–	0,025	–	0,200	–	–	–
	f [mm/rev]	–	–	–	–	–	–	–	–	–	0,025	–	0,127	–	–	–
	1	–	–	–	–	–	–	–	–	–	110	**135**	165	–	–	–
	2	–	–	–	–	–	–	–	–	–	105	**130**	155	–	–	–
	3	–	–	–	–	–	–	–	–	–	100	**120**	145	–	–	–
	4	–	–	–	–	–	–	–	–	–	90	**110**	135	–	–	–

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.

CDHB


(M)



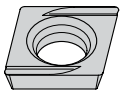
● first choice
○ alternate choice

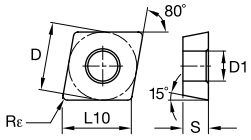
P					●	○	●	○	○	●														
M		○	○	○	●	●	○	○	○	○														
K		○	●	●	○	○	○	○	●	○														
N		●	●	●	●	○		○		○														
S		○	○	○	●	○		●																
H																								

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	max DOC mm	max DOC in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
CDHBS4T0X0	CDHB1206X0	3,97	5/32	4,03	.159	1,02	.040	0,05	.002	2,13	.084	—	—	-	2830897	-	3884731	-	2830888	2830881	-	-	-	-
CDHBS4T0X0M	CDHB1206X0M	3,97	5/32	4,03	.159	1,02	.040	0,05	.002	2,13	.084	1,90	.075	-	-	-	-	-	-	-	-	-	2830746	-
CDHBS4T002	CDHB120605	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084	—	—	-	2830864	-	3884732	-	2830853	2830848	-	2830843	-	-
CDHBS4T002M	CDHB120605M	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084	0,96	.038	-	-	-	-	-	-	-	-	-	2830741	-
CDHBS4T004	CDHB12061	3,97	5/32	4,03	.159	1,02	.040	0,38	.015	2,13	.084	—	—	-	2830830	-	2830788	-	2830817	2830813	-	2830803	-	-

NOTE: Max DOC only applies to tipped inserts, which are designated with an "M" at the end of the catalog number.

CDHH • R/L



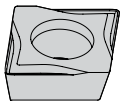


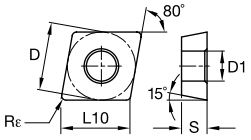
● first choice
○ alternate choice

P					●	○	●	○	○	●												
M		○	○	○	●	●	○	○	○	○												
K		○	●	●	○	○	○	○	●	○												
N		●	●	●	●	○		○		○												●
S		○	○	○	●	○		●														
H																				●		

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
right hand																						
CDHHS4T002R	**CDHH120605R**	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084	-	-	-	2830731	-	-	2830706	-	-	-	-
CDHHS4T004R	**CDHH12061R**	3,97	5/32	4,03	.159	1,02	.040	0,38	.015	2,13	.084	-	-	-	2830682	-	-	-	-	-	-	-
left hand																						
CDHHS4T002L	**CDHH120605L**	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084	-	-	-	2830724	-	2830712	2830700	-	-	-	-
CDHHS4T004L	**CDHH12061L**	3,97	5/32	4,03	.159	1,02	.040	0,38	.015	2,13	.084	-	-	-	2830678	-	-	-	-	-	-	-

CDHH



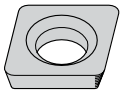


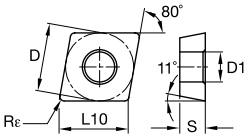
● first choice
○ alternate choice

P					●	○	●	○	○	●												
M		○	○	○	●	●	○	○	○	○												
K		○	●	●	○	○	○	○	●	○												
N		●	●	●	●	○		○		○		●										
S		○	○	○	●	○		●														
H																						

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
neutral hand																						
CDHHS4T002	CDHH120605	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084	▮	▮	▮	2830632	▮	▮	2830638	▮	▮	▮	▮
CDHHS4T004	CDHH12061	3,97	5/32	4,10	.161	1,02	.040	0,38	.015	2,13	.084	▮	▮	▮	2830619	▮	▮	▮	▮	▮	▮	▮

CPHB



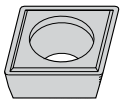


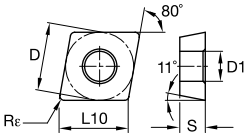
● first choice
○ alternate choice

P					●	○	●	○	○	●												
M		○	○	○	●	●	○	○	○	○												
K		○	●	●	○	○	○	○	●	○												
N		●	●	●	●	○		○		○		●										
S		○	○	○	●	○		●														
H																						

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
CPHB06T102	CPHB21205	6,35	1/4	6,45	.254	1,90	.075	0,18	.007	2,79	.110	▮	▮	▮	2824583	▮	▮	▮	▮	▮	▮	▮
CPHB06T104	CPHB2121	6,35	1/4	6,45	.254	1,90	.075	0,38	.015	2,79	.110	▮	▮	▮	2824562	▮	▮	▮	▮	▮	▮	▮

CPHH



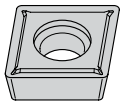


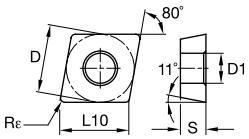
● first choice
○ alternate choice

P					●	○	●	○	○	●														
M		○	○	○	●	●	○	○	○	○														
K		○	●	●	○	○	○	○	●	○														
N		●	●	●	●	○		○		○														
S		○	○	○	●	○		●																
H																								

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
CPHH06T102	CPHH21205	6,35	1/4	6,45	.254	1,91	.075	0,18	.007	2,79	.110	▮	▮	▮	2824461	▮	2824454	▮	▮	▮	▮	▮
CPHH06T104	CPHH2121	6,35	1/4	6,45	.254	1,91	.075	0,38	.015	2,80	.110	▮	▮	▮	2824441	▮	▮	▮	▮	▮	▮	▮

CPMT-LF



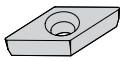


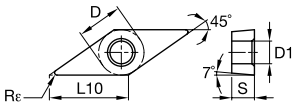
● first choice
○ alternate choice

P					●	○	●	○	○	●														
M		○	○	○	●	●	○	○	○	○														
K		○	●	●	○	○	○	○	●	○														
N		●	●	●	●	○		○		○														
S		○	○	○	●	○		●																
H																								

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
CPMT09T302LF	CPMT32505LF	9,53	3/8	9,67	.381	3,97	.156	0,20	.008	4,40	.173	▮	▮	▮	2821519	▮	▮	▮	▮	▮	▮	▮
CPMT09T304LF	CPMT3251LF	9,53	3/8	9,67	.381	3,97	.156	0,40	.016	4,40	.173	▮	▮	▮	2821499	▮	▮	▮	▮	▮	▮	▮
CPMT09T308LF	CPMT3252LF	9,53	3/8	9,67	.381	3,97	.156	0,80	.031	4,40	.173	▮	▮	▮	2821484	▮	▮	▮	▮	▮	▮	▮

GCHW



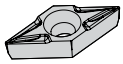


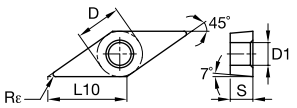
● first choice
○ alternate choice

P					●	○	●	○	○	●													
M		○	○	○	●	●	○	○	○	○													
K		○	●	●	○	○	○	○	●	○													
N		●	●	●	●	○		○		○													●
S		○	○	○	●	○		●															
H																					●		

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
GCHW060202	GCHW151505	4,76	3/16	6,73	.265	2,36	.093	0,18	.007	2,39	.094	-	-	-	2827596	-	-	2827601	-	-	-	-
GCHW060204	GCHW15151	4,76	3/16	6,73	.265	2,36	.093	0,38	.015	2,39	.094	-	-	-	2827577	-	-	2827584	-	-	-	-

GCHT



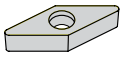


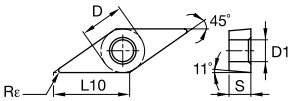
● first choice
○ alternate choice

P					●	○	●	○	○	●													
M		○	○	○	●	●	○	○	○	○													
K		○	●	●	○	○	○	○	●	○													
N		●	●	●	●	○		○		○													●
S		○	○	○	●	○		●															
H																					●		

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
GCHT060202	GCHT151505	4,83	.1902	6,83	.269	2,36	.093	0,18	.007	2,39	.094	-	-	-	2827537	-	-	-	-	-	-	-
GCHT060204	GCHT15151	4,76	3/16	6,83	.269	2,36	.093	0,38	.015	2,39	.094	-	-	-	2827525	-	-	2827531	-	-	-	-

GPHW



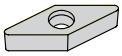


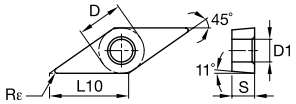
● first choice
○ alternate choice

P					●	○	●	○	○	●														
M		○	○	○	●	●	○	○	○	○														
K		○	●	●	○	○	○	○	●	○														
N		●	●	●	●	○		○		○														
S		○	○	○	●	○		●																
H										●														

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
GPHW050102	GPHW12105	3,97	5/32	5,61	.221	1,59	.062	0,18	.007	2,13	.084	▪	▪	▪	2827631	▪	2827625	2827637	▪	▪	▪	▪
GPHW050104	GPHW1211	3,97	5/32	5,61	.221	1,59	.062	0,38	.015	2,13	.084	▪	▪	▪	2827615	▪	2827608	2827621	▪	▪	▪	▪

GPHT



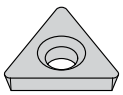


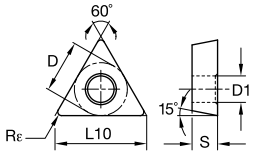
● first choice
○ alternate choice

P					●	○	●	○	○	●														
M		○	○	○	●	●	○	○	○	○														
K		○	●	●	○	○	○	○	●	○														
N		●	●	●	●	○		○		○														
S		○	○	○	●	○		●																
H										●														

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
GPHT050102	GPHT12105	3,97	5/32	5,76	.227	1,57	.062	0,18	.007	2,13	.084	▪	▪	▪	2827560	▪	▪	2827566	▪	▪	▪	▪
GPHT050104	GPHT1211	4,08	.1605	5,76	.227	1,57	.062	0,38	.015	2,13	.084	▪	▪	▪	2827548	▪	▪	2827554	▪	▪	▪	▪

TBHB



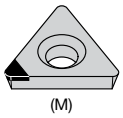


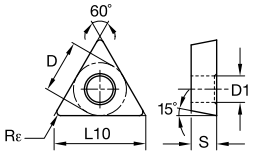
● first choice
○ alternate choice

P					●	○	●	○	○	●													
M		○	○	○	●	●	○	○	○	○													
K		○	●	●	○	○	○	○	●	○													
N		●	●	●	●	○		○		○		●											
S		○	○	○	●	○		●															
H																							

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
		mm	in	mm	in	mm	in	mm	in	mm	in											
TBHB07S1X0	TBHB1308X0	4,06	.16	7,04	.277	1,19	.047	0,05	.002	2,39	.094	I	I	I	2828556	I	I	I	I	I	I	I
TBHB110201	TBHB2150	6,35	1/4	11,00	.433	2,38	.094	0,10	.004	3,33	.131	I	I	I	2824266	I	I	I	I	I	I	I

TDHB


(M)



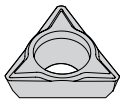
● first choice
○ alternate choice

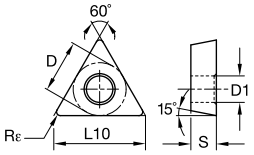
P					●	○	●	○	○	●															
M		○	○	○	●	●	○	○	○	○															
K		○	●	●	○	○	○	○	●	○															
N		●	●	●	●	○		○		○															●
S		○	○	○	●	○		●																	
H																									

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	max DOC mm	max DOC in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
TDHB07S102M	TDHB130805M	4,06	.160	7,04	.277	1,19	.047	0,18	.007	2,39	.095	1,27	.050	-	-	-	-	-	-	-	-	-	2828579	-
TDHB07S104M	TDHB13081M	4,06	.160	7,04	.277	1,19	.047	0,38	.015	2,39	.094	1,27	.050	-	-	-	-	-	-	-	-	-	2828634	-
TDHB07S1X0	TDHB1308X0	4,06	.160	7,04	.277	1,19	.047	0,05	.002	2,41	.095	—	—	-	2828784	-	2828796	-	-	2828778	-	-	-	-
TDHB07S102	TDHB130805	4,06	.160	7,04	.277	1,19	.047	0,18	.007	2,41	.095	—	—	-	2828732	-	2828755	-	2828749	2828727	-	2828720	-	-
TDHB07S104	TDHB13081	4,06	.160	7,04	.277	1,19	.047	0,38	.015	2,41	.095	—	—	-	2828697	-	2828708	-	2828702	2828693	-	2828688	-	-
TDHB07S108	TDHB13082	4,06	.160	7,04	.277	1,19	.047	0,79	.031	2,41	.095	—	—	-	-	-	2828682	-	-	-	-	-	-	-

NOTE: Max DOC only applies to tipped inserts, which are designated with an "M" at the end of the catalog number.

TDHH





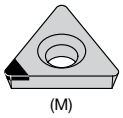
● first choice
○ alternate choice

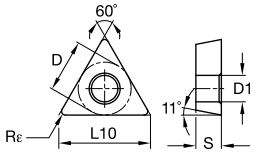
P					●	○	●	○	○	●														
M		○	○	○	●	●	○	○	○	○														
K		○	●	●	○	○	○	○	●	○														
N		●	●	●	●	○		○		○														●
S		○	○	○	●	○		●																
H																							●	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	max DOC mm	max DOC in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
TDHH07S102	TDHH130805	4,06	.160	7,04	.277	1,19	.047	0,18	.007	2,41	.095	—	—	'	'	'	2828398	'	'	'	'	'	'	'
TDHH07S102L	TDHH130805L	4,06	.160	7,04	.277	1,19	.047	0,18	.007	2,41	.095	4,52	.178	'	'	'	2828541	'	2828529	2828516	'	2828508	'	'
TDHH07S102R	TDHH130805R	4,06	.160	7,04	.277	1,19	.047	0,18	.007	2,41	.095	4,52	.178	'	'	'	2828547	'	'	'	'	'	'	'
TDHH07S104L	TDHH13081L	4,06	.160	7,04	.277	1,19	.047	0,38	.015	2,41	.095	4,36	.172	'	'	'	2828494	'	'	2828472	'	'	'	'
TDHH07S104R	TDHH13081R	4,06	.160	7,04	.277	1,19	.047	0,38	.015	2,41	.095	4,36	.172	'	'	'	2828499	'	'	'	'	'	'	'
TDHH07S104	TDHH13081	4,06	.160	7,18	.283	1,19	.047	0,38	.015	2,41	.095	—	—	'	'	'	2828386	'	'	'	'	'	'	'

NOTE: Max DOC only applies to tipped inserts, which are designated with an "M" at the end of the catalog number.

TPHB


(M)



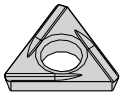
● first choice
○ alternate choice

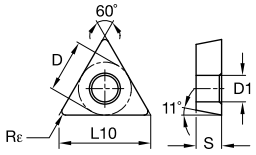
P					●	○	●	○	○	●												
M		○	○	○	●	●	○	○	○	○												
K		○	●	●	○	○	○	○	●	○												
N		●	●	●	●	○		○		○		●										
S		○	○	○	●	○		●														
H																						

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	max DOC mm	max DOC in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
TPHB1102X0	TPHB215X0	6,35	1/4	11,00	.433	2,38	.094	0,05	.002	3,30	.130	—	—	-	-	2824236	2824251	-	-	2824220	-	-	-	-
TPHB1102X0M	TPHB215X0M	6,35	1/4	11,00	.433	2,38	.094	0,05	.002	3,30	.130	1,62	.064	-	-	-	-	-	-	-	-	-	2823954	-
TPHB110202	TPHB21505	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,30	.130	—	—	-	-	2824191	2824200	-	2824195	2824168	-	2824148	-	-
TPHB110202M	TPHB21505M	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,30	.130	1,62	.064	-	-	-	-	-	-	-	-	-	2823949	-
TPHB110204M	TPHB2151M	6,35	1/4	11,00	.433	2,38	.094	0,40	.015	3,30	.130	1,62	.064	-	-	-	-	-	-	-	-	-	2823942	-
TPHB110204	TPHB2151	6,35	1/4	11,00	.433	2,38	.094	0,38	.015	3,30	.130	—	—	-	-	2824122	2824136	-	2824129	2824104	-	2824090	-	-
TPHB110208	TPHB2152	6,35	1/4	11,00	.433	2,38	.094	0,79	.031	3,30	.130	—	—	-	-	-	2824077	-	-	2824044	-	2824037	-	-
TPHB1603X0	TPHB32X0	9,53	3/8	16,50	.650	3,18	.125	0,05	.002	3,30	.130	—	—	-	-	-	2821402	-	-	2821844	-	-	-	-
TPHB160302	TPHB3205	9,53	3/8	16,50	.650	3,18	.125	0,18	.007	3,30	.130	—	—	-	-	-	2821397	-	-	2821816	-	-	-	-
TPHB160304	TPHB321	9,53	3/8	16,50	.650	3,18	.125	0,38	.015	3,30	.130	—	—	-	-	-	2821392	-	2821778	2821772	-	2821749	-	-
TPHB160308	TPHB322	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,30	.130	—	—	-	-	-	2821381	-	2821377	2821349	-	2821331	-	-
TPCB160302	TD6P05	9,53	3/8	—	—	3,23	.127	0,18	.007	3,30	.130	—	—	-	-	-	-	-	2821822	-	-	-	-	-

NOTE: Max DOC only applies to tipped inserts, which are designated with an "M" at the end of the catalog number.

TPHH • R/L



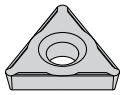


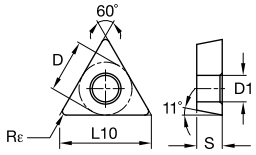
● first choice
○ alternate choice

P					●	○	●	○	○	●		●
M		○	○	○	●	●	○	○	○	○		
K		○	●	●	○	○	○	○	●	○		
N		●	●	●	●	○		○		○		●
S		○	○	○	●	○		●				
H											●	

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
right hand																						
TPHH110202R	TPHH21505R	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,33	.131	■	■	■	2823812	■	■	■	■	■	■	■
TPHH160302R	TPHH3205R	9,53	3/8	16,50	.650	3,18	.125	0,18	.007	3,33	.131	■	■	■	2821213	■	■	■	■	■	■	■
TPHH160304R	TPHH321R	9,53	3/8	16,50	.650	3,18	.125	0,38	.015	3,33	.131	■	■	■	2821168	■	■	■	■	■	■	■
TPHH160308R	TPHH322R	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,33	.131	■	■	■	2821121	■	■	■	■	■	■	■
left hand																						
TPHH110202L	TPHH21505L	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,33	.131	■	■	■	2823805	■	■	■	■	2823767	■	■
TPHH110204L	TPHH2151L	6,35	1/4	11,00	.433	2,38	.094	0,38	.015	3,33	.131	■	■	■	2823753	■	2823739	■	■	■	■	■
TPHH160302L	TPHH3205L	9,53	3/8	16,50	.650	3,18	.125	0,18	.007	3,33	.131	■	■	■	2821208	■	■	■	■	■	■	■
TPHH160304L	TPHH321L	9,53	3/8	16,50	.650	3,18	.125	0,38	.015	3,33	.131	■	■	■	2821162	■	2821150	■	■	■	■	■
TPHH160308L	TPHH322L	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,33	.131	■	■	■	2821115	■	■	■	■	■	■	■

TPHH



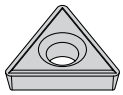


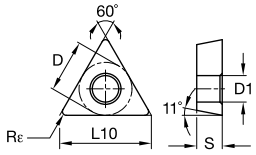
● first choice
○ alternate choice

P					●	○	●	○	○	●													
M		○	○	○	●	●	○	○	○	○													
K		○	●	●	○	○	○	○	●	○													
N		●	●	●	●	○		○		○		●											
S		○	○	○	●	○		●															
H											●												

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
TPHH110202	TPHH21505	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,30	.130	●	●	●	2823914	○	2823908	●	●	●	●	●
TPHH110204	TPHH2151	6,35	1/4	11,00	.433	2,38	.094	0,38	.015	3,30	.130	●	●	●	2823858	○	○	●	●	●	●	●
TPCH110204	TPCH221	6,50	.256	11,26	.443	2,38	.094	0,38	.015	3,30	.130	●	●	●	●	○	2823851	●	●	●	●	●

TPHH-LF



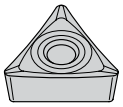


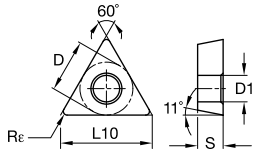
● first choice
○ alternate choice

P					●	○	●	○	○	●													
M		○	○	○	●	●	○	○	○	○													
K		○	●	●	○	○	○	○	●	○													
N		●	●	●	●	○		○		○												●	
S		○	○	○	●	○		●															
H											●												

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
TPHH160304	TPHH321	9,53	3/8	16,50	.650	3,18	.125	0,40	.016	3,33	.131	●	●	●	2821070	○	2821705	●	●	●	●	●
TPHH160304LF	TPHH321LF	9,53	3/8	16,50	.650	3,18	.125	0,40	.016	3,33	.131	●	2821718	●	●	○	●	●	●	●	●	●
TPHH160308	TPHH322	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,33	.131	●	●	●	●	○	2821670	●	●	●	●	●
TPHH160308	TPHH322LF	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,33	.131	●	●	●	2821067	○	●	●	●	●	●	●
TPHH17T309LF	TPHH312524LF	9,80	.386	16,98	.669	3,97	.156	0,94	.037	3,33	.131	●	●	●	2821319	○	●	●	●	●	●	●

TPGT-HP



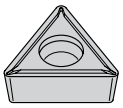


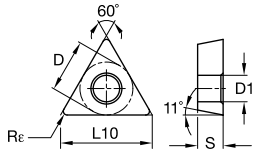
● first choice
○ alternate choice

P					●	○	●	○	○	●														
M		○	○	○	●	●	○	○	○	○														
K		○	●	●	○	○	○	○	●	○														
N		●	●	●	●	○		○		○														
S		○	○	○	●	○		●																
H																								

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
TPGT110202HP	TPGT21505HP	6,35	1/4	11,00	.433	2,38	.094	0,20	.008	2,90	.114	▪	▪	▪	2823605	▪	▪	▪	▪	▪	▪	▪
TPGT110204HP	TPGT2151HP	6,35	1/4	11,00	.433	2,38	.094	0,40	.016	2,90	.114	▪	▪	▪	2823592	▪	▪	2823595	▪	▪	▪	▪
TPGT16T304HP	TPGT3251HP	9,53	3/8	16,50	.650	3,97	.156	0,40	.016	4,40	.173	▪	▪	▪	2821536	▪	▪	▪	▪	▪	▪	▪

TPMT-LF



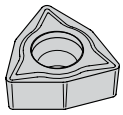


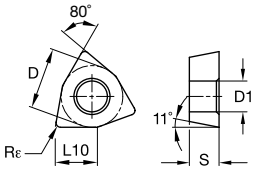
● first choice
○ alternate choice

P					●	○	●	○	○	●														
M		○	○	○	●	●	○	○	○	○														
K		○	●	●	○	○	○	○	●	○														
N		●	●	●	●	○		○		○														
S		○	○	○	●	○		●																
H																								

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
TPMT110202LF	TPMT21505LF	6,35	1/4	11,00	.433	2,38	.094	0,20	.008	2,80	.110	▪	▪	▪	2823646	▪	▪	▪	▪	▪	▪	▪
TPMT110204LF	TPMT2151LF	6,35	1/4	11,00	.433	2,38	.094	0,40	.016	2,90	.114	▪	▪	▪	2823625	▪	2823619	▪	▪	▪	▪	▪
TPMT160304LF	TPMT321LF	9,53	3/8	16,50	.650	3,18	.125	0,40	.016	4,40	.173	▪	▪	▪	2821577	▪	2821571	▪	▪	▪	▪	▪
TPMT160308LF	TPMT322LF	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	4,40	.173	▪	▪	▪	2821566	▪	▪	▪	▪	▪	▪	▪

WPHT



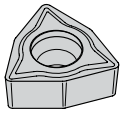


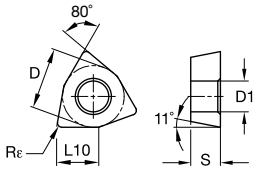
● first choice
○ alternate choice

P					●	○	●	○	○	●												
M		○	○	○	●	●	○	○	○	○												
K		○	●	●	○	○	○	○	●	○												
N		●	●	●	●	○		○		○												●
S		○	○	○	●	○		●														
H																				●		

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
WPHTS30101	WPHT1510	4,76	3/16	3,26	.128	1,59	.062	0,10	.004	2,16	.085	-	-	-	2827496	-	-	-	-	-	-	-
WPHTS30102	WPHT15105	4,76	3/16	3,26	.128	1,59	.062	0,20	.008	2,16	.085	-	-	-	2827483	-	-	2827490	-	-	-	-
WPHTS30104	WPHT1511	4,76	3/16	3,26	.128	1,59	.062	0,40	.016	2,16	.085	-	-	-	2827471	-	-	2827477	-	-	-	-
WPGT040202UF	WPGT21505UF	6,35	1/4	4,34	.171	2,38	.094	0,20	.008	2,79	.110	-	-	-	2824331	-	-	-	-	-	-	-
WPHT040201	WPHT2150	6,35	1/4	4,34	.171	2,38	.094	0,10	.004	2,80	.110	-	-	-	2824344	-	-	-	-	-	-	-
WPHT040204	WPHT2151	6,35	1/4	4,34	.171	2,38	.094	0,40	.016	2,80	.110	-	-	-	2824316	-	-	-	-	-	-	-

WPMT-LF



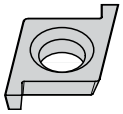


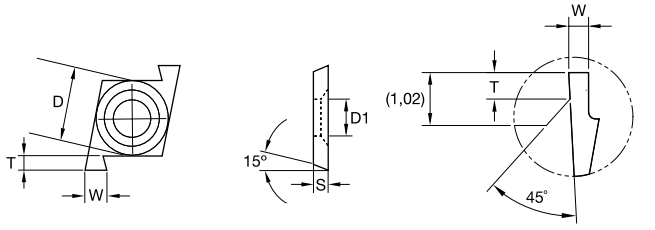
● first choice
○ alternate choice

P					●	○	●	○	○	●													
M		○	○	○	●	●	○	○	○	○													
K		○	●	●	○	○	○	○	●	○													
N		●	●	●	●	○		○		○		●											
S		○	○	○	●	○		●															
H											●												

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
WPMTS3T104LF	WPMT15121LF	4,76	3/16	3,26	.128	1,98	.078	0,40	.016	2,15	.085	■	■	■	■	2827521	■	■	■	■	■	■
WPMT040204LF	WPMT2151LF	6,35	1/4	4,34	.171	2,38	.094	0,40	.016	2,90	.114	■	■	■	■	2824362	■	■	■	■	■	■
WPMT06T304LF	WPMT3251LF	9,53	3/8	6,52	.257	3,97	.156	0,40	.016	4,40	.173	■	■	■	■	2821036	■	■	■	■	■	■
WPMT06T308LF	WPMT3252LF	9,53	3/8	6,52	.257	3,97	.156	0,80	.031	4,40	.173	■	■	■	■	2821023	■	■	■	■	■	■

CDG • R/L





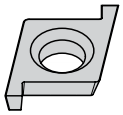
NOTE: Detail of 0,38 insert.

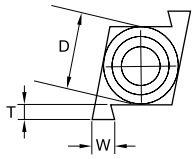
● first choice
○ alternate choice

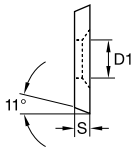
P					●	○	●	○	○	●													
M		○	○	○	●	●	○	○	○	○													
K		○	●	●	○	○	○	○	●	○													
N		●	●	●	●	○		○		○		●											
S		○	○	○	●	○		●															
H											●												

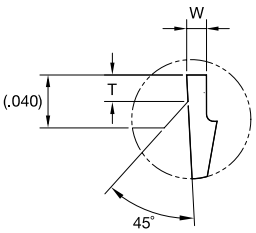
ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	T mm	T in	W mm	W in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
right hand																						
CDG50252R	CDG50252R	3,97	5/32	1,27	.050	1,02	.040	0,64	.025	2,13	.084	■	■	■	2830541	■	■	■	■	■	■	■
CDG50302R	CDG50302R	3,97	5/32	1,27	.050	1,02	.040	0,76	.030	2,13	.084	■	■	■	2830529	■	■	■	■	■	■	■

CPG • R/L









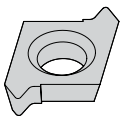
Detail of .015" (0,38mm) insert.

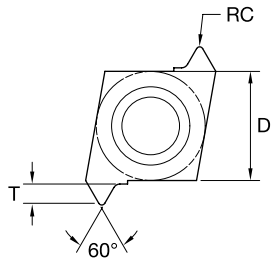
● first choice
○ alternate choice

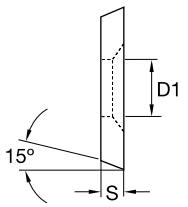
	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
P				●	○	●	○	○	●		
M				●	●	○	○	○	○		
K		●	●	○	○	○	○	●	○		
N	●	●	●	●	○		○		○		●
S	○	○	○	●	○		●				
H										●	

ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	T mm	T in	W mm	W in	D1 mm	D1 in	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
right hand																						
CPG2032R	**CPG2032R**	6,35	1/4	1,91	.075	1,65	.065	0,76	.030	2,79	.110	I	I	I	2824546	I	I	I	I	I	I	I
CPG2062R	**CPG2062R**	6,35	1/4	1,91	.075	1,65	.065	1,52	.060	2,79	.110	I	I	I	2824531	I	I	I	I	I	I	I

CDT • R/L





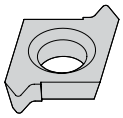


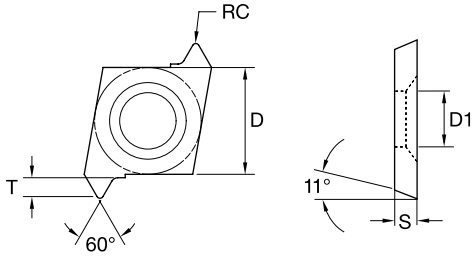
● first choice
○ alternate choice

	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
P				●	○	●	○	○	●		
M				●	●	○	○	○	○		
K		●	●	○	○	○	○	●	○		
N	●	●	●	●	○		○		○		●
S	○	○	○	●	○		●				
H										●	

catalog number	D	S	T	RC	D1	TP min	TP max	TPI min	TPI max	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
CDT50022R	3,97	1,27	0,76	0,05	2,11	0,5	1,0	24.0	48.0	I	I	I	2830567	I	I	I	I	I	I	I

CPT • R/L



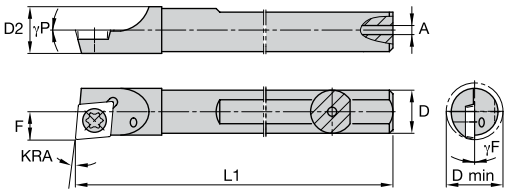


● first choice
○ alternate choice

P					●	○	●	○	○	●															
M		○	○	○	●	●	○	○	○	○															
K		○	●	●	○	○	○	○	●	○															
N		●	●	●	●	○		○			●														
S		○	○	○	●	○		●																	
H																									

ISO catalog number	ANSI catalog number	D mm	D in	S mm	S in	T mm	T in	RC mm	RC in	D1 mm	D1 in	TPI min	TPI max	TP min	TP max	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
right hand																										
CPT20052R	**CPT20052R**	6,35	1/4	1,91	.075	1,65	.065	0,13	.005	2,79	.110	10	24	1,0	2,5	-	-	-	2824516	-	-	2824523	-	-	-	-

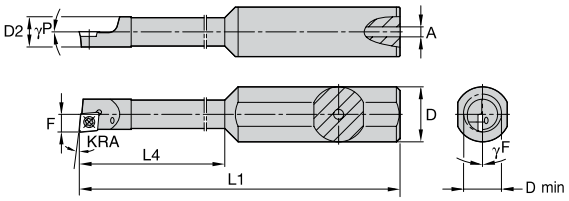
CSBI



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2832371	**CSBI16518757R**	-7	.188	.180	.166	.095	2.500	.040	0.0°	0.0°	CD..120605
2832617	**CSBI180187255R**	-5	.188	.204	.180	.104	2.500	.040	0.0°	5.0°	CD..120605
2832553	**CSBI187255R**	-5	.188	.228	.203	.228	2.500	.040	0.0°	5.0°	CD..120605
2832442	**CSBI25035R**	-5	.250	.285	.260	.145	3.000	.040	0.0°	5.0°	CD..120605
2832566	**CSBI187250R**	0	.188	.244	.203	.122	2.500	.040	0.0°	5.0°	CD..120605
2832454	**CSBI25030R**	0	.250	.292	.260	.152	3.000	.040	0.0°	5.0°	CD..120605
left hand											
2832365	**CSBI16518757L**	-7	.188	.180	.166	.095	2.500	.040	0.0°	0.0°	CD..120605
2832623	**CSBI180187255L**	-5	.188	.204	.180	.104	2.500	.040	0.0°	5.0°	CD..120605
2832559	**CSBI187255L**	-5	.188	.228	.203	.116	2.500	.040	0.0°	5.0°	CD..120605
2832448	**CSBI25035L**	-5	.250	.285	.260	.145	3.000	.040	0.0°	5.0°	CD..120605

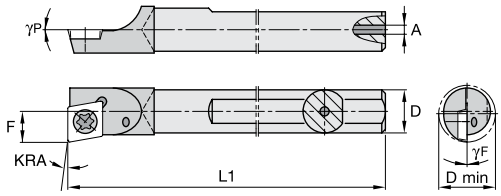
CSBI • STEPPED



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert
right hand												
2832607	**CSBI18037515R**	-5	.375	.204	.180	.104	2.500	1.000	.040	0.0°	5.0°	CD..120605
2832596	**CSBI18037555R**	-5	.375	.204	.180	.104	2.500	.500	.040	0.0°	5.0°	CD..120605
2832535	**CSBI20337515R**	-5	.375	.228	.203	.116	2.500	1.000	.040	0.0°	5.0°	CD..120605
2832429	**CSBI2503751255R**	-5	.375	.285	.260	.145	2.500	1.250	.040	0.0°	5.0°	CD..120605
2832414	**CSBI250375755R**	-5	.375	.285	.260	.145	2.500	.750	.040	0.0°	5.0°	CD..120605
2832589	**CSBI18050015R**	-5	.500	.204	.180	.104	2.750	1.000	.040	0.0°	5.0°	CD..120605
2832577	**CSBI18050055R**	-5	.500	.204	.180	.104	2.750	.500	.040	0.0°	5.0°	CD..120605
2832488	**CSBI20350015R**	-5	.500	.228	.203	.116	2.750	1.000	.040	0.0°	5.0°	CD..120605
2832467	**CSBI20350055R**	-5	.500	.228	.203	.116	2.750	.500	.040	0.0°	5.0°	CD..120605
2832398	**CSBI2505001255R**	-5	.500	.285	.260	.145	2.750	1.250	.040	0.0°	5.0°	CD..120605
2832374	**CSBI250500755R**	-5	.500	.285	.260	.145	2.750	.750	.040	0.0°	5.0°	CD..120605
2832547	**CSBI20337510R**	0	.375	.234	.203	.122	2.500	1.000	.040	0.0°	5.0°	CD..120605
left hand												
2832602	**CSBI18037555L**	-5	.375	.204	.180	.104	2.500	.500	.040	0.0°	5.0°	CD..120605
2832419	**CSBI250375755L**	-5	.375	.285	.260	.145	2.500	.750	.040	0.0°	5.0°	CD..120605
2832583	**CSBI18050055L**	-5	.500	.204	.180	.104	2.750	.500	.040	0.0°	5.0°	CD..120605
2832494	**CSBI20350015L**	-5	.500	.228	.203	.116	2.750	1.000	.040	0.0°	5.0°	CD..120605

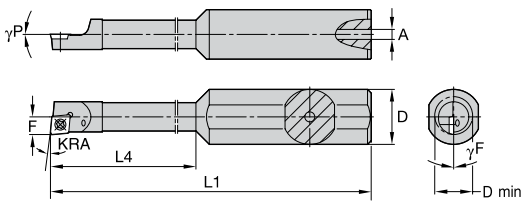
CCBI



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2831949	**CCBI16515667R**	-7	.156	.180	.095	6.000	.040	0.0°	0.0°	CD..120605
2832281	**CCBI18018745R**	-5	.188	.208	.104	4.000	.040	0.0°	5.0°	CD..120605
2832276	**CCBI18018765R**	-5	.188	.208	.104	6.000	.040	0.0°	5.0°	CD..120605
2832183	**CCBI18745R**	-5	.188	.218	.111	4.000	.040	0.0°	5.0°	CD..120605
2832164	**CCBI18765R**	-5	.188	.218	.111	6.000	.040	0.0°	5.0°	CD..120605
2832049	**CCBI25045R**	-5	.250	.285	.145	4.000	.047	0.0°	5.0°	CD..120605
2832029	**CCBI25065R**	-5	.250	.285	.145	6.000	.047	0.0°	5.0°	CD..120605
2832270	**CCBI31265R**	-5	.312	.356	.185	6.000	.093	0.0°	5.0°	CD..120605
2832195	**CCBI18740R**	0	.187	.224	.117	4.000	.040	0.0°	5.0°	CD..120605
2832062	**CCBI25040R**	0	.250	.292	.152	4.000	.047	0.0°	5.0°	CD..120605
2832234	**CCBI31260R**	0	.313	.356	.185	6.000	.093	0.0°	5.0°	CD..120605
left hand										
2831945	**CCBI16515667L**	-7	.156	.180	.095	6.000	.040	0.0°	0.0°	CD..120605
2832287	**CCBI18018745L**	-5	.188	.208	.104	4.000	.040	0.0°	5.0°	CD..120605
2832190	**CCBI18745L**	-5	.188	.218	.111	4.000	.040	0.0°	5.0°	CD..120605
2832172	**CCBI18765L**	-5	.188	.218	.111	6.000	.040	0.0°	5.0°	CD..120605
2832057	**CCBI25045L**	-5	.250	.285	.145	4.000	.047	0.0°	5.0°	CD..120605
2832033	**CCBI25065L**	-5	.250	.285	.145	6.000	.047	0.0°	5.0°	CD..120605
2832265	**CCBI31265L**	-5	.313	.356	.185	6.000	.093	0.0°	5.0°	CD..120605
2832200	**CCBI18740L**	0	.188	.224	.117	4.000	.040	0.0°	5.0°	CD..120605

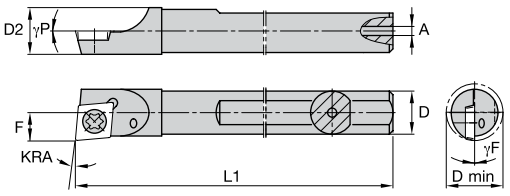
CCBI • STEPPED



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	F	L1	L4	A	γF°	γP°	gage insert
right hand											
2832254	**CCBI18050018755R**	-5	.500	.208	.104	3.375	1.875	.125	0.0°	5.0°	CD..120605
2832241	**CCBI1805008755R**	-5	.500	.208	.104	2.375	.875	.040	0.0°	5.0°	CD..120605
2832141	**CCBI20350015R**	-5	.500	.234	.119	2.500	1.000	.040	0.0°	5.0°	CD..S4T002
2832120	**CCBI20350025R**	-5	.500	.234	.119	3.500	2.000	.125	0.0°	5.0°	CD..120605
2832006	**CCBI2505001255R**	-5	.500	.285	.145	2.750	1.250	.125	0.0°	5.0°	CD..120605
2832205	**CCBI1806258755R**	-5	.625	.208	.104	3.375	.875	.125	0.0°	5.0°	CD..120605
2832101	**CCBI20362515R**	-5	.625	.234	.119	3.500	1.000	.125	0.0°	5.0°	CD..S4T002
2831976	**CCBI2506251255R**	-5	.625	.285	.145	3.750	1.250	.125	0.0°	5.0°	CD..120605
2832152	**CCBI20350010R**	0	.500	.234	.125	2.500	1.000	.125	0.0°	5.0°	CD..S4T002
3337598	**CCBI2505001250R**	0	.500	.292	.152	2.750	1.250	.125	0.0°	5.0°	CD..120605
left hand											
2832247	**CCBI1805008755L**	-5	.500	.208	.104	2.375	.875	.125	0.0°	5.0°	CD..120605
2832147	**CCBI20350015L**	-5	.500	.234	.119	2.500	1.000	.125	0.0°	5.0°	CD..S4T002
2832012	**CCBI2505001255L**	-5	.500	.285	.145	2.750	1.250	.125	0.0°	5.0°	CD..120605
2832211	**CCBI1806258755L**	-5	.625	.208	.104	3.375	.875	.125	0.0°	5.0°	CD..120605

QSMI

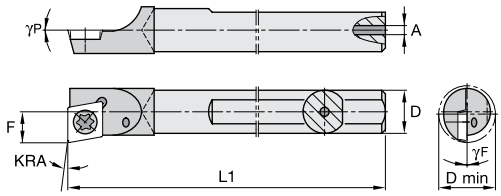


NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2825394	**QSMI62565R**	-5	.625	.670	.635	.343	6.000	.156	0.0°	0.0°	CP..2....
2825464	**QSMI37545R**	0	.375	.481	.385	.278	3.997	.125	0.0°	0.0°	CP..2....
2825455	**QSMI50055R**	0	.500	.605	.510	.340	4.997	.156	0.0°	0.0°	CP..2....
left hand											
2825457	**QSMI37545L**	0	.375	.481	.385	.278	3.997	.125	0.0°	0.0°	CP..2....

NOTE: D min and F calculated using the CPG grooving-style insert.

QCMI

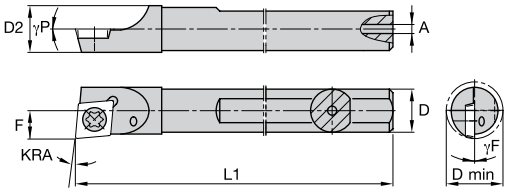


NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2825117	**QCMI37565R**	-5	.375	.420	.218	6.000	.125	0.0°	0.0°	CPHB21205
2825105	**QCMI50085R**	-5	.500	.545	.280	8.000	.188	0.0°	0.0°	CP..21205
left hand										
2825112	**QCMI37565L**	-5	.375	.420	.218	6.000	.125	0.0°	0.0°	CP..2..

NOTE: F calculated using the CPG-style insert.

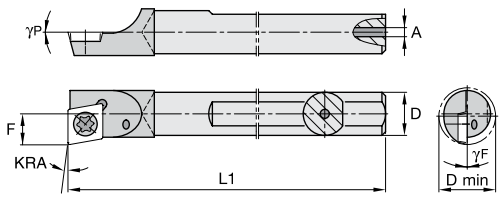
SSBIC



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2822637	**SSBIC62575R**	-5	.625	.680	.635	.353	7.000	.156	0.0°	0.0°	CP..3252

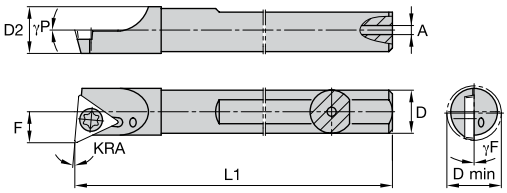
SDBIC



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2822301	**SDBIC62565R**	-5	.625	.680	.353	6.000	.218	-5.0°	0.0°	CPMT3252
2822289	**SDBIC625105R**	-5	.625	.680	.353	10.000	.218	-5.0°	0.0°	CPMT3252

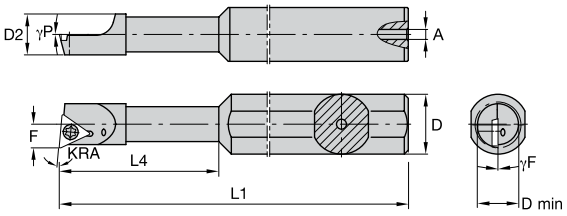
FSBI



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2830455	**FSBI187355R**	-5	.188	.275	.197	.123	3.500	.040	0.0°	5.0°	TD..130805
2830358	**FSBI25045R**	-5	.250	.296	.260	.156	4.000	.040	0.0°	5.0°	TD..130805
2830260	**FSBI31245R**	-5	.313	.358	.322	.187	4.000	.060	0.0°	5.0°	TD..130805
left hand											
2830270	**FSBI31245L**	-5	.313	.358	.322	.187	4.000	.060	0.0°	5.0°	TD..130805

FSBI • STEPPED

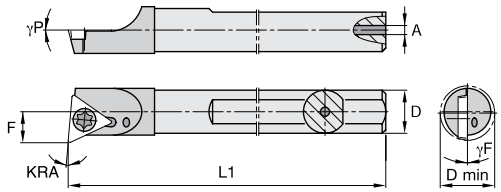


NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert
right hand												
2830430	**FSBI20350015R**	-5	.500	.275	.203	.126	3.000	1.000	.040	0.0°	5.0°	TD..130805
2830405	**FSBI20350055R**	-5	.500	.275	.203	.126	3.000	.500	.040	0.0°	5.0°	TD..130805
2830335	**FSBI2505001255R**	-5	.500	.296	.259	.156	3.000	1.250	.040	0.0°	5.0°	TD..130805
2830312	**FSBI250500755R**	-5	.500	.296	.259	.156	3.000	.750	.040	0.0°	5.0°	TD..130805
2830245	**FSBI312500155R**	-5	.500	.358	.321	.187	3.000	1.500	.060	0.0°	5.0°	TD..130805
2830212	**FSBI31250015R**	-5	.500	.358	.321	.187	3.000	1.000	.060	0.0°	5.0°	TD..130805
2830380	**FSBI20362555R**	-5	.625	.275	.203	.126	4.000	.500	.040	0.0°	5.0°	TD..130805
2830284	**FSBI250625755R**	-5	.625	.296	.259	.156	4.000	.750	.040	0.0°	5.0°	TD..130805
2830189	**FSBI312625155R**	-5	.625	.358	.321	.187	4.000	1.500	.060	0.0°	5.0°	TD..130805
2830185	**FSBI31262515R**	-5	.625	.358	.321	.187	4.000	1.000	.060	0.0°	5.0°	TD..130805
2830417	**FSBI20350050R**	0	.500	.275	.203	.134	3.000	.500	.040	0.0°	5.0°	TD..130805
2830329	**FSBI250500750R**	0	.500	.296	.259	.156	3.000	.750	.040	0.0°	5.0°	TD..130805
left hand												
2830324	**FSBI250500755L**	-5	.500	.296	.259	.156	3.000	.750	.040	0.0°	5.0°	TD..130805
3383045	**FSBI2506251250L**	0	.625	.296	.259	.156	4.000	1.250	.040	0.0°	5.0°	TD..130805

FCBI



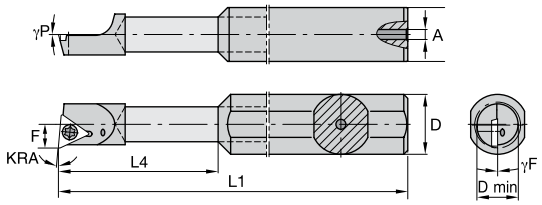


NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2830020	**FCBI18745R**	-5	.188	.275	.126	4.000	.040	0.0°	5.0°	TD..130805
2829995	**FCBI18765R**	-5	.188	.275	.126	6.000	.040	0.0°	5.0°	TD..130805
2829897	**FCBI25045R**	-5	.250	.296	.156	4.000	.047	0.0°	5.0°	TD..130805
2829764	**FCBI31265R**	-5	.312	.358	.187	6.000	.093	0.0°	5.0°	TD..130805
2829881	**FCBI25065R**	-5	.250	.296	.156	6.000	.047	0.0°	5.0°	TDHB130805
2829787	**FCBI31245R**	-5	.312	.358	.187	4.000	.093	0.0°	5.0°	TDHB130805
2830032	**FCBI18740R**	0	.188	.275	.134	4.000	.040	0.0°	5.0°	TD..130805
2829908	**FCBI25040R**	0	.250	.296	.156	4.000	.047	0.0°	5.0°	TD..130805
2829892	**FCBI25060R**	0	.250	.296	.156	6.000	.047	0.0°	5.0°	TD..130805
2829799	**FCBI31240R**	0	.313	.358	.187	4.000	.093	0.0°	5.0°	TD..130805
2829777	**FCBI31260R**	0	.313	.358	.187	6.000	.093	0.0°	5.0°	TD..130805
left hand										
2830027	**FCBI18745L**	-5	.187	.275	.126	4.000	.040	0.0°	5.0°	TD..130805
2829903	**FCBI25045L**	-5	.250	.296	.156	4.000	.047	0.0°	5.0°	TD..130805
2829793	**FCBI31245L**	-5	.312	.358	.187	4.000	.093	0.0°	5.0°	TD..130805
2829770	**FCBI31265L**	-5	.312	.358	.187	6.000	.093	0.0°	5.0°	TD..130805

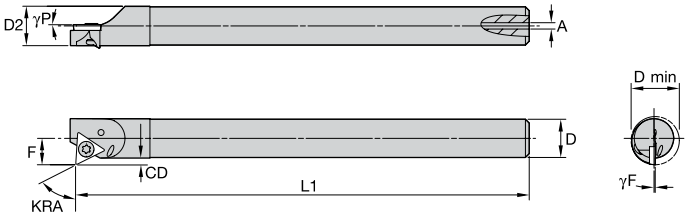
FCBI • STEPPED



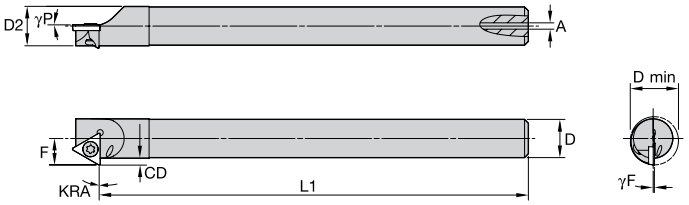


order number	catalog number	KRA	D	D min	F	L1	L4	A	γF°	γP°	gage insert
right hand											
2829979	**FCBI20350015R**	-5	.500	.275	.126	2.500	1.000	.125	0.0°	5.0°	TD..130805
2829857	**FCBI2505001255R**	-5	.500	.296	.156	2.750	1.250	.250	0.0°	5.0°	TD..130805
2829740	**FCBI312500155R**	-5	.500	.358	.187	3.000	1.500	.125	0.0°	5.0°	TD..130805
2829942	**FCBI20362515R**	-5	.625	.275	.126	3.500	1.000	.125	0.0°	5.0°	TD..130805
2829828	**FCBI2506251255R**	-5	.625	.296	.156	3.750	1.250	.250	0.0°	5.0°	TD..130805
2829704	**FCBI312625155R**	-5	.625	.358	.187	4.000	1.500	.125	0.0°	5.0°	TD..130805
2829751	**FCBI312500150R**	0	.500	.358	.187	3.000	1.500	.125	0.0°	5.0°	TD..130805
left hand											
2829835	**FCBI2506251255L**	-5	.625	.296	.156	3.750	1.250	.125	0.0°	5.0°	TD..130805

FSRI



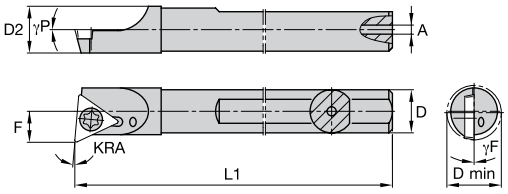
NOTE: KRA shown as 60°.



NOTE: KRA shown as 0°.

order number	catalog number	KRA	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert
right hand												
2830138	**FSRI312350R**	0	.313	.394	.322	.223	3.500	.062	.040	0.0°	0.0°	TD..130805
2830120	**FSRI3123560R**	30	.313	.407	.322	.236	3.500	.075	.040	0.0°	0.0°	TD..130805

QSBI

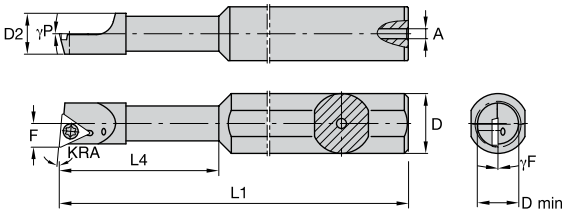


NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2825910	**QSBI37555R**	-5	.375	.438	.385	.221	5.000	.125	0.0°	5.0°	TP..21505
2825774	**QSBI50065R**	-5	.500	.563	.510	.296	6.000	.156	0.0°	5.0°	TP..21505
2825923	**QSBI37550R**	0	.375	.438	.385	.221	5.000	.125	0.0°	5.0°	TP..21505
2825788	**QSBI50060R**	0	.500	.563	.510	.296	6.000	.156	0.0°	5.0°	TP..21505
left hand											
2825917	**QSBI37555L**	-5	.375	.438	.385	.221	5.000	.125	0.0°	5.0°	TP..21505
2825781	**QSBI50065L**	-5	.500	.563	.510	.296	6.000	.156	0.0°	5.0°	TP..21505

QSBI • STEPPED

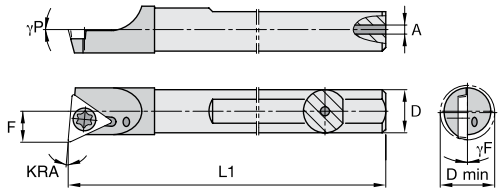




NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert
right hand												
2825884	**QSBI37550011255R**	-5	.500	.438	.390	.221	3.750	1.125	.080	0.0°	5.0°	TP..21505
2825854	**QSBI37550018755R**	-5	.500	.438	.390	.221	3.750	1.875	.080	0.0°	5.0°	TP..21505
2825832	**QSBI37562511255R**	-5	.625	.438	.390	.221	4.250	1.125	.080	0.0°	5.0°	TP..21505
2825816	**QSBI37562518755R**	-5	.625	.438	.390	.221	4.250	1.875	.080	0.0°	5.0°	TP..21505
2825753	**QSBI500625155R**	-5	.625	.563	.510	.296	4.250	1.500	.156	0.0°	5.0°	TP..21505
2825801	**QSBI375750155R**	-5	.750	.438	.390	.221	4.000	1.500	.080	0.0°	5.0°	TP..21505
2825720	**QSBI625750255R**	-5	.750	.688	.625	.353	4.500	2.500	.098	0.0°	5.0°	TP..21505
2825897	**QSBI37550011250R**	0	.500	.438	.390	.221	3.750	1.125	.080	0.0°	5.0°	TP..21505
left hand												
2825760	**QSBI500625155L**	-5	.625	.563	.510	.296	4.250	1.500	.156	0.0°	5.0°	TP..21505
3783153	**QSBI500625255L**	-5	.625	.563	.510	.296	4.250	2.500	.156	0.0°	5.0°	TP..21505

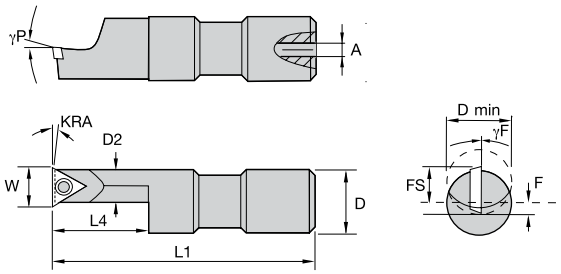
QCBI



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2825290	**QCBI37565R**	-5	.375	.438	.228	6.000	.125	0.0°	5.0°	TP..21505
2825265	**QCBI375105R**	-5	.375	.438	.228	10.000	.125	0.0°	5.0°	TP..21505
2825272	**QCBI50085R**	-5	.500	.563	.296	8.000	.188	0.0°	5.0°	TP..21505
2825232	**QCBI500105R**	-5	.500	.563	.296	10.000	.188	0.0°	5.0°	TP..21505
2825304	**QCBI37560R**	0	.375	.438	.228	6.000	.125	0.0°	5.0°	TP..21505
2825285	**QCBI50080R**	0	.500	.563	.296	8.000	.188	0.0°	5.0°	TP..21505
left hand										
2825297	**QCBI37565L**	-5	.375	.438	.228	6.000	.125	0.0°	5.0°	TP..21505
2825278	**QCBI50085L**	-5	.500	.563	.296	8.000	.188	0.0°	5.0°	TP..21505

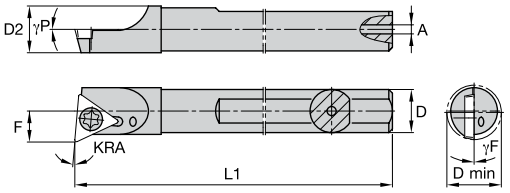
QSOI



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	L4	FS	W	A	γF°	γP°	gage insert
right hand														
2825640	**QSOI375750155R**	-5	.750	.750	.375	.023	3.750	1.500	—	—	.080	0.0°	5.0°	TP..21505
2825660	**QSOI3126251250R**	0	.625	.606	.312	.055	3.125	1.250	.156	.422	.060	0.0°	5.0°	TP..21505
2825647	**QSOI375750150R**	0	.750	.750	.375	.024	3.750	1.500	.188	.423	.080	0.0°	5.0°	TP..21505

SSBI

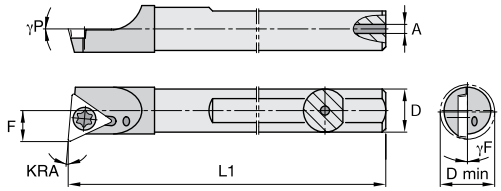


NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2823053	**SSBI500255R**	-5	.500	.668	.572	.339	2.500	.156	0.0°	5.0°	TP..3205
2823025	**SSBI50065R**	-5	.500	.668	.572	.339	6.000	.156	0.0°	5.0°	TP..3205
2822980	**SSBI62545R**	-5	.625	.720	.635	.393	4.000	.156	0.0°	5.0°	TP..3205
2822947	**SSBI62575R**	-5	.625	.720	.635	.393	7.000	.156	0.0°	5.0°	TP..3205
2822921	**SSBI75045R**	-5	.750	.850	.760	.460	4.000	.156	0.0°	5.0°	TP..3205
2822898	**SSBI75085R**	-5	.750	.850	.760	.460	8.000	.156	0.0°	5.0°	TP..3205
2823121	**SSBI1000105R**	-5	1.000	1.100	1.010	.585	10.000	.250	0.0°	5.0°	TP..3205
2823096	**SSBI100055R**	-5	1.000	1.100	1.010	.585	5.000	.250	0.0°	5.0°	TP..3205
2822935	**SSBI75040R**	0	.750	.850	.760	.460	4.000	.156	0.0°	5.0°	TP..3205
left hand											
2823032	**SSBI50065L**	-5	.500	.668	.572	.339	6.000	.156	0.0°	5.0°	TP..3205
2822987	**SSBI62545L**	-5	.625	.720	.635	.393	4.000	.156	0.0°	5.0°	TP..3205
2822954	**SSBI62575L**	-5	.625	.720	.635	.393	7.000	.156	0.0°	5.0°	TP..3205
2822901	**SSBI75085L**	-5	.750	.850	.760	.460	8.000	.156	0.0°	5.0°	TP..3205

SCBI

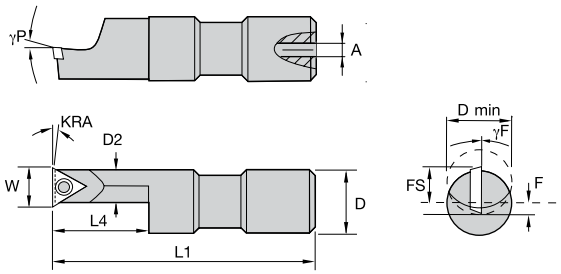




NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2822500	**SCBI62565R**	-5	.625	.720	.393	6.000	.218	0.0°	5.0°	TP..3205
2822515	**SCBI625105R**	-5	.625	.720	.393	10.000	.218	0.0°	5.0°	TP..3205
2822454	**SCBI75065R**	-5	.750	.850	.460	6.000	.281	0.0°	5.0°	TP..3205
2822479	**SCBI750105R**	-5	.750	.850	.460	10.000	.281	0.0°	5.0°	TP..3205
2822561	**SCBI1000125R**	-5	1.000	1.100	.585	12.000	.312	0.0°	5.0°	TP..3205
left hand										
2822503	**SCBI62565L**	-5	.625	.720	.393	6.000	.218	0.0°	5.0°	TP..3205
2822460	**SCBI75065L**	-5	.750	.850	.460	6.000	.281	0.0°	5.0°	TP..3205

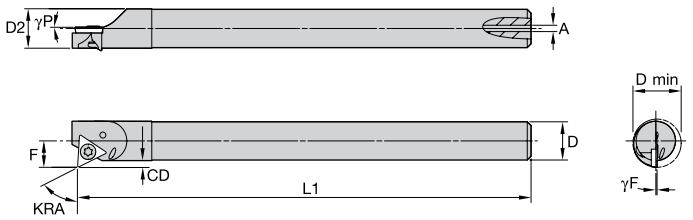
SSOI



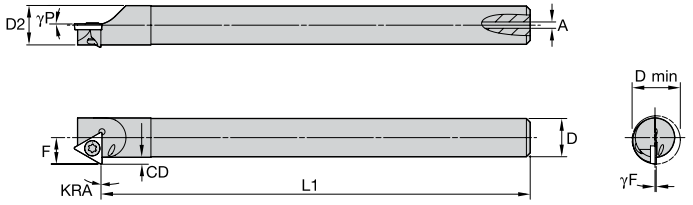
NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	L1	L4	FS	W	A	γF°	γP°	gage insert
right hand														
2822843	**SSOI5001000255R**	-5	1.000	.969	.500	.070	4.750	2.500	—	—	.118	0.0°	5.0°	TP..3205
2822857	**SSOI5001000150R**	0	1.000	.969	.500	.070	3.750	1.500	.250	.640	.118	0.0°	5.0°	TP..3205
2822850	**SSOI5001000250R**	0	1.000	.969	.500	.070	4.750	2.500	.250	.640	.118	0.0°	5.0°	TP..3205

QSRI



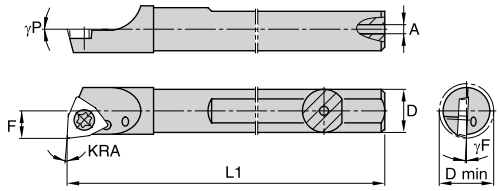
NOTE: KRA shown as 60°.



NOTE: KRA shown as 0°.

order number	catalog number	KRA	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert
right hand												
2825633	**QSRI375450R**	0	.375	.492	.370	.287	4.500	.102	.125	0.0°	0.0°	TP..21505
2825605	**QSRI50050R**	0	.500	.645	.510	.380	5.000	.125	.156	0.0°	0.0°	TP..21505
2825614	**QSRI375560R**	30	.375	.525	.390	.320	5.000	.125	.125	0.0°	0.0°	TP..21505
2825587	**QSRI500660R**	30	.500	.645	.510	.380	6.000	.125	.156	0.0°	0.0°	TP..21505
2825621	**QSRI375545R**	45	.375	.525	.390	.320	5.000	.125	.125	0.0°	0.0°	TP..21505
2825594	**QSRI500645R**	45	.500	.645	.510	.380	6.000	.125	.156	0.0°	0.0°	TP..21505

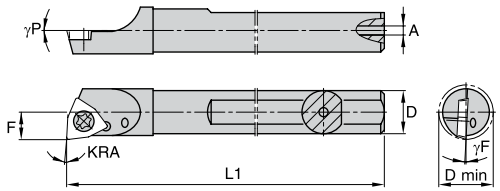
GSBIW



NOTE: KRA shown as -3°.

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2828170	**GSBIW18743R**	-3	.188	.260	.228	.126	4.000	.040	-3.0°	0.0°	WP..1511
2828161	**GSBIW25043R**	-3	.250	.285	.260	.142	4.000	.040	-3.0°	0.0°	WP..1511
2828145	**GSBIW31243R**	-3	.313	.347	.322	.174	4.000	.040	-3.0°	0.0°	WP..1511

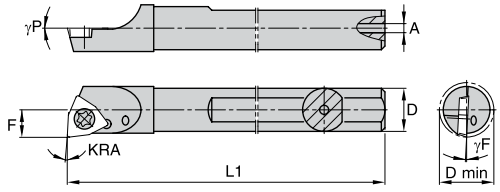
QSBIW



NOTE: KRA shown as -3°.

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2825364	**QSBIW37553R**	-3	.375	.413	.385	.211	5.000	.093	-3.0°	0.0°	WP..2151
2825351	**QSBIW50063R**	-3	.500	.538	.510	.272	6.000	.156	-3.0°	0.0°	WP..2151

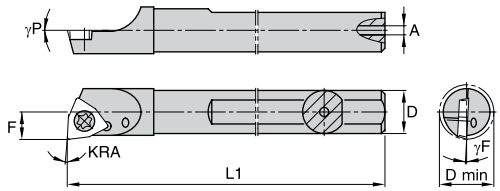
SSBIW



NOTE: KRA shown as -3°.

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2823167	**SSBIW62573R**	-3	.625	.673	.635	.345	7.000	.156	-3.0°	0.0°	WP..3251
2823155	**SSBIW75083R**	-3	.750	.797	.760	.407	8.000	.156	-3.0°	0.0°	WP..321

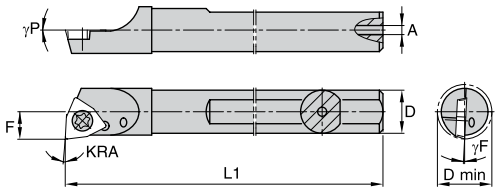
SCBIW



NOTE: KRA shown as -3°.

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2822603	**SCBIW625103R**	-3	.625	.673	.345	10.000	.218	-3.0°	0.0°	WP..3251
2822591	**SCBIW750103R**	-3	.750	.797	.407	10.000	.281	-3.0°	0.0°	WP..321

QCBIW

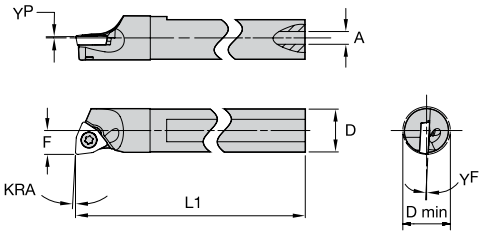


NOTE: KRA shown as -3°.

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2825335	**QCBIW37563R**	-3	.375	.413	.211	6.000	.125	-3.0°	0.0°	WP..2151
2825324	**QCBIW50083R**	-3	.500	.538	.273	8.000	.188	0.0°	0.0°	WP..2151
left hand										
2825327	**QCBIW37563L**	-3	.375	.413	.211	6.000	.125	-3.0°	0.0°	WP..2151
2825318	**QCBIW50083L**	-3	.500	.538	.273	8.000	.188	0.0°	0.0°	WP..2151

GCBIW

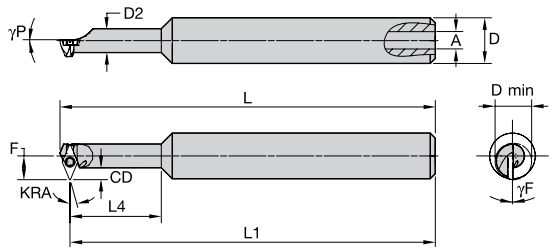




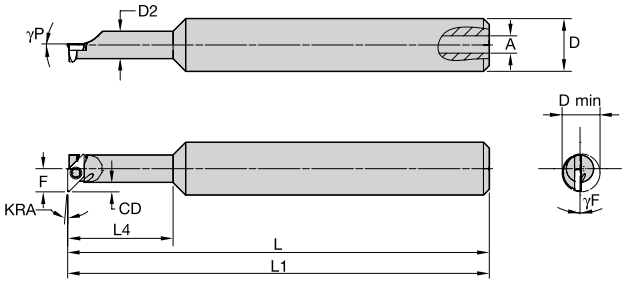
NOTE: KRA shown as -3°.

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2827756	**GCBIW18763R**	-3	.188	.260	.126	6.000	.040	-3.0°	0.0°	WP..1511
2827743	**GCBIW25063R**	-3	.250	.285	.143	6.000	.047	-3.0°	0.0°	WP..1511
2827734	**GCBIW31263R**	-3	.312	.347	.174	6.000	.093	-3.0°	0.0°	WP..1511
left hand										
2827727	**GCBIW31263L**	-3	.312	.347	.174	6.000	.093	-3.0°	0.0°	WP..1511

CSPI



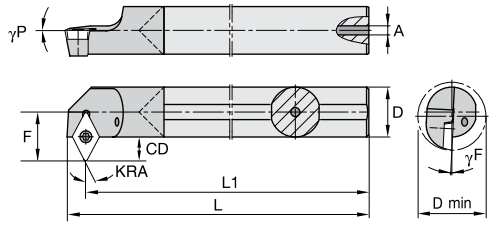
NOTE: KRA shown as 22.5°.



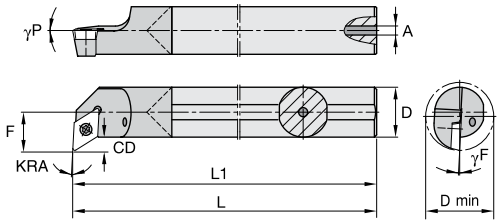
NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	CD	L	L1	L4	A	γF°	γP°	gage insert
right hand														
2832344	**CSPI25050015R**	-5.0	.500	.360	.260	.220	.090	4.000	4.000	1.000	.040	0.0°	0.0°	GP..12105
2832334	**CSPI3125001255R**	-5.0	.500	.423	.323	.251	.090	4.000	4.000	1.250	.040	0.0°	0.0°	GP..12105
2832297	**CSPI25050010R**	.0	.500	.360	.260	.220	.090	4.000	4.000	1.000	.040	0.0°	0.0°	GPHW12105
2832319	**CSPI2505001225R**	22.5	.500	.400	.260	.260	.130	4.080	4.000	1.000	.040	0.0°	0.0°	GP..12105
left hand														
2832326	**CSPI3125001255L**	-5.0	.500	.423	.323	.251	.090	4.000	4.000	1.250	.040	0.0°	0.0°	GP..12105

CCPI



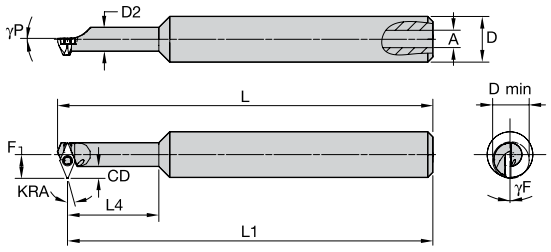
NOTE: KRA shown as 22.5°.



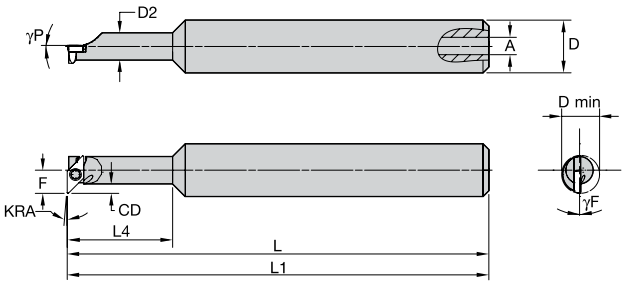
NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	F	CD	L	L1	A	γF°	γP°	gage insert
right hand												
2831774	**CCPI25065R**	-5.0	.250	.360	.220	.091	6.000	6.000	.047	0.0°	0.0°	GP..12105
2831762	**CCPI31265R**	-5.0	.313	.423	.251	.091	6.000	6.000	.093	0.0°	0.0°	GP..12105
2831727	**CCPI25060R**	.0	.250	.360	.220	.091	6.000	6.000	.047	0.0°	0.0°	GP..12105
2831739	**CCPI3126225R**	22.5	.313	.448	.276	.116	6.101	6.000	.093	0.0°	0.0°	GP..12105
left hand												
2831767	**CCPI25065L**	-5.0	.250	.360	.220	.091	6.000	6.000	.047	0.0°	0.0°	GP..12105

GSPI



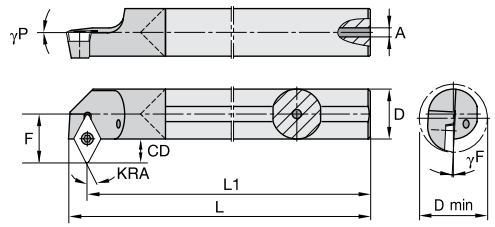
NOTE: KRA shown as 22.5°.



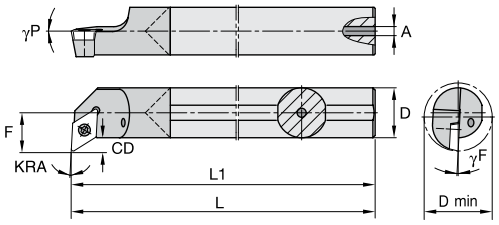
NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	D2	F	CD	L	L1	L4	A	γF°	γP°	gage insert
right hand														
2828281	**GSPI375625155R**	-5.0	.625	.515	.385	.312	.120	4.500	4.500	1.500	.098	0.0°	0.0°	GC..151505
2828269	**GSPI50075025R**	-5.0	.750	.630	.510	.374	.119	5.000	5.000	2.000	.098	0.0°	0.0°	GC..151505
2828203	**GSPI50075020R**	.0	.750	.630	.510	.374	.119	5.000	5.000	2.000	.098	0.0°	0.0°	GC..151505
2828310	**GSPI3562515225R**	22.5	.625	.540	.385	.338	.146	4.134	4.000	1.500	.098	0.0°	0.0°	GC..151505
left hand														
2828275	**GSPI375625155L**	-5.0	.625	.515	.385	.312	.120	4.500	4.500	1.500	.098	0.0°	0.0°	GC..151505

GCPI



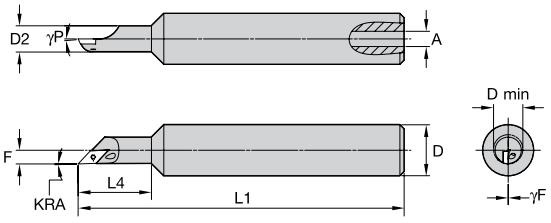
NOTE: KRA shown as 22.5°.



NOTE: KRA shown as -5°.

order number	catalog number	KRA	D	D min	F	CD	L	L1	A	γF°	γP°	gage insert
right hand												
2827811	GCPI50085R	-5.0	.500	.640	.374	.120	8.000	8.000	.188	0.0°	0.0°	GC..151505
2827800	GCPI625105R	-5.0	.625	.765	.437	.121	10.000	10.000	.218	0.0°	0.0°	GC..151505
2827775	GCPI37560R	.0	.375	.515	.312	.121	6.000	6.000	.125	0.0°	0.0°	GC..151505
2827825	GCPI37565R	.0	.375	.515	.312	.121	6.000	6.000	.125	0.0°	0.0°	GC..151505
2827767	GCPI50080R	.0	.500	.640	.374	.120	8.000	8.000	.188	0.0°	0.0°	GC..151505
2827845	GCPI3756225R	22.5	.375	5.400	.338	.147	6.134	6.000	.125	0.0°	0.0°	GC..151505

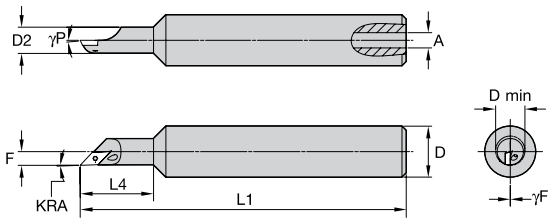
CTPI



NOTE: KRA shown as -2°.

order number	catalog number	KRA	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert
right hand												
2828101	CTPI32262590647R	-2.0	.625	.339	.322	.168	4.000	.900	.187	0.0°	0.0°	GP..12105

GTPI



NOTE: KRA shown as -2°.

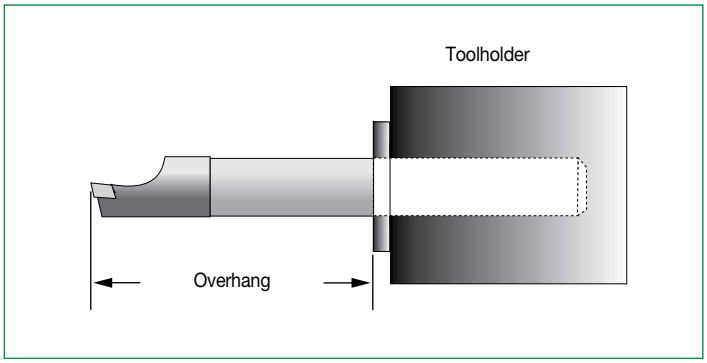
order number	catalog number	KRA	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert
right hand												
2828184	GTPI37562590647R	-2.0	.625	.625	.375	.236	4.000	.900	.187	0.0°	-3.0°	GC..151505

Setup Recommendations

Setup Recommendations for Bar Overhang

WIDIA-CIRCLE™ cutting tools are the finest quality boring, grooving, profiling, and threading tools available. For more than 50 years, WIDIA-CIRCLE has been the industry leader in solving small-diameter hole machining problems in major manufacturing plants worldwide.

A common problem associated with any cutting tool is extending the tool beyond its support point. This condition of excessive overhang can cause chatter, poor finishes, or inadequate tool life.



We recommend a 4:1 ratio (4 times bar diameter) overhang when using steel shank bars and up to a 10:1 (10 times bar diameter) overhang when using carbide shank bars. The overhang ratios are affected by many factors:

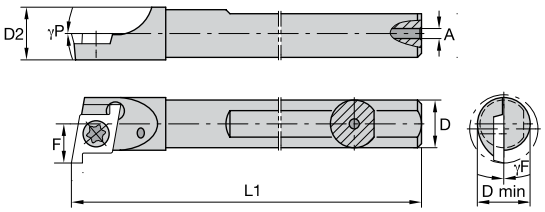
- Type(s) of material(s) being machined.
- Depth of cut(s).
- Feed rate(s).

Recommended conditions may still be unsatisfactory because of chatter. Chatter can be induced by non-rigid setups or harmonics from the machine or machining conditions. In many cases, changing the RPM of the machine can reduce chatter.

shank diameter (inch)	steel shank ratio 4:1 (inch)	carbide shank ratio 10:1 (inch)
0.156"	0.625"	1.560"
0.187"	0.748"	1.187"
0.250"	1.000"	2.500"
0.375"	1.500"	3.750"
0.500"	2.000"	5.000"
0.625"	2.500"	6.250"
0.750"	3.000"	7.500"
0.875"	3.500"	8.750"
1.000"	4.000"	10.000"
1.250"	5.000"	12.500"

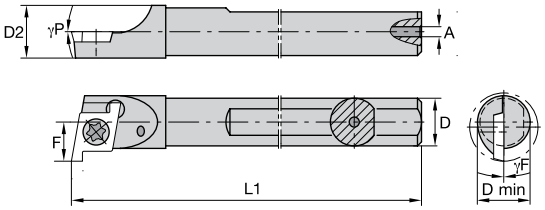
shank diameter (mm)	steel shank ratio 4:1 (mm)	carbide shank ratio 10:1 (mm)
4,00mm	16,00mm	40,00mm
5,00mm	20,00mm	50,00mm
6,00mm	24,00mm	60,00mm
8,00mm	32,00mm	80,00mm
10,00mm	40,00mm	100,00mm
12,00mm	48,00mm	120,00mm
16,00mm	64,00mm	160,00mm
20,00mm	80,00mm	200,00mm
25,00mm	100,00mm	250,00mm
32,00mm	128,00mm	320,00mm

CSMI



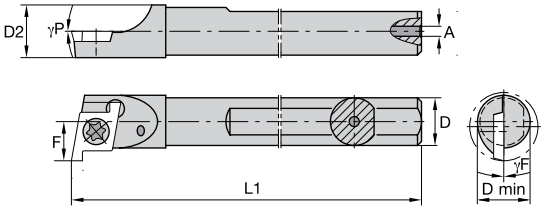
order number	catalog number	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand										
2832353	**CSMI187250R**	.188	.272	.219	.154	2.500	.040	0.0°	0.0°	CD.5..
2832348	**CSMI25030R**	.250	.312	.260	.175	3.000	.040	0.0°	0.0°	CD.5..

CCMI



order number	catalog number	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand										
2831841	**CCMI18740R**	.187	.272	.208	.154	4.000	.040	0.0°	0.0°	CD.5..
2831838	**CCMI25040R**	.250	.312	.258	.175	4.000	.047	0.0°	0.0°	CD.5..

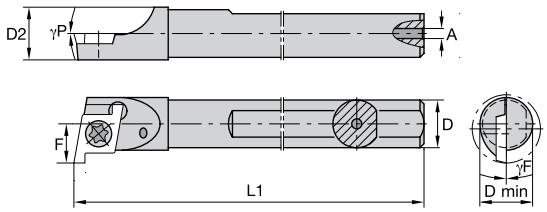
QSMI



order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert
right hand											
2825394	**QSMI62565R**	-5	.625	.670	.635	.343	6.000	.156	0.0°	0.0°	CP..2....
2825464	**QSMI37545R**	0	.375	.481	.385	.278	3.997	.125	0.0°	0.0°	CP..2....
2825455	**QSMI50055R**	0	.500	.605	.510	.340	4.997	.156	0.0°	0.0°	CP..2....
left hand											
2825457	**QSMI37545L**	0	.375	.481	.385	.278	3.997	.125	0.0°	0.0°	CP..2....

NOTE: D min and F calculated using the CPG grooving-style insert.
Refer to insert design for cutting depth, cutting width, and blind hole limitations.

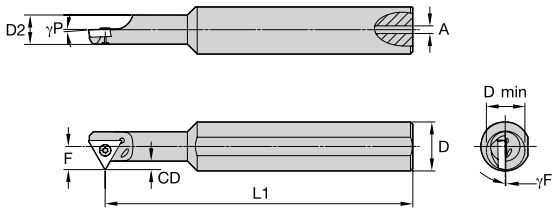
QCMI



order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2825117	**QCMI37565R**	-5	.375	.420	.218	6.000	.125	0.0°	0.0°	CPHB21205
2825105	**QCMI50085R**	-5	.500	.545	.280	8.000	.188	0.0°	0.0°	CP..21205
left hand										
2825112	**QCMI37565L**	-5	.375	.420	.218	6.000	.125	0.0°	0.0°	CP..2..

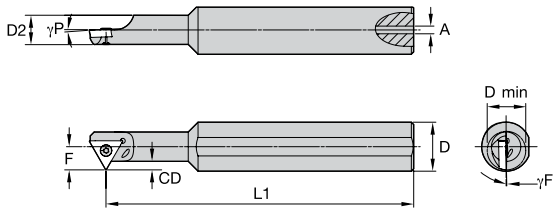
NOTE: F calculated using the CPG-style insert.
Refer to insert design for cutting depth, cutting width, and blind hole limitations.

FSII



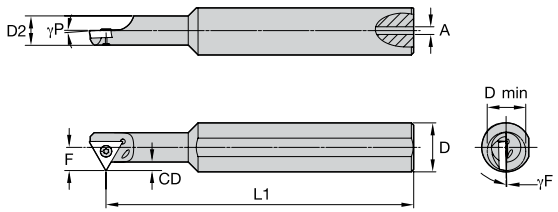
order number	catalog number	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert
right hand											
2830177	**FSII25062512560R**	.625	.322	.250	.155	4.000	.060	.040	0.0°	-2.0°	TB..1308X0
2830171	**FSII2506257560R**	.625	.322	.250	.155	4.000	.060	.040	0.0°	-2.0°	TB..1308X0

QSII



order number	catalog number	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert
right hand											
2825707	**QSII375625187560R**	.625	.468	.375	.234	4.000	.093	.098	0.0°	-2.0°	TB..2150
2825693	**QSII375625112560R**	.625	.478	.375	.234	4.000	.093	.098	0.0°	-2.0°	TB..2150
2825679	**QSII5006251560R**	.625	.603	.501	.297	4.000	.093	.098	0.0°	-2.0°	TB..2150

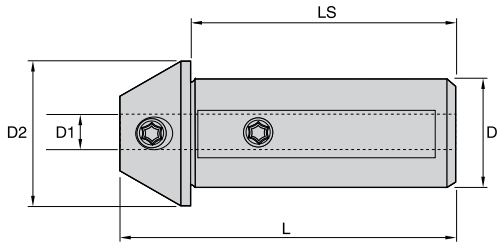
SSII



order number	catalog number	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert
right hand											
2822864	**SSII750860R**	.750	.935	.760	.548	8.000	.168	.156	0.0°	-2.0°	TP..3205

CSI





order number	catalog number	D1	D	D2	LS	L
2832898	CSI750187	.188	.750	1.100	2.000	2.500
2832795	CSI1000187	.188	1.000	1.100	2.000	2.500
2832893	CSI750250	.250	.750	1.100	2.000	2.500
2832790	CSI1000250	.250	1.000	1.100	2.000	2.500
2832885	CSI750312	.313	.750	1.100	2.000	2.500
2832785	CSI1000312	.313	1.000	1.100	2.000	2.500
2832844	CSI625375	.375	.625	1.100	2.000	2.500
2832879	CSI750375	.375	.750	1.100	2.000	2.500
2832780	CSI1000375	.375	1.000	1.100	2.000	2.500
2832874	CSI750500	.500	.750	1.100	2.000	2.500
2832775	CSI1000500	.500	1.000	1.100	2.000	2.500



widia.com

WIDIA™

WGC™

Grooving and Cut-Off

The most versatile tool in the market for grooving, profiling, and cut-off operations.



4 BENEFITS IN 1

VERSATILITY

Single-sided versatile grooving, cut-off, and profiling solution for all materials.

STABILITY

Secure seating and clamping for reliability in demanding groove-turn applications.

PRODUCTIVITY

Higher speeds and feeds due to better chip evacuation and low cutting forces. Optimized chip breaker design and through coolant capability.

SIMPLICITY

Easy to select and apply for all grooving, cut-off, and profiling applications.

GROOVING

PRECISION MOLDED AND GROUND



P M N S

PT-Positive Rake

PRECISION MOLDED



P M K H

PN-Negative Rake

CUT-OFF

PRECISION MOLDED AND GROUND



P M N S

F-Fine

PRECISION MOLDED



P K

M-Medium



P M

R-Rough

PROFILING

PRECISION GROUND



P M N S

PC-Full Radius

NOTE: Use the NOVO™ software to select appropriate tooholder and insert.

WIDIA GROOVING AND CUT-OFF

INSERTS

APPLICATION	TYPES	GROOVE WIDTH	INSERT GEOMETRY	MATERIALS
GROOVING		2.00–10.13mm (0.084–0.399")	PT-Positive Rake	P M K N S
			PN-Negative Rake	P M K S
CUT-OFF		1.4–8.0mm (0.055–0.315")	F-Fine	P M K N S
			M-Medium	P M K S
			R-Rough	P M K S
PROFILING		2.0–8.0mm (0.079–0.315")	PC-Full Radius	P M K N S

APPLICATIONS



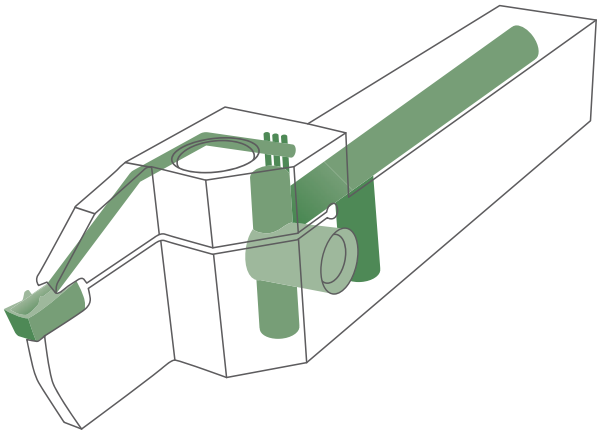
TURNING | PROFILING | FACING | CHAMFERING | GROOVING | CUT-OFF | DEEP GROOVING | THROUGH COOLANT

INDUSTRY

ENERGY

GENERAL ENGINEERING

TRANSPORTATION

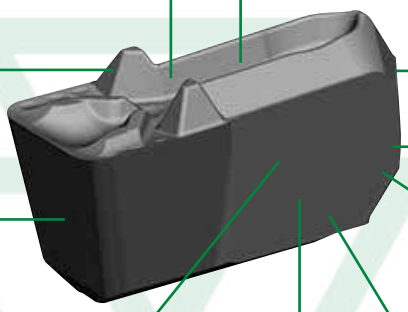


Grooving and Cut-Off • WGC

Proprietary negative chip geometry
Added chip control in steel, cast, stainless, and hardened materials.

Coolant channel on rake and pocket
Efficient coolant delivery for longer tool life and higher metal removal rates.

Single-ended design
Deeper grooving capability than typical double-ended systems.



Protective horns
Eliminate chip jamming and protect steel for reduced downtime and wear.

Proprietary V-back seating design
Provides high side-load stability comparable to longer double-ended inserts.

Positive back stop
Enables easy indexing.

Wide range of insert offering
1,4–10mm. PVD grades.

Strong V-style clamping
High stability for grooving, cut-off, side turning, deep grooving, face grooving, and profiling applications.

Enhanced body edge design
Improved seating stability.

Angle between top and bottom V
Creates a pull-in effect, securing the insert tighter in the pocket.

Industry-leading grade technologies
Proven performance in all materials.

Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

W	G	0312	M	03	U	02	PT
Family Name	Insert Type	Groove Width	Unit	Seat Size	Tolerance	Corner Radius	Chipbreaker/ Edge Condition
WGC	**G** = Square **R** = Full Radius	**Metric** = 1/100mm **Inch** = 1/1000"	**M** = Metric **I** = Inch		**U** = Precision Molded **P** = Precision Ground		**PT** = Groove-Turn Universal Positive **PN** = Groove-Turn Universal Negative

seat size (SSC)	groove width mm	groove width inch
1B	1,40	.055
1F	1,60–1,99	.063–.078
02	2,00–2,99	.079–.117
03	3,00–3,99	.118–.156
04	4,00–4,99	.157–.196
05	5,00–5,99	.197–.235
06	6,00–7,99	.236–.314
08	8,00–8,99	.315–.353
10	9,00–10,12	.354–.398

**.312" = seat size 08*

mm	
00	full radius
01	0,1
02	0,2
04	0,4
08	0,8
12	1,2

inch	
00	full radius
05	.008
1	.016
2	.032
3	.047

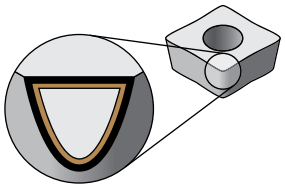
W	C	030	M	03	N	00	F	02
Family Name	Insert Type	Cutting Edge Width	Unit	Seat Size	Hand of Insert	Approach Angle	Chipbreaker	Corner Radius
WGC	**C** = Cut-Off		**M** = Metric **I** = Inch		**N** = Neutral **L** = Left hand **R** = Right hand	**00** = Neutral **06** = 6°	**F** = Cut-Off Low Feed **M** = Cut-Off Fine **R** = Cut-Off Rough	

	mm	inch
014	1,4	.055
020	2,0	.079
030	3,0	.118
040	4,0	.157
050	5,0	.197
060	6,0	.236
070	7,0	.279
080	8,0	.315

	mm	inch
1B	1,4	.055
1F	2,0	.079
02	3,0	.118
03	4,0	.157
04	5,0	.197
05	6,0	.236
06	7,0	.279
08	8,0	.315

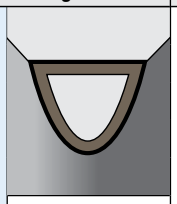
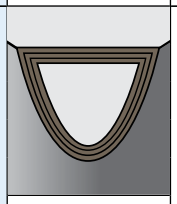
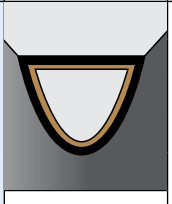
	mm	inch
01	0,1	.004
02	0,2	.008
04	0,4	.016

Grades and Grade Descriptions



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Coating	Grade Description	wear resistance ← → toughness: 05	10	15	20	25	30	35	40	45
WU10PT  –	**Composition:** An advanced multilayer PVD coating over a very deformation-resistant unalloyed carbide substrate. The new and improved coating improves edge stability with wide range speed and feed capabilities. **Application:** The WU10PT™ grade is ideal for finishing to general machining of most workpiece materials at a wide range of speed and feed capabilities. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys with improved edge toughness and higher cutting speed/feed capability.	P								
		M								
		K								
		N								
		S								
		H								
WU25PT  –	**Composition:** An advanced PVD-TiAlN-coated grade with a tough, ultra-fine grain, unalloyed substrate. **Application:** For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Speeds may vary from low to medium and will handle interruptions and high feed rates.	P								
		M								
		K								
		N								
		S								
		H								
WU35PT  –	**Composition:** A multilayer PVD-coated carbide grade with an advanced AlTiN-TiN coating over a super-tough substrate. **Application:** WU35PT is an excellent grade for machining stainless steels, all types of steels, super alloys in turning, and cut-off applications. The substrate provides improved toughness while the coating layers offer excellent abrasion resistance and dependability at a wide range of speeds and feeds. Improved edge toughness provides security in interrupted cuts.	P								
		M								
		S								

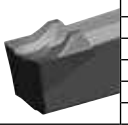
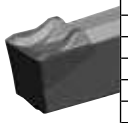
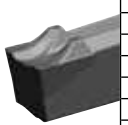
Plunge Feed Rates

● first choice
○ alternate choice

P	Steel	K	Cast Iron	S	High-Temp Alloys
M	Stainless Steel	N	Non-Ferrous	H	Hardened Materials

Chip Control	Description	Insert Geometry	Seat Size (SSC)	Corner Radius in (mm)	Starting Conditions in (mm)	Plunge Feed Rates inch/rev (mm/rev) .0020 (0,05)	.0040 (0,10)	.0060 (0,15)	.0080 (0,20)	.0100 (0,25)	.0120 (0,30)	.0140 (0,35)
-PT	Positive rake angle for lower cutting forces.		1F	.008 (0,2)	.0024 (0,06)	◆						
			2	.008 (0,2)	.0031 (0,08)	◆						
			3	.008 (0,2)	.0035 (0,09)	◆						
				.016 (0,4)	.0043 (0,11)	◆						
			4	.016 (0,4)	.0047 (0,12)	◆						
				.031 (0,8)	.0059 (0,15)		◆					
			5	.016 (0,4)	.0059 (0,15)		◆					
				.031 (0,8)	.0059 (0,16)		◆					
			6	.016 (0,4)	.0059 (0,15)		◆					
				.031 (0,8)	.0071 (0,18)		◆					
				.047 (1,2)	.0079 (0,20)			◆				
			8	.031 (0,8)	.0079 (0,20)			◆				
				.047 (1,2)	.0087 (0,22)				◆			
			10	.047 (1,2)	.0094 (0,24)					◆		
-PN	Stable negative cutting edge allowing for more aggressive applications.		1F	.008 (0,2)	.0024 (0,06)	◆						
			2	.008 (0,2)	.0031 (0,08)	◆						
			3	.008 (0,2)	.0035 (0,09)	◆						
				.016 (0,4)	.0043 (0,11)	◆						
			4	.016 (0,4)	.0047 (0,12)	◆						
				.031 (0,8)	.0059 (0,15)		◆					
			5	.016 (0,4)	.0059 (0,15)		◆					
				.031 (0,8)	.0059 (0,16)		◆					
			6	.016 (0,4)	.0059 (0,15)		◆					
				.031 (0,8)	.0071 (0,18)		◆					
				.047 (1,2)	.0079 (0,20)			◆				
			8	.031 (0,8)	.0079 (0,20)			◆				
				.047 (1,2)	.0087 (0,22)				◆			
			10	.047 (1,2)	.0094 (0,24)					◆		

Cut-Off Feed Rates

Chip Control	Description	Insert Geometry	Seat Size (SSC)	Starting Conditions in (mm)	Cut-Off Feed Rates inch/rev (mm/rev) .0020 (0,05)	.0040 (0,10)	.0060 (0,15)	.0080 (0,20)	.0100 (0,25)	.0120 (0,30)	.0140 (0,35)	.0160 (0,40)
-F	Positive geometry for reduced cutting forces.		1B	.0024 (0,06)	◆							
			2	.0028 (0,07)	◆							
			3	.0035 (0,09)		◆						
			4	.0043 (0,11)		◆						
			5	.0051 (0,13)			◆					
-M	Stable cutting edge for aggressive feed rates. Primarily in cast iron.		1B	.0024 (0,06)	◆							
			2	.0028 (0,07)	◆							
			3	.0035 (0,09)		◆						
			4	.0043 (0,11)		◆						
			5	.0055 (0,14)			◆					
			6	.0063 (0,16)			◆					
			8	.0067 (0,17)			◆					
-R	Most stable cutting edge for steel.		2	.0039 (0,10)		◆						
			3	.0055 (0,14)			◆					
			4	.0063 (0,16)			◆					
			5	.0075 (0,19)				◆				
			6	.0083 (0,21)					◆			
			8	.0090 (0,23)						◆		

NOTE: For cut-off inserts with a lead angle, maximum feed rate should be reduced by up to 40%.

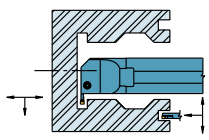
Maximum Feed Rate Values

Data above is for P and K material groups. **Maximum** feed rates should be adjusted by multiplying max feed rate values by following factors for shown material groups.

Material Group	Feed Factor
M	0.8
N	1.2
S	0.8
H	0.5

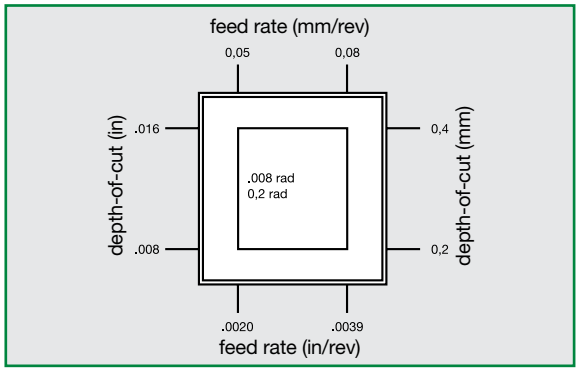
I.D. and Face Grooving

For I.D. and face grooving applications, reduce feed rate by 20%.

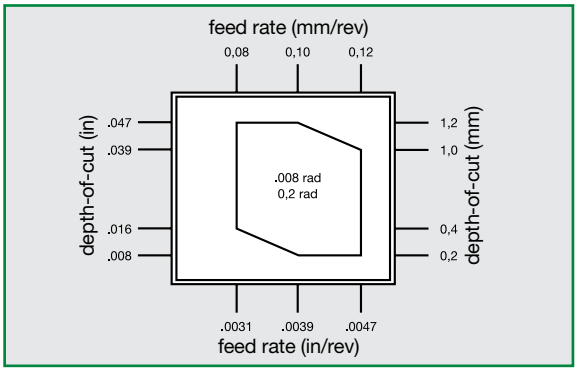


Turn and Profile Feed Rates

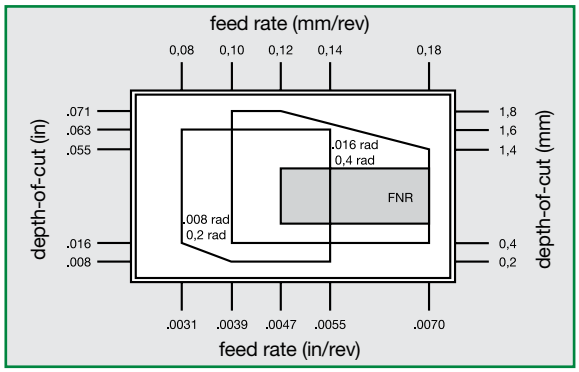
Seat Size 1F



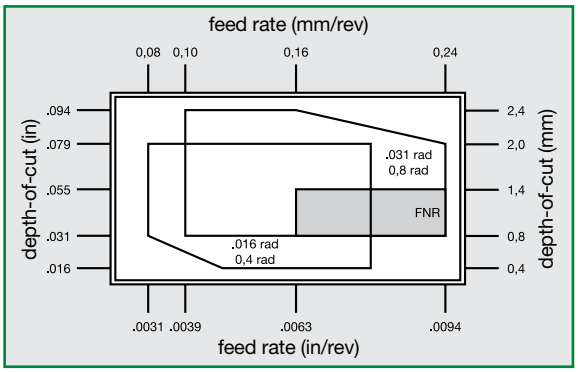
Seat Size 2



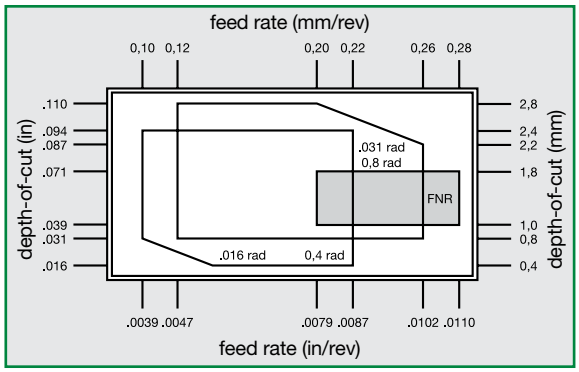
Seat Size 3



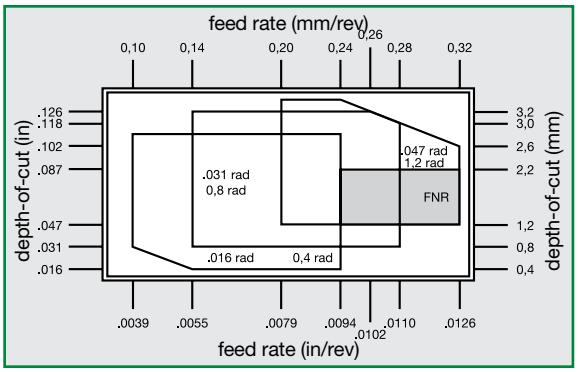
Seat Size 4



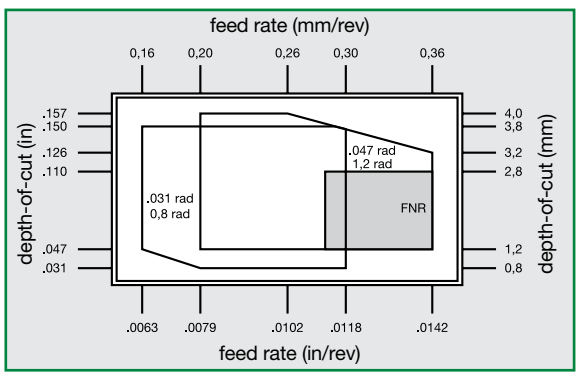
Seat Size 5



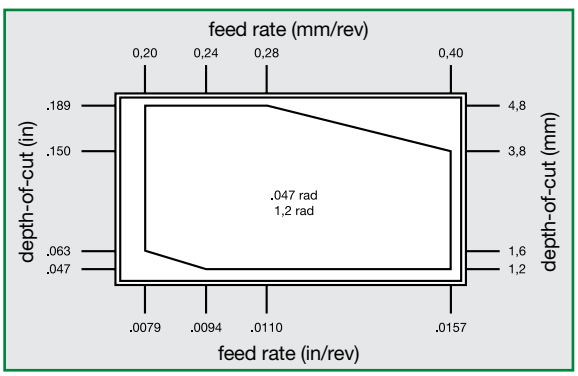
Seat Size 6



Seat Size 8



Seat Size 10



** FNR = Full Nose Radius*

Recommended Starting Speeds [SFM]

Material Group		WU10PT			WU25PT			WU35PT		
P	0-1	450	**450**	450	360	**740**	880	290	**590**	700
	2	450	**450**	450	360	**520**	880	290	**420**	510
	3	450	**450**	450	360	**410**	800	290	**330**	510
	4	250	**250**	250	200	**290**	540	160	**230**	350
	5	400	**400**	400	320	**530**	680	260	**420**	540
	6	350	**350**	350	280	**400**	600	220	**320**	480
M	1	450	**450**	450	300	**550**	800	250	**400**	450
	2	400	**400**	400	300	**500**	800	250	**350**	450
	3	400	**400**	400	300	**450**	700	250	**300**	450
K	1	400	**400**	400	320	**480**	760	–	**–**	–
	2	300	**300**	300	240	**400**	560	–	**–**	–
	3	200	**200**	200	160	**280**	400	–	**–**	–
N	1–2	500	**500**	500	400	**1440**	2560	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–
	4	400	**400**	400	320	**960**	1600	–	**–**	–
	5	300	**300**	300	240	**440**	640	–	**–**	–
	6	400	**400**	400	320	**560**	800	–	**–**	–
S	1	50	**50**	50	25	**125**	200	25	**125**	200
	2	50	**50**	50	25	**100**	250	25	**100**	200
	3	50	**50**	50	50	**125**	250	50	**125**	200
	4	50	**50**	50	25	**175**	350	50	**150**	300
H	1	100	**100**	100	–	**–**	–	–	**–**	–
	2	50	**50**	50	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–

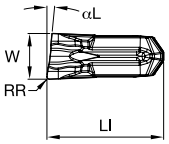
*NOTE: First choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

WGC Cut-Off Inserts • F Precision Molded • Metric

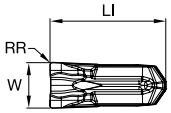

Left Hand


Neutral

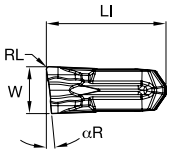

Right Hand



Left Hand



Neutral



Right Hand

● first choice
○ alternate choice

P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

		W		W tol ±		LI				RR		RL				
catalog number	SSC	mm	in	mm	in	mm	in	αR	αL	mm	in	mm	in	WU10PT	WU25PT	WU35PT
WC014M1BL06F01	1B	1,40	.055	0,050	.002	9,00	.355	–	6	0,15	.006	–	–	'	6470544	'
WC014M1BN00F01	1B	1,40	.055	0,050	.002	9,00	.355	–	–	0,15	.006	0,15	.006	'	6470545	'
WC014M1BR06F01	1B	1,40	.055	0,050	.002	9,02	.355	6	–	–	–	0,15	.006	'	6470546	'
WC020M02L06F02	2	2,00	.079	0,050	.002	9,00	.353	–	6	0,20	.008	–	–	'	6470547	'
WC020M02N00F02	2	2,00	.079	0,050	.002	9,00	.353	–	–	0,20	.008	0,20	.008	'	6470548	'
WC020M02R06F02	2	2,00	.079	0,050	.002	9,00	.353	6	–	–	–	0,20	.008	'	6470549	'
WC030M03L06F02	3	3,00	.118	0,075	.003	9,60	.378	–	6	0,20	.008	–	–	'	6470550	'
WC030M03N00F02	3	3,00	.118	0,075	.003	9,63	.379	–	–	0,20	.008	0,20	.008	'	6470561	'
WC030M03R06F02	3	3,00	.118	0,075	.003	9,60	.378	6	–	–	–	–	–	'	6470562	'
WC040M04L06F02	4	4,00	.157	0,075	.003	10,19	.401	–	6	0,20	.008	–	–	'	6470563	'
WC040M04N00F02	4	4,00	.157	0,075	.003	10,19	.401	–	–	0,20	.008	0,20	.008	'	6470564	'
WC040M04R06F02	4	4,00	.157	0,075	.003	10,19	.401	6	–	–	–	0,20	.008	'	6470565	'
WC050M05N00F03	5	5,00	.197	0,075	.003	12,24	.482	–	–	0,30	.012	0,30	.012	'	6470566	'

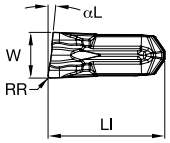
NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Cut-Off Inserts • F Precision Ground • Inch

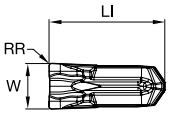

Left Hand


Neutral

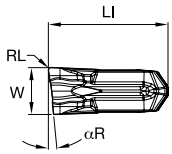

Right Hand



Left Hand



Neutral



Right Hand

● first choice
○ alternate choice

		W		W tol ±		LI				RR		RL					
catalog number	SSC	mm	in	mm	in	mm	in	αR	αL	mm	in	mm	in	WU10PT	WU25PT	WU35PT	
WC014M1BPR06F00	1B	1,40	.055	0,025	.001	9,00	.355	6	–	–	–	–	–	-	6686392	-	P ○ ● ●
WC014M1BPR12F00	1B	1,40	.055	0,025	.001	9,00	.355	12	–	–	–	–	–	-	6686394	-	M ● ● ●
WC094I02PL06F00	2	2,39	.094	0,025	.001	8,95	.352	–	6	–	–	–	–	-	6686395	-	K ○ ○
WC094I02PL12F00	2	2,39	.094	0,025	.001	8,95	.352	–	12	–	–	–	–	-	6686396	-	N ● ○
WC094I02PN00F00	2	2,39	.094	0,025	.001	8,95	.352	–	–	–	–	–	–	-	6686398	-	S ● ● ●
WC094I02PR06F00	2	2,39	.094	0,025	.001	8,95	.352	6	–	–	–	–	–	-	6686411	-	H ○
WC094I02PR12F00	2	2,39	.094	0,025	.001	8,95	.352	–	12	–	–	–	–	-	6686413	-	
WC094I02PL06F0	2	2,39	.094	0,025	.001	9,04	.360	–	6	0,10	.004	0,10	.004	-	-	6686474	
WC094I02PN00F0	2	2,39	.094	0,025	.001	9,04	.356	–	–	0,10	.004	0,10	.004	-	6686397	6686475	
WC094I02PN00F05	2	2,39	.094	0,025	.001	9,04	.356	–	–	0,20	.008	0,20	.008	6686067	6686399	-	
WC094I02PR06F0	2	2,39	.094	0,025	.001	9,04	.356	6	–	0,10	.004	0,10	.004	-	6686400	6686477	
WC094I02PR06F05	2	2,39	.094	0,025	.001	9,04	.356	6	–	0,20	.008	0,20	.008	6686082	6686412	-	

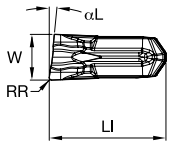
WGC Cut-Off Inserts • F Precision Ground • Inch

(continued)

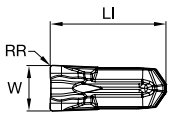

Left Hand


Neutral

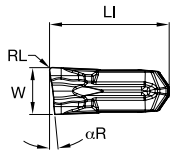

Right Hand



Left Hand



Neutral



Right Hand

● first choice
○ alternate choice

P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

		W		W tol ±		LI				RR		RL				
catalog number	SSC	mm	in	mm	in	mm	in	αR	αL	mm	in	mm	in	WU10PT	WU25PT	WU35PT
WC025M02PR06F01	2	2,50	.098	0,025	.001	9,04	.356	6	–	0,15	.006	0,15	.006	-	-	6686472
WC030M03PN00F02	3	3,00	.118	0,075	.003	9,63	.379	–	–	0,20	.008	0,20	.008	-	-	6686473
WC125I03PL06F00	3	3,18	.125	0,025	.001	9,48	.373	–	6	–	–	–	–	-	6686414	-
WC125I03PL12F00	3	3,18	.125	0,025	.001	9,48	.373	–	12	–	–	–	–	-	6686416	-
WC125I03PN00F00	3	3,18	.125	0,025	.001	9,48	.373	–	–	–	–	–	–	6686086	6686418	-
WC125I03PR06F00	3	3,18	.125	0,025	.001	9,48	.373	6	–	–	–	–	–	6686089	6686421	-
WC125I03PL06F0	3	3,18	.125	0,025	.001	9,63	.379	–	6	0,10	.004	0,10	.004	-	-	6686478
WC125I03PL06F05	3	3,18	.125	0,025	.001	9,63	.379	–	6	0,20	.008	0,20	.008	-	6686415	-
WC125I03PN00F0	3	3,18	.125	0,025	.001	9,63	.379	–	–	0,10	.004	0,10	.004	6686083	6686417	6686479
WC125I03PN00F05	3	3,18	.125	0,025	.001	9,63	.379	–	–	0,20	.008	0,20	.008	6686087	6686419	-
WC125I03PR06F0	3	3,18	.125	0,025	.001	9,63	.379	6	–	0,10	.004	0,10	.004	6686088	6686420	6686480
WC125I03PR06F05	3	3,18	.125	0,025	.001	9,63	.379	6	–	0,20	.008	0,20	.008	6686090	6686422	-

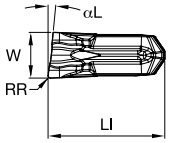
WGC Cut-Off Inserts • F Precision Ground • Inch

(continued)

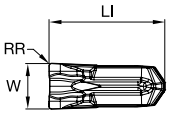

Left Hand


Neutral

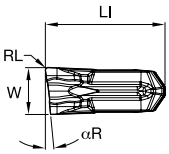

Right Hand



Left Hand



Neutral



Right Hand

● first choice
○ alternate choice

P		○	●	●												
M		●	●	●												
K		○	○													
N		●	○													
S		●	●	●												
H		○														

		W		W tol ±		LI				RR		RL				
catalog number	SSC	mm	in	mm	in	mm	in	αR	αL	mm	in	mm	in	WU10PT	WU25PT	WU35PT
WC125I03PR12F00	3	3,18	.125	0,025	.001	9,75	.373	12	–	–	–	–	–	▪	6686423	▪
WC040M04PR06F00	4	4,00	.158	0,025	.001	10,01	.394	6	–	–	–	–	–	▪	6686430	▪
WC040M04PR12F00	4	4,00	.158	0,025	.001	10,01	.394	12	–	–	–	–	–	▪	6686431	▪
WC188I04PR12F00	4	4,75	.187	0,025	.001	10,01	.394	12	–	–	–	–	–	▪	6686429	▪
WC188I04PR06F00	4	4,76	.188	0,025	.001	10,01	.394	6	–	–	–	–	–	6686102	6686427	▪
WC188I04PL06F00	4	4,76	.188	0,025	.001	10,02	.395	–	6	–	–	–	–	▪	6686424	▪
WC188I04PN00F00	4	4,76	.188	0,025	.001	10,02	.395	–	–	–	–	–	–	▪	6686425	▪
WC188I04PN00F05	4	4,76	.188	0,025	.001	10,16	.400	–	–	0,20	.008	0,20	.008	6686101	6686426	▪
WC188I04PR06F05	4	4,76	.188	0,025	.001	10,17	.400	6	–	0,20	.008	0,20	.008	▪	6686428	▪

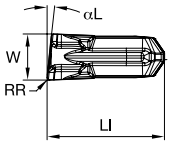
NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Cut-Off Inserts • M Precision Molded • Metric

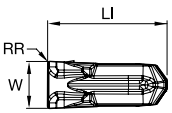

Left Hand


Neutral

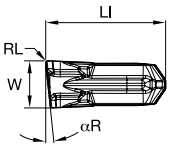

Right Hand



Left Hand



Neutral



Right Hand

● first choice
○ alternate choice

P		○	●	●												
M		●	●	●												
K		○	○													
N		●	○													
S		●	●	●												
H		○														

		W		W tol ±		LI				RR		RL				
catalog number	SSC	mm	in	mm	in	mm	in	αR	αL	mm	in	mm	in	WU10PT	WU25PT	WU35PT
WC014M1BL06M02	1B	1,40	.055	0,050	.002	9,02	.355	–	6	–	–	0,20	.008	▪	6461828	▪
WC014M1BN00M01	1B	1,40	.055	0,050	.002	9,01	.355	–	–	0,15	.006	0,15	.006	▪	6461829	▪
WC014M1BR06M02	1B	1,40	.055	0,050	.002	9,02	.355	6	–	–	–	0,20	.008	▪	6461830	▪
WC020M02L06M02	2	2,00	.079	0,050	.002	8,97	.353	–	6	–	–	0,20	.008	▪	6461861	▪
WC020M02N00M02	2	2,00	.079	0,050	.002	8,98	.353	–	–	0,20	.008	0,20	.008	▪	6461862	▪
WC020M02R06M02	2	2,00	.079	0,050	.002	9,00	.353	6	–	–	–	0,20	.009	▪	6461863	▪
WC030M03L06M02	3	3,00	.118	0,075	.003	9,61	.378	–	6	–	–	0,20	.008	▪	6461864	▪
WC030M03N00M02	3	3,00	.118	0,075	.003	9,60	.378	–	–	0,20	.008	0,20	.008	▪	6461865	▪
WC030M03R06M02	3	3,00	.118	0,075	.003	9,61	.378	6	–	–	–	0,20	.008	▪	6461866	▪
WC040M04L06M02	4	4,00	.157	0,075	.003	10,19	.401	–	6	0,20	.008	–	–	▪	6461867	▪
WC040M04N00M02	4	4,00	.157	0,075	.003	10,20	.402	–	–	0,20	.008	0,20	.008	▪	6461868	▪
WC040M04R06M02	4	4,00	.158	0,050	.002	10,20	.401	6	–	–	–	0,20	.008	▪	6461869	▪

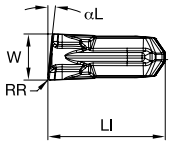
WGC Cut-Off Inserts • M Precision Molded • Metric

(continued)

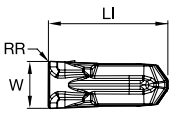

Left Hand


Neutral

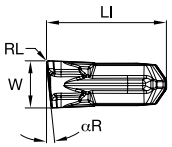

Right Hand



Left Hand



Neutral



Right Hand

● first choice
○ alternate choice

														WU10PT	WU25PT	WU35PT
		W		W tol ±		LI				RR		RL				
catalog number	SSC	mm	in	mm	in	mm	in	αR	αL	mm	in	mm	in			
WC050M05N00M03	5	5,00	.197	0,075	.003	12,25	.482	–	–	0,30	.012	0,30	.012	-	6461870	-
WC060M06N00M03	6	6,00	.236	0,075	.003	14,59	.574	–	–	0,30	.012	0,30	.012	-	6461881	-
WC080M08N00M04	8	8,00	.315	0,075	.003	17,46	.688	–	–	0,40	.016	0,40	.016	-	6461882	-

P	○	●	●	
M		●	●	●
K	○	○		
N	●	○		
S	●	●	●	
H	○			

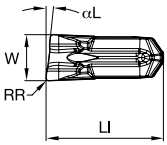
NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Cut-Off Inserts • R Precision Molded • Metric

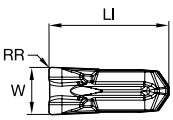

Left Hand


Neutral

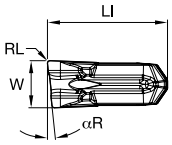

Right Hand



Left Hand



Neutral



Right Hand

● first choice
○ alternate choice

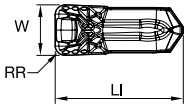
P		○	●	●												
M		●	●	●												
K		○	○													
N		●	○													
S		●	●	●												
H		○														

		W		W tol ±		LI				RR		RL				
catalog number	SSC	mm	in	mm	in	mm	in	αR	αL	mm	in	mm	in	WU10PT	WU25PT	WU35PT
WC020M02L06R02	2	2,00	.079	0,050	.002	8,97	.353	–	6	0,20	.008	–	–	▪	6470426	▪
WC020M02N00R02	2	2,00	.079	0,050	.002	8,98	.353	–	–	0,20	.008	0,20	.008	▪	6470427	▪
WC020M02R06R02	2	2,00	.079	0,050	.002	8,97	.353	6	–	–	–	0,20	.008	▪	6470428	▪
WC030M03L06R02	3	3,00	.118	0,075	.003	9,61	.378	–	6	0,20	.008	–	–	▪	6470429	▪
WC030M03N00R02	3	3,00	.118	0,075	.003	9,60	.378	–	–	0,20	.008	0,20	.008	▪	6470430	▪
WC030M03R06R02	3	3,00	.118	0,075	.003	9,61	.378	6	–	–	–	0,20	.008	▪	6470461	▪
WC040M04N00R02	4	4,00	.158	0,075	.003	10,20	.402	–	–	0,20	.008	0,20	.008	▪	6470462	▪
WC050M05N00R03	5	5,00	.197	0,075	.003	12,25	.482	–	–	0,30	.012	0,30	.012	▪	6470463	▪
WC060M06N00R03	6	6,00	.236	0,075	.003	14,59	.574	–	–	0,30	.012	0,30	.012	▪	6470464	▪
WC080M08N00R04	8	8,00	.315	0,075	.003	17,46	.687	–	–	0,40	.016	0,40	.016	▪	6470465	▪

NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Grooving Inserts • PT Precision Molded • Metric





● first choice
○ alternate choice

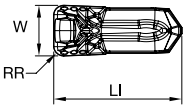
P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WU35PT
WG0212M02U02PT	2	2,13	.084	0,050	.002	0,20	.008	8,97	.353	'	6461734	'
WG0251M02U02PT	2	2,51	.099	0,050	.002	0,20	.008	8,97	.353	'	6461735	'
WG0312M03U02PT	3	3,13	.123	0,075	.003	0,20	.008	9,60	.378	'	6461736	'
WG0312M03U04PT	3	3,13	.123	0,075	.003	0,40	.016	9,60	.378	'	6461737	'
WG0412M04U04PT	4	4,13	.162	0,075	.003	0,40	.016	10,19	.401	'	6461738	'
WG0412M04U08PT	4	4,13	.162	0,075	.003	0,80	.031	10,19	.401	'	6461739	'
WG0512M05U04PT	5	5,13	.202	0,075	.003	0,40	.016	12,25	.482	'	6461740	'
WG0512M05U08PT	5	5,13	.202	0,075	.003	0,80	.032	12,25	.482	'	6461821	'
WG0612M06U04PT	6	6,13	.241	0,075	.003	0,40	.016	14,59	.575	'	6461822	'
WG0612M06U08PT	6	6,13	.241	0,075	.003	0,80	.032	14,59	.574	'	6461823	'
WG0712M06U08PT	6	7,13	.281	0,075	.003	0,80	.032	14,59	.574	'	6461824	'
WG0812M08U08PT	8	8,13	.320	0,075	.003	0,80	.032	17,45	.687	'	6461825	'
WG0812M08U12PT	8	8,13	.320	0,075	.003	1,20	.046	17,45	.687	'	6461826	'
WG1012M10U12PT	10	10,13	.399	0,075	.003	1,20	.047	20,75	.817	'	6461827	'

NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Grooving Inserts • PT Precision Molded • Inch





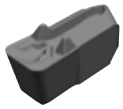
● first choice
○ alternate choice

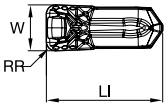
P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WU35PT
WG130I03U1PT	3	3,30	.130	0,075	.003	0,40	.016	9,60	.378	-	6470487	-
WG130I03U05PT	3	3,30	.130	0,075	.003	0,20	.008	9,60	.378	-	6470486	-
WG192I04U1PT	4	4,88	.192	0,075	.003	0,40	.016	10,19	.401	-	6470488	-
WG192I04U2PT	4	4,88	.192	0,075	.003	0,78	.031	10,19	.401	-	6470489	-
WG255I06U1PT	6	6,48	.255	0,075	.003	0,40	.016	14,58	.574	-	6470490	-
WG255I06U2PT	6	6,48	.255	0,075	.003	0,80	.031	14,58	.574	-	6470541	-
WG317I08U3PT	8	8,05	.317	0,075	.003	1,19	.047	17,46	.687	-	6470542	-
WG380I10U3PT	10	9,65	.380	0,075	.003	1,19	.047	20,75	.817	-	6470543	-

NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Grooving Inserts • PT Precision Ground • Metric





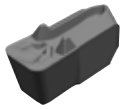
● first choice
○ alternate choice

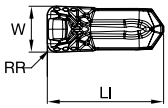
P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WU35PT
WG0200M02P02PT	2	2,00	.079	0,025	.001	0,20	.079	8,92	.351	-	6741598	-
WG0300M03P02PT	3	3,00	.118	0,025	.001	0,20	.008	9,55	.376	-	6741599	-
WG0300M03P04PT	3	3,00	.118	0,025	.001	0,40	.016	9,55	.376	-	6741600	-
WG0400M04P04PT	4	4,00	.158	0,025	.001	0,40	.016	10,15	.399	-	6741611	-
WG0400M04P08PT	4	4,00	.158	0,025	.001	0,80	.032	10,15	.399	-	6741612	-
WG0500M05P04PT	5	5,00	.197	0,025	.001	0,40	.016	12,18	.480	-	6741613	-
WG0500M05P08PT	5	5,00	.197	0,025	.001	0,08	.032	12,20	.480	-	6741614	-
WG0600M06P04PT	6	6,00	.236	0,025	.001	0,40	.016	14,53	.572	-	6741615	-
WG0600M06P08PT	6	6,00	.236	0,025	.001	0,80	.032	14,54	.573	-	6741616	-

NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Grooving Inserts • PT Precision Ground • Inch





● first choice
○ alternate choice

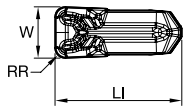
P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WU35PT
WG125I03P05PT	3	3,18	.125	0,075	.003	0,20	.008	9,55	.376	-	6686432	-
WG188I04P08PT	4	4,76	.188	0,025	.001	0,32	.013	10,14	.399	-	6686433	-
WG250I06P08PT	6	6,35	.250	0,075	.001	0,32	.013	14,53	.572	-	6686434	-

NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Grooving Inserts • PN Precision Molded • Metric





● first choice
○ alternate choice

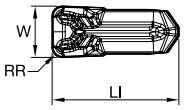
P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WU35PT
WG0212M02U02PN	2	2,13	.084	0,050	.002	0,20	.008	8,97	.353	'	6470850	'
WG0251M02U02PN	2	2,51	.099	0,050	.002	0,20	.008	8,97	.353	'	6471041	'
WG0312M03U02PN	3	3,13	.123	0,075	.003	0,20	.008	9,60	.378	'	6471042	'
WG0312M03U04PN	3	3,13	.123	0,075	.003	0,40	.016	9,60	.378	'	6471043	'
WG0412M04U04PN	4	4,13	.162	0,075	.003	0,40	.016	10,20	.401	'	6471044	'
WG0412M04U08PN	4	4,13	.162	0,075	.003	0,80	.031	10,20	.401	'	6471045	'
WG0512M05U04PN	5	5,13	.202	0,075	.003	0,40	.016	12,24	.482	'	6471046	'
WG0512M05U08PN	5	5,13	.202	0,075	.003	0,80	.031	12,24	.482	'	6471047	'
WG0612M06U04PN	6	6,13	.241	0,075	.003	0,40	.016	14,59	.575	'	6471048	'
WG0612M06U08PN	6	6,13	.241	0,075	.003	0,80	.031	14,59	.574	'	6471049	'
WG0812M08U08PN	8	8,13	.320	0,075	.003	0,80	.031	17,46	.687	'	6471050	'
WG0812M08U12PN	8	8,13	.320	0,075	.003	1,20	.047	17,46	.687	'	6471062	'
WG1012M10U12PN	10	10,13	.399	0,075	.003	1,20	.047	20,75	.817	'	6471064	'

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

WGC Grooving Inserts • PN Precision Molded • Inch





● first choice
○ alternate choice

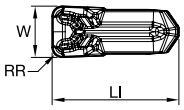
P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WU35PT
WG125I03U1PN	3	3,18	.125	0,075	.003	0,40	.016	9,60	.378	-	6470834	-
WG125I03U05PN	3	3,18	.125	0,075	.003	0,20	.008	9,60	.378	-	6470833	-
WG130I03U1PN	3	3,30	.130	0,075	.003	0,40	.016	9,60	.378	-	6470836	-
WG130I03U05PN	3	3,30	.130	0,075	.003	0,20	.008	9,60	.378	-	6470835	-
WG187I04U1PN	4	4,75	.187	0,075	.003	0,40	.016	10,19	.401	-	6470837	-
WG187I04U2PN	4	4,75	.187	0,075	.003	0,80	.032	10,20	.401	-	6470838	-
WG192I04U1PN	4	4,88	.192	0,075	.003	0,40	.016	10,20	.401	-	6470839	-
WG192I04U2PN	4	4,88	.192	0,075	.003	0,80	.031	10,20	.401	-	6470840	-
WG250I06U1PN	6	6,35	.250	0,075	.003	0,40	.016	14,58	.574	-	6470841	-
WG250I06U2PN	6	6,35	.250	0,075	.003	0,80	.032	14,58	.574	-	6470842	-
WG255I06U1PN	6	6,48	.255	0,075	.003	0,40	.016	14,58	.574	-	6470843	-
WG255I06U2PN	6	6,48	.255	0,075	.003	0,80	.031	14,58	.574	-	6470844	-

WGC Grooving Inserts • PN Precision Molded • Inch

(continued)





● first choice
○ alternate choice

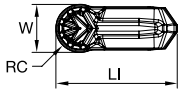
P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WU35PT
WG312I08U3PN	8	7,93	.312	0,075	.003	1,20	.047	17,46	.687	-	6470845	-
WG317I08U3PN	8	8,05	.317	0,075	.003	1,19	.047	17,46	.687	-	6470846	-
WG375I10U3PN	10	9,53	.375	0,075	.003	1,20	.047	20,75	.817	-	6470847	-
WG380I10U3PN	10	9,65	.380	0,075	.003	1,20	.047	20,70	.815	-	6470848	-

NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Grooving Inserts • PC Full Radius Precision Ground • Metric





● first choice
○ alternate choice

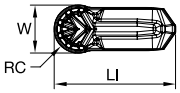
P	○	●	●
M	●	●	●
K	○	○	
N	●	○	
S	●	●	●
H	○		

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	RC mm	RC in	LI mm	LI in	WU10PT	WU25PT	WU35PT
WR0200M02P00PC	2	2,00	.079	0,025	.001	1,00	.039	8,91	.351	-	6470467	-
WR0300M03P00PC	3	3,00	.118	0,025	.001	1,50	.059	9,54	.376	-	6470468	-
WR0400M04P00PC	4	4,00	.158	0,025	.001	2,00	.079	10,13	.399	-	6470469	-
WR0500M05P00PC	5	5,00	.197	0,025	.001	2,50	.098	12,18	.480	-	6470470	-
WR0600M06P00PC	6	6,00	.236	0,025	.001	3,00	.118	14,52	.572	-	6470481	-
WR0800M08P00PC	8	8,00	.315	0,025	.001	4,00	.158	17,41	.685	-	6470482	-

NOTE: SSC = To correspond with the SSC on the toolholder.

WGC Grooving Inserts • PC Full Radius Precision Ground • Inch





● first choice
○ alternate choice

P		○	●	●								
M		●	●	●								
K		○	○									
N		●	○									
S		●	●	●								
H		○										

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	RC mm	RC in	LI mm	LI in	WU10PT	WU25PT	WU35PT
WR125I03P00PC	3	3,18	.125	0,025	.001	1,59	.062	9,54	.376	-	6470263	-
WR187I04P00PC	4	4,76	.188	0,025	.001	2,38	.094	10,13	.399	-	6470264	-
WR250I06P00PC	6	6,35	.250	0,025	.001	3,18	.125	14,54	.572	-	6470265	-
WR312I08P00PC	8	7,92	.312	0,025	.001	3,96	.156	17,40	.685	-	6470266	-

NOTE: SSC = To correspond with the SSC on the toolholder.

Catalog Numbering System • Grooving

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

WGC	S	M	R	10	02	08	C
Family Name	Tool Style	Support Type	Hand	Shank Size	Seat Size	Max Groove Depth	Coolant
WIDIA™ Grooving and Cut-Off	**S = Straight mount**	**M** = Maximum support for specific groove width and straight clearance for unlimited workpiece diameter **A** = Face grooving — inboard sweep **B** = Face grooving — outboard sweep	**L** = Left hand **R** = Right hand	**Metric** = Height x Width in mm letter indicates tool length according to ISO **Inch** = Height x Width in 1/16" increments	1B 1F 02 03 04 05 06 08 10	in millimetres	**C** = Through the pocket coolant capable

Catalog Numbering System • Cut-Off Blades

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

A	16	R	WGC	E	M	R	03	07	I
Steel Bar with Coolant	Bar Diameter	Bar Length	Platform	Tool Type	Support Type	Hand of Tool	Insert Seat Size	Max Cutting Depth	Tool Units
Steel boring bar with through coolant capability.	**Metric** = Diameter in mm **Inch** = Diameter in 1/16" increments		WIDIA™ Grooving and Cut-Off	**E** = End mount (90°)	**M** = Maximum support	**L** = Left hand **R** = RIght hand	**1F** **02** **03** **04** **05** **06** **08** **10**	in millimeters	**M** = Metric **I** = Inch

symbol	mm	inch
K	125	5
M	150	6
Q	180	7
R	200	8
S	250	10
T	300	12

Catalog Numbering System • Modular Toolholders

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

WGC	M	S	R	16	50	C
Family Name	Modular	Tool Style	Hand	Shank Size	Blade Size	Coolant
WIDIA™ Grooving and Cut-Off		**S** = Straight Mount **E** = End Mount (90°)	**L** = Left hand **R** = Right hand	**Metric** = Height x Width in mm letter indicates tool length accodring to ISO **Inch** = Height x Width in 1/16" increments	**50** **65**	**C** = Through coolant capable

Catalog Numbering System • Modular Blades

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

WGC	M	50	R	03	12	M	C
Family Name	Modular	Blade Size	Hand	Seat Size	Max Groove Depth	Support Type	Coolant
WIDIA™ Grooving and Cut-Off		**50** **65**	**L** = Left hand **R** = Right hand	**1B** **1F** **02** **03** **04** **05** **06** **08** **10**	in millimeters	**M** = Maximum support for specific groove width and straight clearance for unlimited diameter	**C** = Through the pocket coolant capable

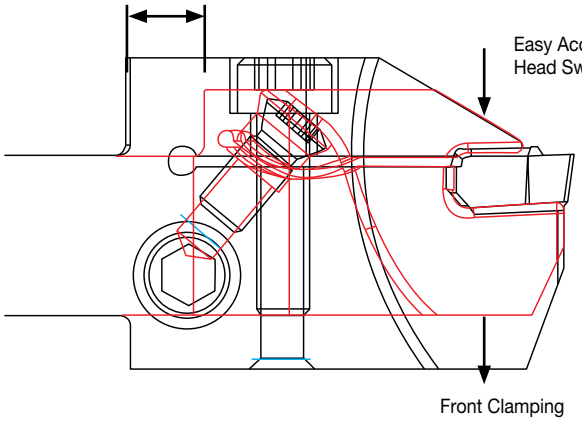
WGC • Integral Reinforced Front Clamp Toolholders

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

WGC	S	C	F	L	2020K	3	16	C
WGC	S	C	F	L	12	3	16	C
Family Name	Tool Style	Support Type	Clamping Screw Position	Hand	Shank Size	Seat Size	Cut-Off Depth	Coolant
Widia Grooving and Cut-Off	S: Straight Mount	C: Reinforced maximum support width circular clearance	F: Front	L: Left Hand R: Right Hand	Metric: Height x Width in mm Letter Indicates Tool Length according to ISO Inch: Height x Width in 1/16 inch increment	1B 1F 2 3 4 5 6 8 10	in Millimeters	Through Coolant Capability

Benefits of Front Clamp Compared to Top Clamp

Reduced Head Length for Added Stability.



Integral reinforced Front Clamp Holders provide greater rigidity and stability.

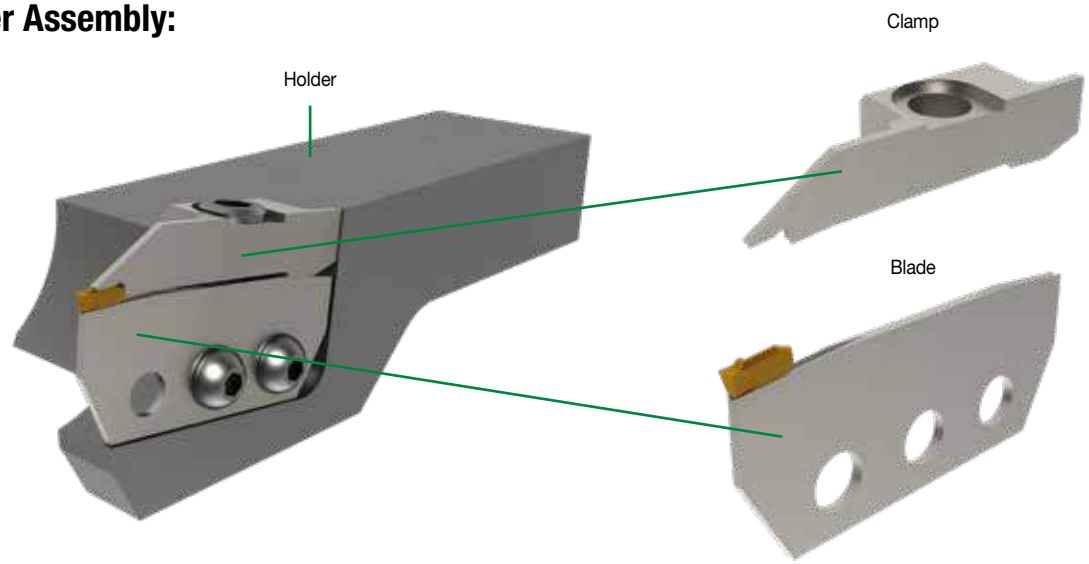
Easy access to clamp and unclamp screw.

Available in small shank sizes and suitable for shorter CDs.

WGC Separator Blades and Clamps for Universal Style Holders

- Cut-off up to 3" bar capacity.
- Insert widths .094-.188" (2,38–4,76mm).
- Quick, reliable insert indexing.
- Positive mechanical clamping.
- Common blade for RH and LH holders.
- Inserts in proven PVD grades WU10PT, WU25PT, and WU35PT.

Toolholder Assembly:



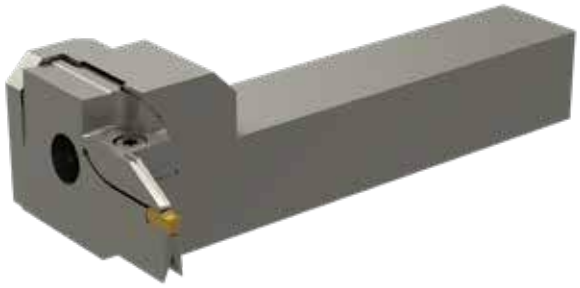
WGC Separator Blades and Clamps for Universal Style Holders

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

WGC	SU	N	02	28	B
Platform (WIDIA™ Grooving and Cut-Off)	Separator Universal	Hand	Pocket Seat Size	CD (mm)	
		N: Neutral R: Right L: Left			B: Blade K: Clamp

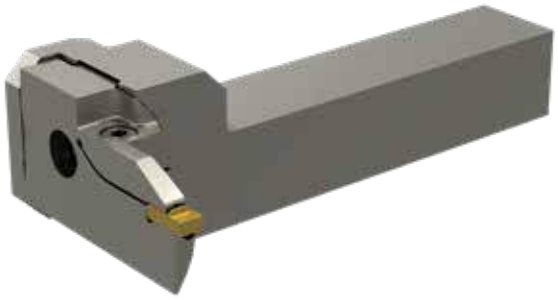
WIDIA™ WGC Ranger Adjustable Face Grooving System

WGC Ranger is the industry's only fully adjustable face grooving platform. The system can produce face groove diameters from 2.25–16" (57,2–406mm).



Square Shank Toolholders

- Compact, right angle design with full 1" depth of cut capability when using .188"- and .250"-wide inserts.
- Versatile selection of curve-out cartridges, featuring .125", .188", and .250" widths.
- Inserts in grades for steels, stainless steels, non-ferrous materials, and cast iron.



Round Shank Bars

- Available in 1", 1.25", and 1.50" round shanks with added flexibility to use both right-hand and left-hand cartridges in the same shank.
- Versatile selection of both curve-in and curve-out cartridges to produce external and internal (through the bore) face groove styles.
- Insert widths of .125", .188", and .250" with choice of square front inserts for plunge and groove, or full nose radii for plunge, groove, and profile.

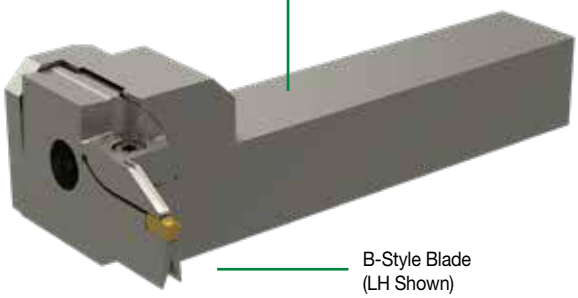


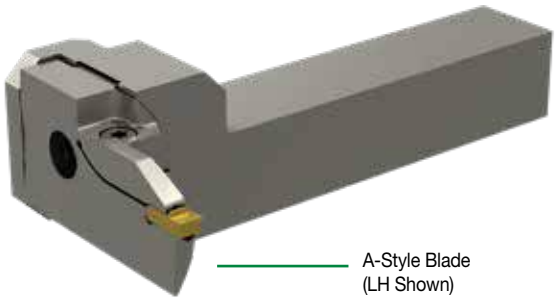
WGC Ranger • Nomenclature

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

WGC	M	RA	L	3	19	B	317
Platform (WIDIA™ Grooving and Cut-Off)	Modular	Ranger	Hand	Pocket Seat Size	CD [mm]	Style	Minimum Insert Width
			L: Left Hand R: Right Hand	3 4 6		A: Inboard B: Outboard	317: 3.17 [0.125] 476: 4.76 [0.187] 635: 6.35 [0.250]

Use only recommended insert width or higher for a particular pocket seat size.

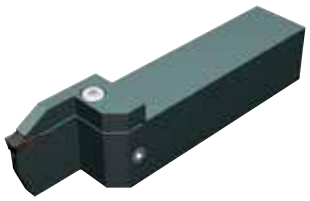




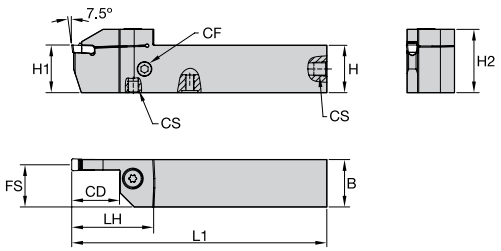


Use LH Blade for RH Holder and vice versa.

WGC Integral Toolholders • Straight • Inch



Left hand



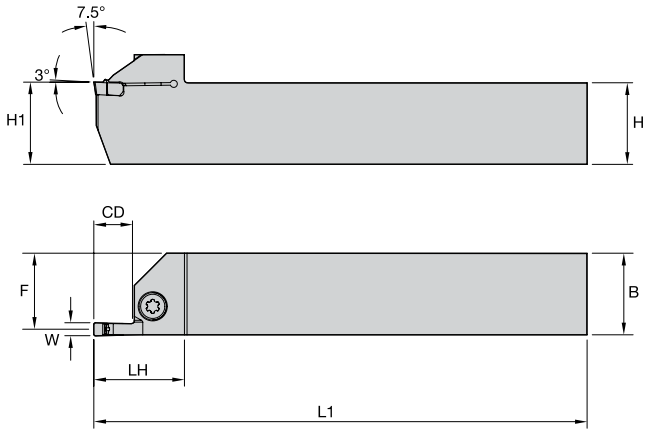
order number	catalog number	SSC	CD	H1	H	B	H2	L1	FS	LH	CF	CS
right hand												
6461884	**WGCSMR120216**	2	.63	.750	.750	.750	1.03	4.50	.71	1.22	—	—
6461885	**WGCSMR160216**	2	.63	1.000	1.000	1.000	1.28	6.00	.96	1.22	—	—
6461886	**WGCSMR120222**	2	.87	.750	.750	.750	1.10	4.50	.71	1.50	—	—
6461887	**WGCSMR160226**	2	1.02	1.000	1.000	1.000	1.35	6.00	.96	1.65	—	—
6461922	**WGCSMR120316C**	3	.63	.750	.750	.750	—	4.50	.69	1.46	M8X1	M8X1
6461923	**WGCSMR160316C**	3	.63	1.000	1.000	1.000	1.35	6.00	.94	1.46	G1/8-28	G1/8-28
6461924	**WGCSMR120322C**	3	.87	.750	.750	.750	1.12	4.50	.69	1.69	M8X1	M8X1
6461925	**WGCSMR160326C**	3	1.02	1.000	1.000	1.000	1.39	6.00	.94	1.85	G1/8-28	G1/8-28
6461926	**WGCSMR120416C**	4	.63	.750	.750	.750	1.10	4.50	.68	1.46	M8X1	M8X1
6461927	**WGCSMR160416C**	4	.63	1.000	1.000	1.000	1.34	6.00	.93	1.46	G 1/8	G 1/8
6461928	**WGCSMR120422C**	4	.87	.750	.750	.750	1.10	4.50	.68	1.69	M8X1	M8X1
6461929	**WGCSMR160426C**	4	1.02	1.000	1.000	1.000	1.38	6.00	.93	1.85	G 1/8	G 1/8
6461930	**WGCSMR200426C**	4	1.02	1.250	1.250	1.250	1.60	6.00	1.18	1.85	G1/8-28	G1/8-28
6461941	**WGCSMR200432C**	4	1.26	1.250	1.250	1.250	1.70	6.00	1.18	2.09	G 1/8	G 1/8
6461942	**WGCSMR160516C**	5	.63	1.000	1.000	1.000	1.40	6.00	.91	1.46	G 1/8	G 1/8
6461943	**WGCSMR160526C**	5	1.02	1.000	1.000	1.000	1.40	6.00	.91	1.85	G 1/8	G 1/8
6461944	**WGCSMR200526C**	5	1.02	1.250	1.250	1.250	1.60	6.00	1.16	1.85	G1/8-28	G1/8-28
6461945	**WGCSMR200532C**	5	1.26	1.250	1.250	1.250	1.70	6.00	1.16	2.09	G 1/8	G 1/8
6461947	**WGCSMR160616C**	6	.63	1.000	1.000	1.000	1.40	6.00	.89	1.46	G 1/8	G 1/8
6461949	**WGCSMR160626C**	6	1.02	1.000	1.000	1.000	1.40	6.00	.89	1.85	G 1/8	G 1/8
6461951	**WGCSMR200626C**	6	1.02	1.250	1.250	1.250	1.60	6.00	1.14	1.85	G1/8-28	G1/8-28
6461953	**WGCSMR200632C**	6	1.26	1.250	1.250	1.250	1.70	6.00	1.14	2.17	G 1/8	G 1/8
6461955	**WGCSMR240640C**	6	1.58	1.500	1.500	1.500	2.00	7.00	1.39	2.48	G 1/8	G 1/8
6461957	**WGCSMR160826C**	8	1.02	1.000	1.000	1.000	1.40	6.00	.86	1.93	G 1/8	G 1/8
6461959	**WGCSMR200826C**	8	1.02	1.250	1.250	1.250	1.70	6.00	1.11	1.93	G1/8-28	G1/8-28
6461961	**WGCSMR200832C**	8	1.26	1.250	1.250	1.250	1.70	6.00	1.11	2.17	G 1/8	G 1/8
6461962	**WGCSMR240840C**	8	1.58	1.500	1.500	1.500	2.00	7.00	1.36	2.48	G 1/8	G 1/8
6461963	**WGCSMR201032C**	10	1.26	1.250	1.250	1.250	1.70	6.00	1.08	2.17	G 1/8	G 1/8
6461964	**WGCSMR241040C**	10	1.58	1.500	1.500	1.500	2.00	7.00	1.33	2.48	G 1/8	G 1/8
left hand												
6461888	**WGCSML120216**	2	.63	.750	.750	.750	—	4.50	.71	1.22	—	—
6461889	**WGCSML160216**	2	.63	1.000	1.000	1.000	1.28	6.00	.96	1.22	—	—
6461890	**WGCSML120222**	2	.87	.750	.750	.750	1.10	4.50	.71	1.50	—	—
6461921	**WGCSML160226**	2	1.02	1.000	1.000	1.000	1.35	6.00	.96	1.65	—	—
6461965	**WGCSML120316C**	3	.63	.750	.750	.750	1.10	4.50	.69	1.46	M8X1	M8X1
6461966	**WGCSML160316C**	3	.63	1.000	1.000	1.000	1.35	6.00	.94	1.46	G 1/8	G 1/8
6461967	**WGCSML120322C**	3	.87	.750	.750	.750	1.12	4.50	.69	1.69	M8X1	M8X1
6461968	**WGCSML160326C**	3	1.02	1.000	1.000	1.000	1.39	6.00	.94	1.85	G 1/8	G 1/8
6461969	**WGCSML120416C**	4	.63	.750	.750	.750	1.10	4.50	.68	1.46	M8X1	M8X1
6461970	**WGCSML160416C**	4	.63	1.000	1.000	1.000	1.34	6.00	.93	1.46	G1/8-28	G1/8-28
6461971	**WGCSML120422C**	4	.87	.750	.750	.750	1.10	4.50	.68	1.69	M8X1	M8X1
6461972	**WGCSML160426C**	4	1.02	1.000	1.000	1.000	1.38	6.00	.93	1.85	G 1/8	G 1/8
6461973	**WGCSML200426C**	4	1.02	1.250	1.250	1.250	1.60	6.00	1.18	1.85	G 1/8	G 1/8
6461974	**WGCSML200432C**	4	1.26	1.250	1.250	1.250	1.70	6.00	1.18	2.09	G 1/8	G 1/8
6461975	**WGCSML160516C**	5	.63	1.000	1.000	1.000	1.40	6.00	.91	1.46	G 1/8	G 1/8
6461976	**WGCSML160526C**	5	1.02	1.000	1.000	1.000	1.10	6.00	.91	1.85	G 1/8	G 1/8
6461977	**WGCSML200526C**	5	1.02	1.250	1.250	1.250	1.60	6.00	1.16	1.85	G 1/8	G 1/8
6461978	**WGCSML200532C**	5	1.26	1.250	1.250	1.250	1.70	6.00	1.16	2.09	G 1/8	G 1/8
6461979	**WGCSML160616C**	6	.63	1.000	1.000	1.000	1.40	6.00	.89	1.46	G 1/8	G 1/8
6461980	**WGCSML160626C**	6	1.02	1.000	1.000	1.000	1.40	6.00	.89	1.85	G1/8-28	G1/8-28
6461991	**WGCSML200626C**	6	1.02	1.250	1.250	1.250	1.60	6.00	1.14	1.85	G1/8-28	G1/8-28
6461992	**WGCSML200632C**	6	1.26	1.250	1.250	1.250	1.70	6.00	1.14	2.17	G 1/8	G 1/8
6461993	**WGCSML240640C**	6	1.58	1.500	1.500	1.500	2.00	7.00	1.39	2.48	G 1/8	G 1/8
6461994	**WGCSML160826C**	8	1.02	1.000	1.000	1.000	1.40	6.00	.86	1.93	G 1/8	G 1/8
6461995	**WGCSML200826C**	8	1.02	1.250	1.250	1.250	1.70	6.00	1.11	1.93	G 1/8	G 1/8
6461996	**WGCSML200832C**	8	1.26	1.250	1.250	1.250	1.70	6.00	1.11	2.17	G 1/8	G 1/8
6461997	**WGCSML240840C**	8	1.58	1.500	1.500	1.500	2.00	7.00	1.36	2.48	G 1/8	G 1/8
6461998	**WGCSML201032C**	10	1.26	1.250	1.250	1.250	1.70	6.00	1.08	2.17	G 1/8	G 1/8
6461999	**WGCSML241040C**	10	1.58	1.500	1.500	1.500	2.00	7.00	1.33	2.48	G 1/8	G 1/8

screw catalog number	screw order number	torque Nm	torque in. lbs.	thread	socket	wrench catalog number	wrench order number
MS1160	**1099645**	7	62	M5	T20	**KT20**	**1022703**
MS1162	**1127019**	9	80	M6	T25	**KT25**	**1022725**
MS1163	**1124104**	18	159	M8	T30	**KT30L**	**1099676**
MS1273	**1020977**	4	35.4	M4	T15	**KT15**	**1022701**
MS1490	**2263299**	17	151	M8	T45	**KT45**	**1018227**
MS1595	**1094300**	12	106	M6	T30	**KT30**	**1099676**
MS1970	**1106668**	12	106	M6	T30	**KT30**	**1099676**
MS2002	**1621087**	9	80	M6	T25	**KT25**	**1022725**
MS2091	**1931147**	9	80	M5	25IP	**K25IP**	**2050113**

WGCSM-Non Through Coolant Integral Toolholders • Integral Straight Shank



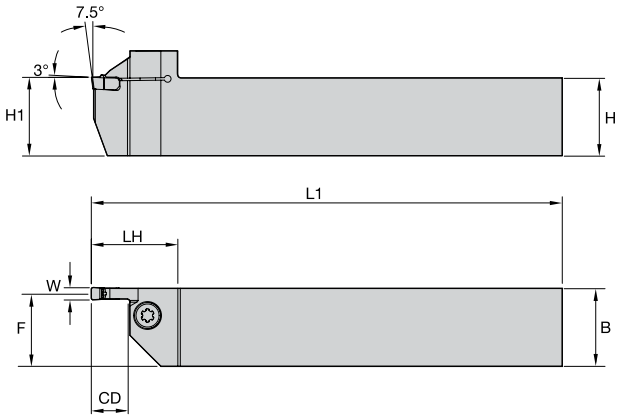
Left Hand



Left Hand



Right Hand



Right Hand

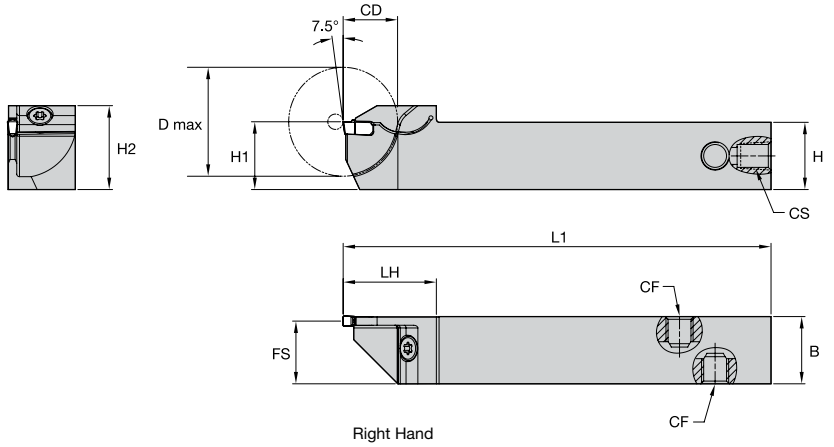
order number	catalog number	SSC	CD	H1	H	B	F	L1	W	LH
right hand										
6949739	**WGCSMR100208**	2	.32	.625	.625	.625	.63	4.50	.08	.91
6949740	**WGCSMR120208**	2	.32	.750	.750	.625	.75	4.50	.08	.91
6949791	**WGCSMR160208**	2	.32	1.000	1.000	1.000	1.00	6.00	.08	.91
6949792	**WGCSMR120310**	3	.39	.750	.750	.750	.75	4.50	.12	1.02
6949793	**WGCSMR160310**	3	.39	1.000	1.000	1.000	1.00	6.00	.12	1.02
6949794	**WGCSMR120316**	3	.63	.750	.750	.750	.75	4.50	.12	1.26
6949795	**WGCSMR160316**	3	.63	1.000	1.000	1.000	1.00	6.00	.12	1.26
6949796	**WGCSMR120412**	4	.47	.750	.750	.750	.75	4.50	.16	1.10
6949797	**WGCSMR160412**	4	.47	1.000	1.000	1.000	1.00	6.00	.16	1.10
left hand										
6949798	**WGCSML100208**	2	.32	.625	.625	.625	.63	4.50	.08	.91
6949799	**WGCSML120208**	2	.32	.750	.750	.750	.75	4.50	.08	.91
6949800	**WGCSML160208**	2	.32	1.000	1.000	1.000	1.00	6.00	.08	.91
6949801	**WGCSML120310**	3	.39	.750	.750	.750	.75	4.50	.12	1.02
6949802	**WGCSML160310**	3	.39	.985	.985	1.000	1.00	6.00	.12	1.02
6949803	**WGCSML120316**	3	.63	.750	.750	.750	.75	4.50	.12	1.26
6949804	**WGCSML160316**	3	.63	.985	.985	1.000	1.00	6.00	.12	1.26
6949805	**WGCSML120412**	4	.47	.750	.750	.750	.75	4.50	.16	1.10
6949806	**WGCSML160412**	4	.47	1.000	1.000	1.000	1.00	6.00	.16	1.10

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WGC Integral Toolholders • Reinforced Front Clamp • Inch



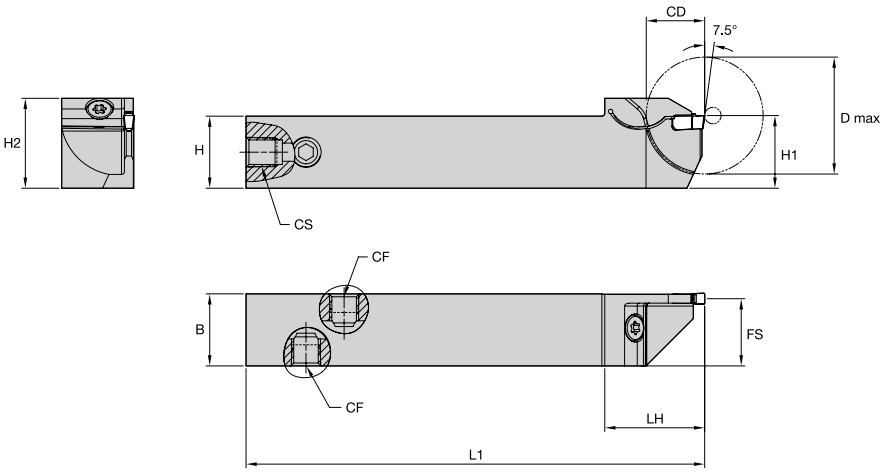
Right Hand



Right Hand



Left Hand



Left Hand

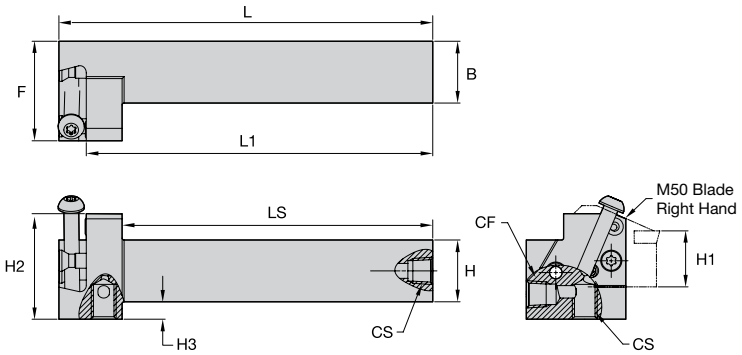
order number	catalog number	SSC	CD	D max	H1	H	B	H2	L1	FS	LH	CF
right hand												
6765342	**WGCSCFR060210**	2	.39	.787	.375	.375	.375	.53	4.50	.34	.81	—
6765348	**WGCSCFR080216**	2	.63	1.260	.500	.500	.500	.66	4.50	.46	1.04	—
6765350	**WGCSCFR100216**	2	.63	1.260	.625	.625	.625	.80	4.50	.59	1.04	—
6765402	**WGCSCFR120216**	2	.63	1.260	.750	.750	.750	.93	4.50	.71	1.04	—
6765349	**WGCSCFR080316C**	3	.63	1.260	.500	.500	.500	.69	4.50	.44	1.08	M8X1
6765401	**WGCSCFR100316C**	3	.63	1.260	.625	.625	.625	.81	4.50	.57	1.08	M8X1
6765403	**WGCSCFR120316C**	3	.63	1.260	.750	.750	.750	.94	4.50	.69	1.08	M8X1
left hand												
6765325	**WGCSCFL060210**	2	.39	.787	.375	.375	.375	.53	4.50	.34	.81	—
6765326	**WGCSCFL080216**	2	.63	1.260	.500	.500	.500	.66	4.50	.46	1.04	—
6765327	**WGCSCFL100216**	2	.63	1.260	.625	.625	.625	.82	4.50	.59	1.04	—
6765330	**WGCSCFL120216**	2	.63	1.260	.750	.750	.750	.93	4.50	.71	1.04	—
6656188	**WGCSCFL080316C**	3	.63	1.260	.500	.500	.500	.69	4.50	.44	1.08	M8X1
6765329	**WGCSCFL100316C**	3	.63	1.260	.625	.625	.625	.81	4.50	.57	1.08	M8X1
6765341	**WGCSCFL120316C**	3	.63	1.260	.750	.750	.750	.94	4.50	.69	1.08	M8X1

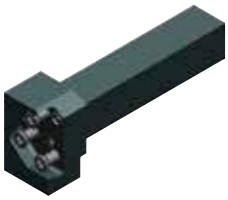
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WGC • Modular Toolholders • Endmount • with Coolant • Inch

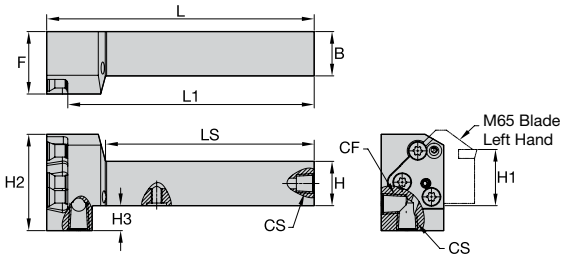


M50 Blade
Right Hand





M65 Blade
Left Hand



order number	catalog number	B	H	H1	L	L1	LS	F	CS	CF	H2	H3	blade size
right hand													
6498941	**WGCMER1650C**	1.00	1.00	1.00	6.0	5.5	4.96	.47	G 1/8-28	G 1/8-28	1.67	.25	50
6498942	**WGCMER1665C**	1.00	1.00	1.00	6.0	5.5	4.70	1.38	G 1/8-28	G 1/8-28	2.09	.50	65
6498943	**WGCMER2050C**	1.25	1.25	1.25	6.0	5.5	4.96	.47	G 1/8-28	G 1/8-28	1.67	—	50
6498944	**WGCMER2065C**	1.25	1.25	1.25	6.0	5.5	4.70	1.38	G 1/8-28	G 1/8-28	2.09	.25	65
6498945	**WGCMER2450C**	1.50	1.50	1.50	6.0	5.5	4.96	.47	G 1/8-28	G 1/8-28	1.92	—	50
6498946	**WGCMER2465C**	1.50	1.50	1.50	7.0	6.5	5.70	1.49	G 1/8-28	G 1/8-28	2.09	—	65
left hand													
6498947	**WGCMEL1650C**	1.00	1.00	1.00	6.0	5.5	4.96	.47	G 1/8-28	G 1/8-28	1.67	.25	50
6498948	**WGCMEL1665C**	1.00	1.00	1.00	6.0	5.5	4.70	1.38	G 1/8-28	G 1/8-28	2.09	.50	65
6498949	**WGCMEL2050C**	1.25	1.25	1.25	6.0	5.5	4.96	.47	G 1/8-28	G 1/8-28	1.67	—	50
6498950	**WGCMEL2065C**	1.25	1.25	1.25	6.0	5.5	4.70	1.38	G 1/8-28	G 1/8-28	2.09	.25	65
6498951	**WGCMEL2450C**	1.50	1.50	1.50	6.0	5.5	4.96	.47	G 1/8-28	G 1/8-28	1.92	—	50
6498952	**WGCMEL2465C**	1.50	1.50	1.50	7.0	6.5	5.70	1.49	G 1/8-28	G 1/8-28	2.09	—	65

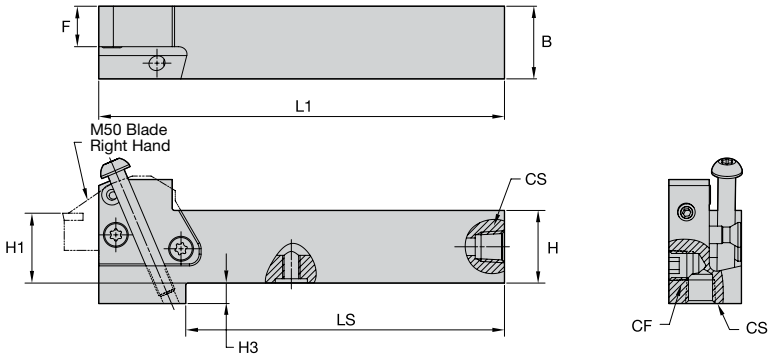
NOTE: WGCMS..: Right-hand holder uses right-hand blades.
WGCME..: Right-hand holder uses left-hand blades.
M50 blade and clamp screw torque equals 71–88 in. lbs. (8–10 Nm).
M65 blade and clamp screw torque equals 159–177 in. lbs. (18–20 Nm).

screw catalog number	screw order number	torque Nm	torque in. lbs.	thread	socket	wrench catalog number	wrench order number
MS1160	**1099645**	**7**	**62**	**M5**	**T20**	**KT20**	**1022703**
MS1162	**1127019**	**9**	**80**	**M6**	**T25**	**KT25**	**1022725**
MS1163	**1124104**	**18**	**159**	**M8**	**T30**	**KT30L**	**1099676**
MS1273	**1020977**	**4**	**35.4**	**M4**	**T15**	**KT15**	**1022701**
MS1490	**2263299**	**17**	**151**	**M8**	**T45**	**KT45**	**1018227**
MS1595	**1094300**	**12**	**106**	**M6**	**T30**	**KT30**	**1099676**
MS1970	**1106668**	**12**	**106**	**M6**	**T30**	**KT30**	**1099676**
MS2002	**1621087**	**9**	**80**	**M6**	**T25**	**KT25**	**1022725**
MS2091	**1931147**	**9**	**80**	**M5**	**25IP**	**K25IP**	**2050113**

WGC • Modular Toolholders • Endmount • with Coolant • Inch

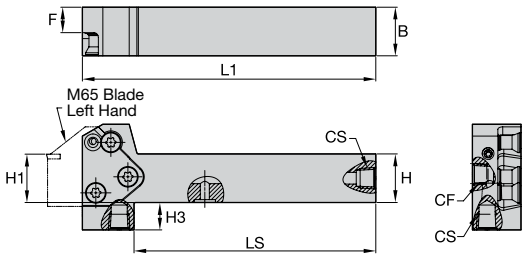


M50 Blade
Right Hand





M65 Blade
Left Hand



order number	catalog number	H	H1	B	L1	LS	F	CS	CF	H3	blade size
right hand											
6499230	**WGCMSR1650C**	1.00	1.00	1.00	5.5	4.33	.56	G 1/8-28	G 1/8-28	.25	50
6499271	**WGCMSR1665C**	1.00	1.00	1.00	6.0	4.90	.53	G 1/8-28	G 1/8-28	–	65
6499272	**WGCMSR2050C**	1.25	1.25	1.25	5.5	4.52	.81	G 1/8-28	G 1/8-28	–	50
6499273	**WGCMSR2065C**	1.25	1.25	1.25	6.0	4.90	.78	G 1/8-28	G 1/8-28	–	65
6499274	**WGCMSR2450C**	1.50	1.50	1.50	5.5	4.52	1.06	G 1/8-28	G 1/8-28	–	50
6499275	**WGCMSR2465C**	1.50	1.50	1.50	7.0	5.90	1.03	G 1/8-28	G 1/8-28	–	65
left hand											
6499276	**WGCMSL1650C**	1.00	1.00	1.00	5.5	4.33	.56	G 1/8-28	G 1/8-28	.25	50
6499277	**WGCMSL1665C**	1.00	1.00	1.00	6.0	4.90	.53	G 1/8-28	G 1/8-28	–	65
6499278	**WGCMSL2050C**	1.25	1.25	1.25	5.5	4.52	.81	G 1/8-28	G 1/8-28	–	50
6499279	**WGCMSL2065C**	1.25	1.25	1.25	6.0	4.90	.78	G 1/8-28	G 1/8-28	–	65
6499280	**WGCMSL2450C**	1.50	1.50	1.50	5.5	4.52	1.06	G 1/8-28	G 1/8-28	–	50
6499281	**WGCMSL2465C**	1.50	1.50	1.50	7.0	5.90	1.03	G 1/8-28	G 1/8-28	–	65

NOTE: WGCMS..: Right-hand holder uses right-hand blades.
WGCME..: Right-hand holder uses left-hand blades.
M50 blade and clamp screw torque equals 71–88 in. lbs. (8–10 Nm).
M65 blade and clamp screw torque equals 159–177 in. lbs. (18–20 Nm).

screw catalog number	screw order number	torque Nm	torque in. lbs.	thread	socket	wrench catalog number	wrench order number
MS1160	**1099645**	**7**	**62**	**M5**	**T20**	**KT20**	**1022703**
MS1162	**1127019**	**9**	**80**	**M6**	**T25**	**KT25**	**1022725**
MS1163	**1124104**	**18**	**159**	**M8**	**T30**	**KT30L**	**1099676**
MS1273	**1020977**	**4**	**35.4**	**M4**	**T15**	**KT15**	**1022701**
MS1490	**2263299**	**17**	**151**	**M8**	**T45**	**KT45**	**1018227**
MS1595	**1094300**	**12**	**106**	**M6**	**T30**	**KT30**	**1099676**
MS1970	**1106668**	**12**	**106**	**M6**	**T30**	**KT30**	**1099676**
MS2002	**1621087**	**9**	**80**	**M6**	**T25**	**KT25**	**1022725**
MS2091	**1931147**	**9**	**80**	**M5**	**25IP**	**K25IP**	**2050113**

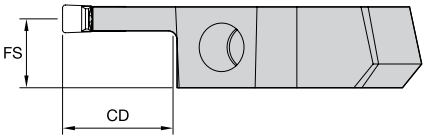
WGCM-S-C • WGC Modular Straight Blade with Coolant



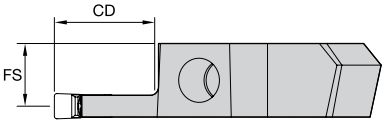
Left Hand



Right Hand



Left Hand



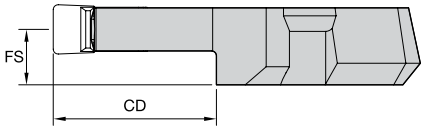
Right Hand



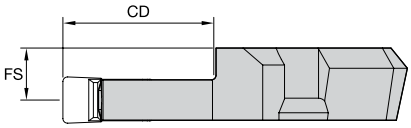
Left Hand



Right Hand



Left Hand



Right Hand

order number	catalog number	SSC	CD	FS	blade size
right hand					
6498457	**WGCM50R1F12M**	1F	12,0	11,00	50
6498458	**WGCM50R0212M**	2	12,0	10,88	50
6498459	**WGCM50R0216M**	2	16,0	10,88	50
6498460	**WGCM50R0312MC**	3	12,0	10,43	50
6498861	**WGCM50R0322MC**	3	22,0	10,43	50
6498862	**WGCM50R0412MC**	4	12,0	9,93	50
6498863	**WGCM50R0422MC**	4	22,0	9,93	50
6498864	**WGCM50R0432MC**	4	32,0	9,93	50
6498865	**WGCM50R0512MC**	5	12,0	9,43	50
6498866	**WGCM50R0516MC**	5	16,0	9,43	50
6498867	**WGCM50R0526MC**	5	26,0	9,43	50
6498868	**WGCM50R0532MC**	5	32,0	9,43	50
6498869	**WGCM65R0616MC**	6	16,0	9,88	65
6498870	**WGCM65R0626MC**	6	26,0	9,88	65
6498881	**WGCM65R0632MC**	6	32,0	9,88	65
6498882	**WGCM65R0816MC**	8	16,0	9,00	65
6498883	**WGCM65R0826MC**	8	26,0	9,00	65
left hand					
6498884	**WGCM50L1F12M**	1F	12,0	11,00	50
6498885	**WGCM50L0212M**	2	12,0	10,88	50
6498886	**WGCM50L0216M**	2	16,0	10,88	50
6498887	**WGCM50L0312MC**	3	12,0	10,43	50
6498888	**WGCM50L0322MC**	3	22,0	10,43	50
6498889	**WGCM50L0412MC**	4	12,0	9,93	50
6498890	**WGCM50L0422MC**	4	22,0	9,93	50
6498891	**WGCM50L0432MC**	4	32,0	9,93	50
6498892	**WGCM50L0512MC**	5	12,0	9,43	50
6498893	**WGCM50L0516MC**	5	16,0	9,43	50
6498894	**WGCM50L0526MC**	5	26,0	9,43	50
6498895	**WGCM50L0532MC**	5	32,0	9,43	50
6498896	**WGCM65L0616MC**	6	16,0	9,88	65
6498897	**WGCM65L0626MC**	6	26,0	9,88	65
6498898	**WGCM65L0632MC**	6	32,0	9,88	65
6498899	**WGCM65L0816MC**	8	16,0	9,00	65
6498900	**WGCM65L0826MC**	8	26,0	9,00	65

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.
Through the pocket coolant available in seat sizes 3 and higher.

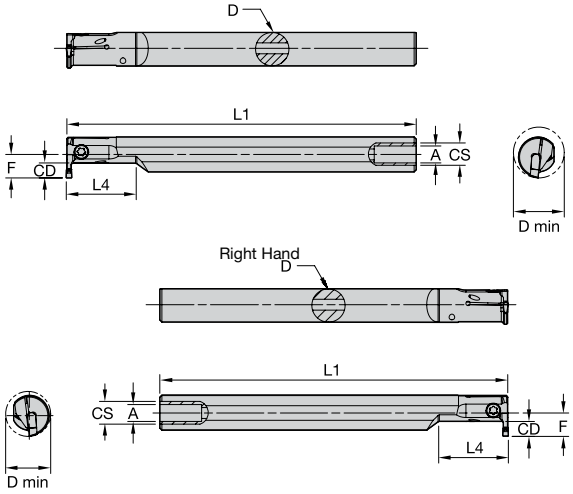
WGC • Integral I.D. Grooving Boring Bars • Inch



Right Hand



Left Hand



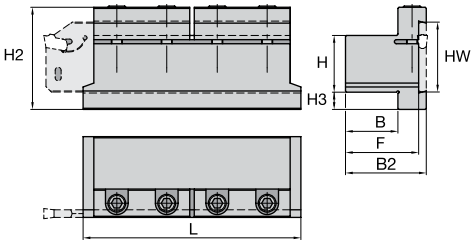
Left Hand

order number	catalog number	SSC	D	D min	CD	L1	F	L4	A	CS
right hand										
6949807	**A08KWGCEMR0205I**	2	.500	.625	.197	5.000	.336	1.000	.156	1/16 - 27 NPT
6949808	**A10MWGCEMR0207I**	2	.625	.787	.276	6.000	.436	1.250	.156	1/8 - 27 NPT
6949809	**A12QWGCEMR0207I**	2	.750	.984	.276	7.000	.550	1.500	.156	1/8 - 27 NPT
6949810	**A16RWGCEMR0210I**	2	1.000	1.250	.394	8.000	.681	2.000	.156	1/4 - 18 NPT
6949811	**A10MWGCEMR0307I**	3	.625	.787	.276	6.000	.436	1.250	.156	1/8 - 27 NPT
6949812	**A12QWGCEMR0307I**	3	.750	.984	.276	7.000	.549	1.500	.156	1/8 - 27 NPT
6949813	**A16RWGCEMR0310I**	3	1.000	1.250	.394	8.000	.681	2.000	.156	1/4 - 18 NPT
6949814	**A16RWGCEMR0410I**	4	1.000	1.250	.394	8.000	.681	2.500	.156	1/4 - 18 NPT
left hand										
6949815	**A08KWGCEML0205I**	2	.500	.625	.197	5.000	.336	1.000	.156	1/16 - 27 NPT
6949816	**A10MWGCEML0207I**	2	.625	.787	.276	6.000	.436	1.250	.156	1/8 - 27 NPT
6949817	**A12QWGCEML0207I**	2	.750	.984	.276	7.000	.550	1.500	.156	1/8 - 27 NPT
6949818	**A16RWGCEML0210I**	2	1.000	1.250	.394	8.000	.681	2.000	.156	1/4 - 18 NPT
6949819	**A10MWGCEML0307I**	3	.625	.787	.276	6.000	.436	1.250	.156	1/8 - 27 NPT
6949820	**A12QWGCEML0307I**	3	.750	.984	.276	7.000	.549	1.500	.156	1/8 - 27 NPT
6949821	**A16RWGCEML0310I**	3	1.000	1.250	.394	8.000	.681	2.000	.156	1/4 - 18 NPT
6949822	**A16RWGCEML0410I**	4	1.000	1.250	.394	8.000	.681	2.500	.156	1/4 - 18 NPT

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WGC • Blade Holders • Inch



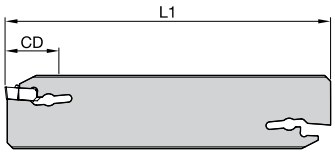


order number	catalog number	HW	H	B	F	H2	B2	H3	L
neutral hand									
2968845	32251221200	1.024	.750	.750	1.161	1.57	1.34	.32	3.39
2968846	32251221600	1.260	1.000	1.000	1.417	1.89	1.63	.30	4.33
2968847	32251222000	1.260	1.250	1.250	1.673	1.97	1.89	.13	4.33

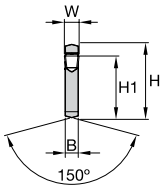
WGC • Double-Ended Cut-Off Blade



Straight

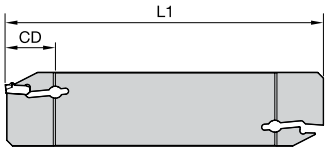


Straight

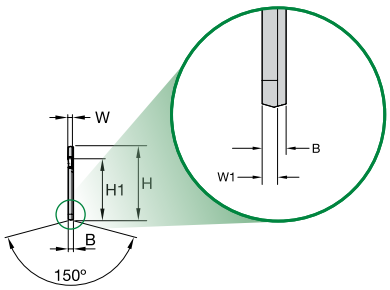




Reinforced



Reinforced

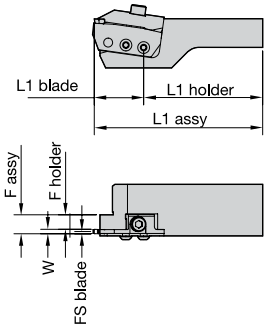


order number	catalog number	SSC	H	W	W1	H1	L1	B	CD
neutral hand									
6498987	WGCBSN19G1B14	1B	19	1,4	1,15	15,5	90	1,80	14
6498988	WGCBSN26J1B15	1B	26	1,4	1,15	21,5	110	1,80	15
6498989	WGCBSN19G1F16	1F	19	1,6	1,30	15,5	90	1,80	16
6498990	WGCBSN26J1F17	1F	26	1,6	1,30	21,5	110	1,80	17
6499211	WGCBSN19G0220	2	19	2,0	–	15,5	90	1,65	20
6499212	WGCBSN26J0230	2	26	2,0	–	21,5	110	1,65	30
6499213	WGCBSN32M0250	2	32	2,0	–	25,1	150	1,65	50
6499214	WGCBSN26J0340	3	26	3,0	2,40	21,5	110	2,40	40
6499215	WGCBSN32M0350	3	32	3,0	2,40	25,1	150	2,40	50
6499216	WGCBSN26J0440	4	26	4,0	3,40	21,5	110	3,40	40
6499217	WGCBSN32M0450	4	32	4,0	3,40	25,1	150	3,40	50
6499218	WGCBSN32M0560	5	32	5,0	4,40	25,1	150	4,40	60
6499219	WGCBSN32M0660	6	32	6,0	5,40	25,1	150	5,40	60
6499220	WGCBSN32M0860	8	32	8,0	7,00	25,1	150	7,00	60
6499221	WGCBSN52X08120	8	53	8,0	7,00	45,3	260	7,00	120

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WGC Separator Universal Style Toolholder • 2¼" Bar Capacity





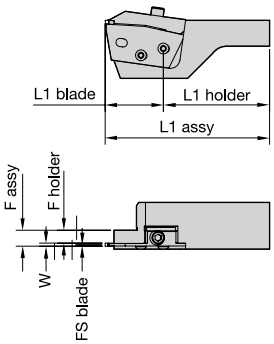
order number	catalog number	B	H	H2	F	L1	L
right hand							
3538667	**206128**	.812	.750	1.719	1.334	2.747	4.270
3538658	**206113**	1.062	1.000	1.719	1.584	4.247	5.770
3538665	**206123**	1.062	1.000	1.719	1.584	3.247	4.770
left hand							
3538662	**206118**	.812	.750	1.719	1.334	2.747	4.270
3538668	**206136**	1.062	1.000	1.719	1.584	3.247	4.770

W	L1	FS	left hand clamp	clamp for toolholder 206118 only	support blade	clamp for toolholder 206128 only	right hand clamp
.094	1.752	.036	**435149**	**435151**	**310109**	**435150**	**435148**
.125	1.752	.050	**435104**	**435110**	**310102**	**435116**	**435101**
.188	1.752	.072	**435105**	**435109**	**310108**	**435117**	**435102**

NOTE: Ships with blade and clamp screws.
Support blade requires two screws.
.750" shank holders 206118 and 206128 use different clamps.
Please use right hand clamp with right hand holder or left hand clamp with left hand holder.

WGC Separator Universal Style Toolholder • 3" Bar Capacity





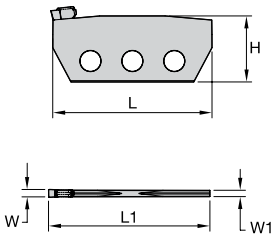
order number	catalog number	B	H	H2	F	L1	L
right hand							
3538660	**206115**	.964	1.000	2.219	1.454	3.754	5.640
3538661	**206116**	1.064	1.000	2.219	1.554	3.754	5.640
3587587	**206121**	1.194	1.250	2.219	1.684	4.004	5.890
left hand							
3563799	**206110**	1.074	1.000	2.219	1.564	3.304	5.190
3538663	**206119**	1.104	1.000	2.219	1.594	3.754	5.640

W	L1	FS	left hand clamp	support blade	right hand clamp
.125	2.246	.050	**435137**	**309111**	**435136**
.188	2.246	.072	**435106**	**309105**	**435103**
.250	2.246	.094	**435107**	**309106**	**435108**

NOTE: Ships with blade and clamp screws.
Support blade requires two screws.
Please use right hand clamp with right hand holder or left hand clamp with left hand holder.

WGCMSU-B • WGC Separator Universal Blade • for 2¼" Bar Capacity



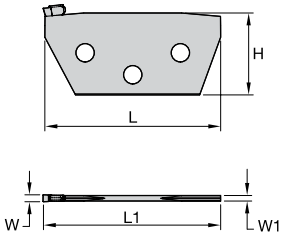


order number	catalog number	SSC	H	FS	L	LPR
neutral hand						
6788445	**WGCSUN0228B**	2	25,40	,825	60,325	60,325
6788446	**WGCSUN0328B**	3	25,00	1,200	60,325	60,325
6788447	**WGCSUN0428B**	4	24,70	1,700	60,325	60,325

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.
Through the pocket coolant available in seat sizes 3 and higher.

WGCMSU-B • WGC Separator Universal Blade • for 3" Bar Capacity



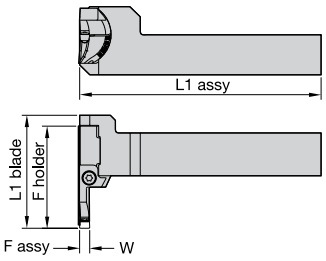


order number	catalog number	SSC	H	FS	L	LPR
neutral hand						
6788453	**WGCSUN0338B**	3	35,50	1,200	76,200	76,200
6788454	**WGCSUN0438B**	4	35,20	1,700	76,200	76,200

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.
Through the pocket coolant available in seat sizes 3 and higher.

WGC Ranger Toolholder • Square Shank



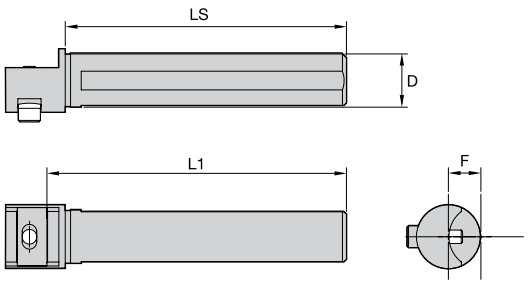


order number	catalog number	B	B3	F	H	H2	L1	LS
right hand								
3538797	**235104**	1.06	.44	-.19	1.00	1.69	5.963	4.475
left hand								
3538800	**235107**	1.06	.44	-.19	1.00	1.69	5.963	4.475
3538801	**235108**	1.06	.44	-.19	1.25	1.94	5.963	4.475

NOTE: The toolholder shank is supplied with the support blade mounting screw, 606218, and nut, 61317. Order the insert and cartridge separately. Select left-hand cartridge for right-hand toolholder. Select right-hand cartridge for left-hand toolholder.

WGC Ranger Toolholder • Round Shank • Universal Shank for RH and LH Assemblies



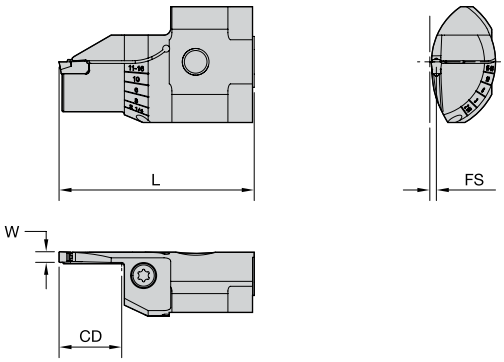


order number	catalog number	D	L1	LS	F
neutral hand					
3538803	**235110**	1.000	6.750	6.600	.763
3538802	**235109**	1.250	6.750	6.600	.763
3538794	**235101**	1.500	6.750	6.500	.763

NOTE: Select right-hand cartridge for right-hand assembly. Select left-hand cartridge for left-hand assembly. Round shank bars are supplied with the support blade mounting screw, 619155, and washer, 613135. Order the insert and cartridge separately.

WGCRM-A • WGC Ranger Single-Ended Modular Blades



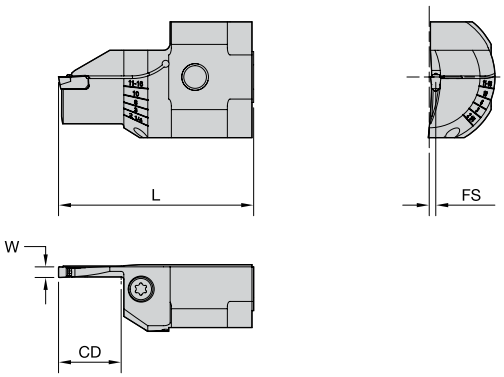


order number	catalog number	SSC	W	CD	D min	D max	FS	L
right hand								
6740385	**WGCMRAR0319A317**	3	.125	19,1	2.25	16.00	-1,63	2.30
6740386	**WGCMRAR0425A476**	4	.188	25,4	2.25	16.00	-2,42	2.55
6740387	**WGCMRAR0625A635**	6	.250	25,4	2.25	16.00	-3,23	2.55
left hand								
6740382	**WGCMRAL0319A317**	3	.125	19,1	2.25	16.00	-1,63	2.30
6740383	**WGCMRAL0425A476**	4	.188	25,4	2.25	16.00	-2,42	2.55
6740384	**WGCMRAL0625A635**	6	.250	25,4	2.25	16.00	-3,23	2.55

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.
Through the pocket coolant available in seat sizes 3 and higher.

WGCRM-B • WGC Ranger Single-Ended Modular Blades





order number	catalog number	SSC	W	CD	D min	D max	FS	L
right hand								
6740411	**WGCMRAR0319B317**	3	.125	19,1	2.25	16.00	-1,55	2.30
6740412	**WGCMRAR0425B476**	4	.188	25,4	2.25	16.00	-2,34	2.55
6740413	**WGCMRAR0625B635**	6	.250	25,4	2.25	16.00	-3,13	2.55
left hand								
6740388	**WGCMRAL0319B317**	3	.125	19,1	2.25	16.00	-1,55	2.30
6740389	**WGCMRAL0425B476**	4	.188	25,4	2.25	16.00	-2,34	2.55
6740390	**WGCMRAL0625B635**	6	.250	25,4	2.25	16.00	-,31	2.55

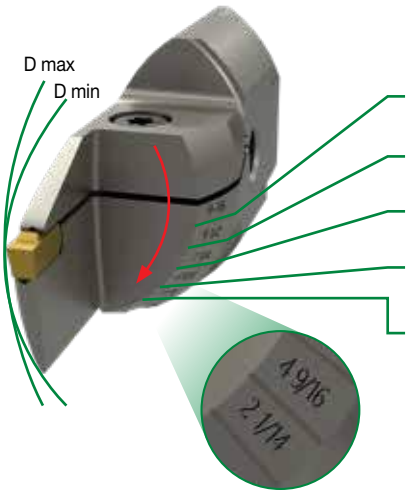
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.
Through the pocket coolant available in seat sizes 3 and higher.

WGC Ranger™ - Technical Information

Application Information:

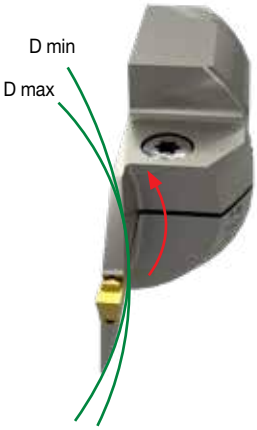
- When changing inserts, be sure the new insert locates against the positive stop on the blade.
- Never tighten the insert clamping screw without an insert in the pocket. Permanent damage to the clamp could occur.
- Toolholder projection length out of the tool block should be as short as possible to maintain rigidity.
- Slower speeds and feeds are recommended compared to O.D. grooving.

A-Style Blade
(LH Shown)



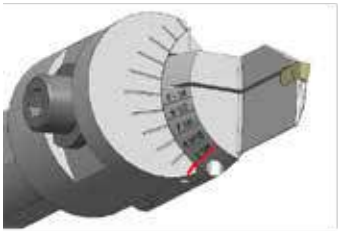
Blade Marking	D min	D max
	[Inch]	[Inch]
	Metric	Metric
9-16	[9]	[16]
	228.6	406.4
9 ½	[8]	[11]
	203.2	279.4
7 ¼	[5]	[9.5]
	127	241.3
4 9/16	[3.375]	[5.75]
	85.725	146.05
2 ¼	[2.25]	[3.5]
	57.15	88.9

B-Style Blade
(LH Shown)

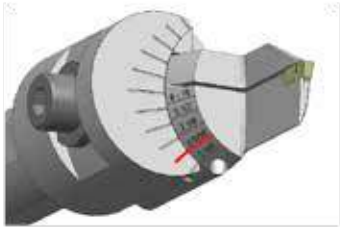


NOTE: Align Each Blade Marking Against Holder Marking to get the Right D min-D max. Tool Pre-setting recommended after each setting.

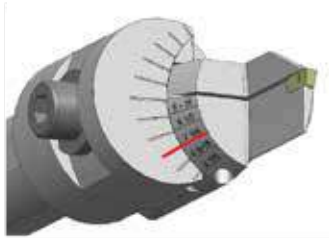
WGC Ranger™ Blade Setting positions



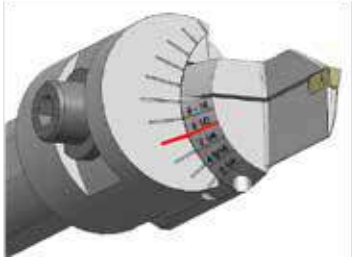
Mark = 2 ¼ setting,
D min = 2.25" D max = 3.5"



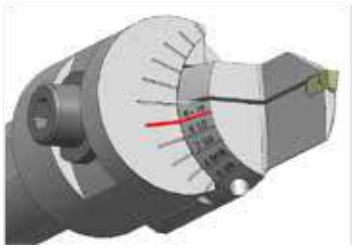
Mark = 4 9/16 setting,
D min= 3.375" D max = 5.75"



Mark = 7 1/4 setting,
D min = 5" D max = 9.5"



Mark = 9 1/2 setting,
D min= 8" D max = 11"



Mark = 9-16 setting,
D min = 9" D max = 16"

WGC Ranger™ Blade vs Old Ranger Blade Cross-Reference

WGC Ranger Blade mm#	ANSI Catalog #	ISO Catalog #	Ranger Blade mm#	Ranger Blade Catalog #
6740382	WGCMRAL0319A317	WGCMRAL0319A317	3539537	338-123
6740383	WGCMRAL0425A476	WGCMRAL0425A476	3539538	338-124
6740384	WGCMRAL0625A635	WGCMRAL0625A635	3539546	338-132
6740385	WGCMRAR0319A317	WGCMRAR0319A317	3539535	338-121
6740386	WGCMRAR0425A476	WGCMRAR0425A476	3539536	338-122
6740387	WGCMRAR0625A635	WGCMRAR0625A635	3539545	338-131
6740388	WGCMRAL0319B317	WGCMRAL0319B317	3539539	338-125
6740389	WGCMRAL0425B476	WGCMRAL0425B476	3539540	338-126
6740390	WGCMRAL0625B635	WGCMRAL0625B635	3539541	338-127
6740411	WGCMRAR0319B317	WGCMRAR0319B317	3539542	338-128
6740412	WGCMRAR0425B476	WGCMRAR0425B476	3539543	338-129
6740413	WGCMRAR0625B635	WGCMRAR0625B635	3539544	338-130

Coolant Kit

Kit Description	Order Number	Shank Size	Coolant Pressure	1/16 NPTF MALE TO JIC MALE	1/8 NPTF MALE TO JIC MALE	M8 X 1.25 MALE TO JIC MALE	M8 X 1.0 MALE TO JIC MALE	G1/8 MALE TO JIC MALE	M10 MALE TO JIC MALE	MALE JIC TO FEMALE JIC ELBOW	HEAVY-DUTY 200MM COOLANT HOSE	HEAVY-DUTY 300MM COOLANT HOSE	UNIV 200MM FLEX COOLANT HOSE	UNIV 300MM FLEX COOLANT HOSE	M8X1.0 BANJO 200MM FLEX HOSE	G1/8 BANJO 200MM FLEX HOSE	M8X1.0 BANJO 300MM FLEX HOSE	G1/8 BANJO 300MM FLEX HOSE
			Component Description															
			Component Order Number	6145374	6145375	6145378	6475041	6145376	6145377	6145379	6145380	6145381	6432549	6432550	6475043	6475045	6475047	6475049
Universal 200mm flex hose coolant kit	6475019	12–40mm 1/2–1-1/2"	200 Bar 2901 psi		•	•	•	•	•	•			•					
Universal 300mm flex hose coolant kit	6475021	12–40mm 1/2–1-1/2"	200 Bar 2901 psi	•	•	•	•	•	•	•				•				
M8x1.0 banjo 200mm flex hose coolant kit	6475023	12–20mm 1/2–3/4"	200 Bar 2901 psi					•	•	•					•			
M8x1.0 banjo 300mm flex hose coolant kit	6475025	12–20mm 1/2–3/4"	200 Bar 2901 psi					•	•	•							•	
G 1/8 banjo 200mm flex hose coolant kit	6475027	25–40mm 1–1-1/2"	200 Bar 2901 psi					•	•	•						•		
G 1/8 banjo 300mm flex hose coolant kit	6475029	25–40mm 1–1-1/2"	200 Bar 2901 psi					•	•	•								•
Universal 200mm heavy-duty coolant kit	6145372	25–40mm 1–1-1/2"	350 Bar* 5076 psi*	•	•			•	•	•	•							
Universal 300mm heavy-duty coolant kit	6145373	25–40mm 1–1-1/2"	350 Bar* 5076 psi*	•	•			•	•	•		•						

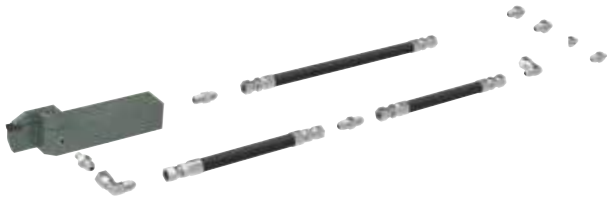
** Max pressure for seat size 02 holders is 200 bar/2901 psi.*

Individual Kit Component List



order number	catalog number	description
6145374	1-16NPTF-JIC	Straight fitting, 1/16 NPTF male thread to JIC male thread
6145375	1-8NPTF-JIC	Straight fitting, 1/8 NPTF male thread to JIC male thread
6145378	M8X1.25-JIC	Straight fitting, M8 x 1.25 male thread to JIC male thread
6475041	M8X1-JIC	Straight fitting, M8 x 1.0 male thread to JIC male thread
6145376	G18-JIC	Straight fitting, G 1/8 male thread to JIC male thread
6145377	M10X1.5-JIC	Straight fitting, M10 x 1.5 male thread to JIC male thread
6145379	JICM-JICF-ELB	Elbow fitting, male JIC thread to female JIC thread
6145380	COOL-HOSE-200-HD	Heavy Duty 200mm Coolant hose with JIC female fitting both ends
6145381	COOL-HOSE-300-HD	Heavy Duty 300mm Coolant hose with JIC female fitting both ends
6432549	COOL-HOSE-200-FLEX	Flexible braided 200mm Coolant hose with JIC female fitting both ends
6432550	COOL-HOSE-300-FLEX	Flexible braided 300mm Coolant hose with JIC female fitting both ends
6475043	M8X1-BAN-JIC-HOSE-200	Flexible braided 200mm Coolant hose, M8 x 1.0 male thread to JIC female thread. Contains (1) M8x1.0 banjo bolt and (2) M8 bonded washers
6475045	G18-BAN-JIC-HOSE-200	Flexible braided 200mm Coolant hose, G 1/8 male thread to JIC female thread. Contains (1) G 1/8 banjo bolt and (2) G 1/8 bonded washers
6475047	M8X1-BAN-JIC-HOSE-300	Flexible braided 300mm Coolant hose, M8 x 1.0 male thread to JIC female thread. Contains (1) M8x1.0 banjo bolt and (2) M8 bonded washers
6475049	G18-BAN-JIC-HOSE-300	Flexible braided 300mm Coolant hose, G 1/8 male thread to JIC female thread. Contains (1) G 1/8 banjo bolt and (2) G 1/8 bonded washers

Individual Kit Component List



The items shown below are not part of any coolant kits shown on previous pages.

order number	catalog number	description
6145382	M6X1-JIC	Straight fitting, M6 x 1.0 male thread to JIC male thread
6145383	JICM-JICM-STR	Straight fitting, JIC male thread to JIC male thread
6145386	G14-G18-RED	Straight fitting, G 1/4 male thread to G 1/8th male thread
6475058	R18-JIC	Straight fitting, 1/8 BSPT male thread to JIC male thread
6475059	R14-JIC	Straight fitting, 1/4 BSPT male thread to JIC male thread

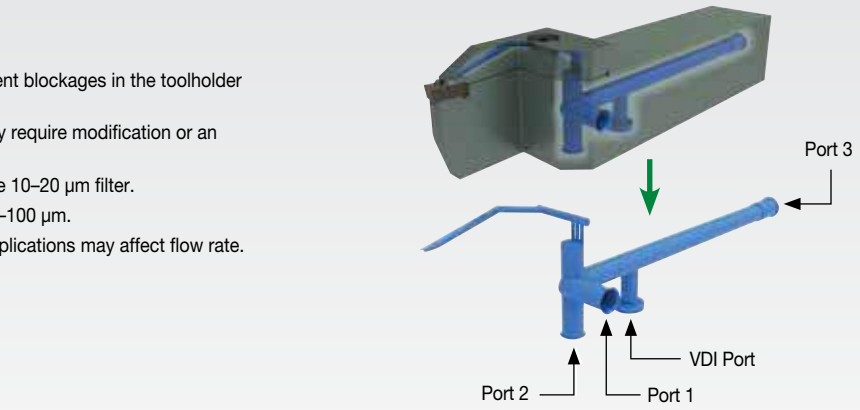
Coolant Spare Parts

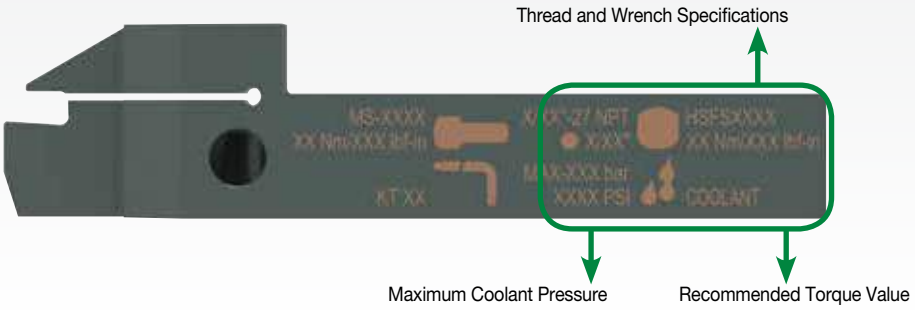
Included in kits; part of components.

order number	catalog number	description
6475051	M8X1-BAN-BOLT	Banjo bolt, M8 x 1.0 male thread
6475053	G18-BAN-BOLT	Banjo bolt, G1/8 male thread
6475060	M6-BON-WASHER	M6 bonded washer
6475055	M8-BON-WASHER	M8 bonded washer
6475061	M10-BON-WASHER	M10 bonded washer
6475056	G18-BON-WASHER	G 1/8 bonded washer

Internal Coolant Delivery Guidelines

1. WGC system capable of 5076 psi (350 bar).
2. Toolholder delivered with four entry holes.
3. A quality filtration system is necessary to prevent blockages in the toolholder that will affect coolant flow and performance.
4. Machines without a proper filtering system may require modification or an inline filter.
   - For pressure >1015 psi [70 bar], use 10–20 µm filter.
   - For pressure <1015 psi [70 bar], 50–100 µm.
   - Using fine filters in low-pressure applications may affect flow rate.





General Safety Guidelines

1. All safety doors and mechanisms must be in place before trying out the internal coolant to avoid any danger to the operator in the event of a failure.
2. Use the correct pipe fittings to connect the holders to the system. Ensure the maximum pressure recommended for the fittings are not exceeded.
3. While implementing pressure >1160 psi [80 bar], increase the pressure in steps to ensure proper functioning of insert clamping and leak-free joints.
4. While indexing inserts, ensure the pocket is free from chips and/or dirt. Also, inspect the insert and make sure there are no blockages in the coolant canal.
5. Periodically check all hoses and fittings for damage and wear for proper functioning of the system. This check should also include filters.

Internal Coolant Delivery Performance

Internal coolant offers a clear advantage in tool life and chip forming/evacuation vs. external coolant in difficult conditions and in high-pressure coolant.

Example: Chipbreaking in plunging of steel.

	Flood Coolant	Internal Coolant	
			
Material steel ST52; Insert size 6mm; f = 0,25 mm/U	1087 psi (75 bar)	2900 psi (200 bar)	

Low Pressure — If performance is at risk due to low coolant pressure, apply internal coolant in combination with external coolant to increase volume.

Recommendation to improve tool life and/or productivity: Apply high-pressure coolant: 80–350 bar recommended.

VDI Assemblies

The WGC internal coolant delivery can be leveraged with VDI holding systems with both traditional or Quick-Change coolant connections.

WMT™

Grooving and Cut-Off

The WMT platform is the economical and reliable option for grooving, cut-off, turning, and profiling applications.

The WMT system, with its extra-long clamping area and precise insert positioning, ensures exceptionally fast and accurate machining, and is an all-in-one tool for demanding operations.

- Specifically designed to increase speeds and feeds.
- Versatile geometry for even your most demanding deep-grooving applications.
- The WMT system enables heavy stock removal in turning applications.
- Ensures finer surface finishes and a long, reliable tool life.
- Extra-long clamping area for unsurpassed grooving and turning stability.
- Interchangeable grooving and cut-off inserts designed for excellent chip control.

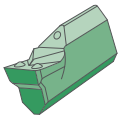
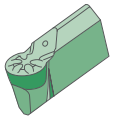


FIVE AVAILABLE CHIPBREAKER STYLES

CM	CM-W	PT	PC	PH
Cut-Off Medium	Cut-Off Medium with Wiper	Groove, Plunge, and Turn	Plunge and Contour	Groove, Plunge, and Turn

RELIABLE ACCURACY WITH WMT™

INSERTS

APPLICATION	TYPES	GROOVE WIDTH	INSERT GEOMETRY	GRADE	MATERIALS
GROOVING		2,0–8,0mm (0.081–0.317")	PT, PH	WU10PT, WU25PT	P M K N S H
FACE GROOVING		3,0–6,35mm (0.125–0.250")	PT, PH	WU10HT	M K N S
CUT-OFF		1,5–4,0mm (0.059–0.157")	CM CM-W	WP10CT, WP25CT	P K
PROFILING		3,0–8,0mm (0.118–0.317")	PC - Full Radius		

APPLICATIONS



TURNING | GROOVING | I.D. GROOVING | FACE GROOVING | CUT-OFF | PROFILING

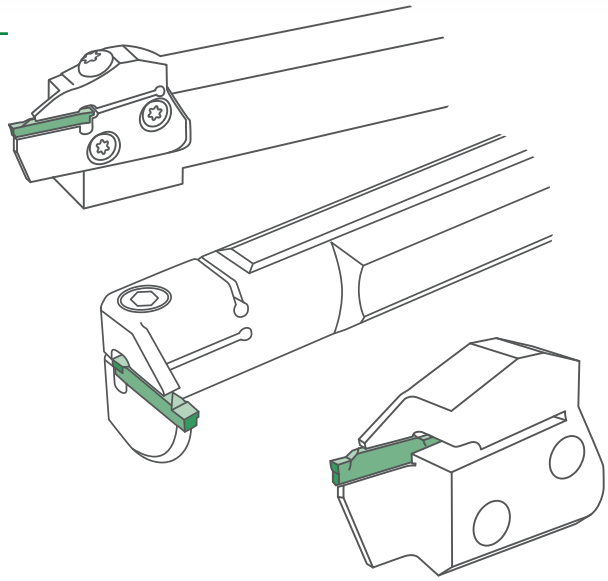
INDUSTRY

TRANSPORTATION

AEROSPACE

ENERGY

GENERAL ENGINEERING



Choosing the Correct WMT Tooling

The Most Advanced Turning Solutions in the Industry

For unsurpassed quality, value, and performance, look no further than the WIDIA™ comprehensive line of specially engineered and dependable grooving and cut-off solutions. All the tools you need from the reliable name you can trust!

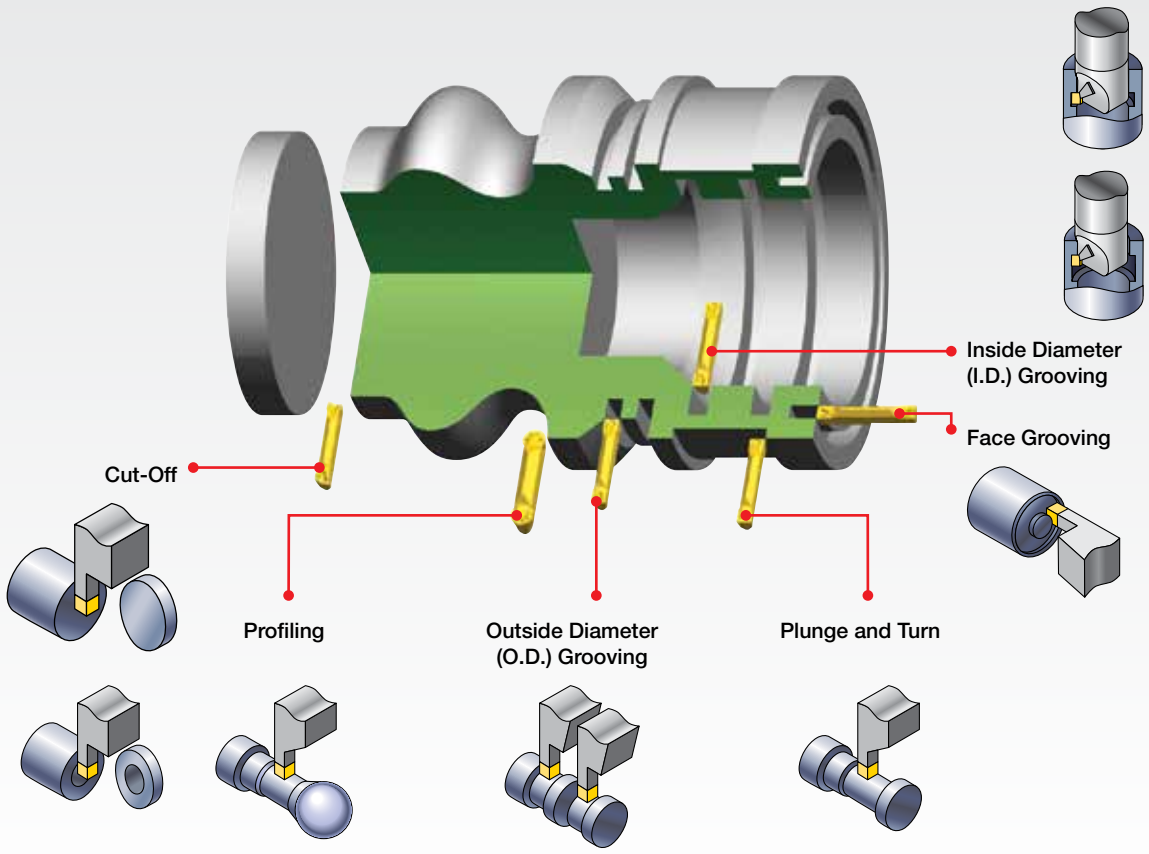
The WMT system, with its extra-long clamping area and precise insert positioning, ensures exceptionally fast and accurate machining, all-in-one tool, for your most demanding grooving, cut-off, turning, and profiling applications.

It is perfect for all general-purpose operations, including both shallow and deep grooving.

Utilize this handy, easy-to-use guide to identify and select the appropriate grooving and cut-off tools for your specific needs.

1 Choose the application to be performed:

Groove depth, width, and profile.



2 Identify the material to be machined:

Each tool has a material grid marked with a letter indicating the materials that can be machined.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

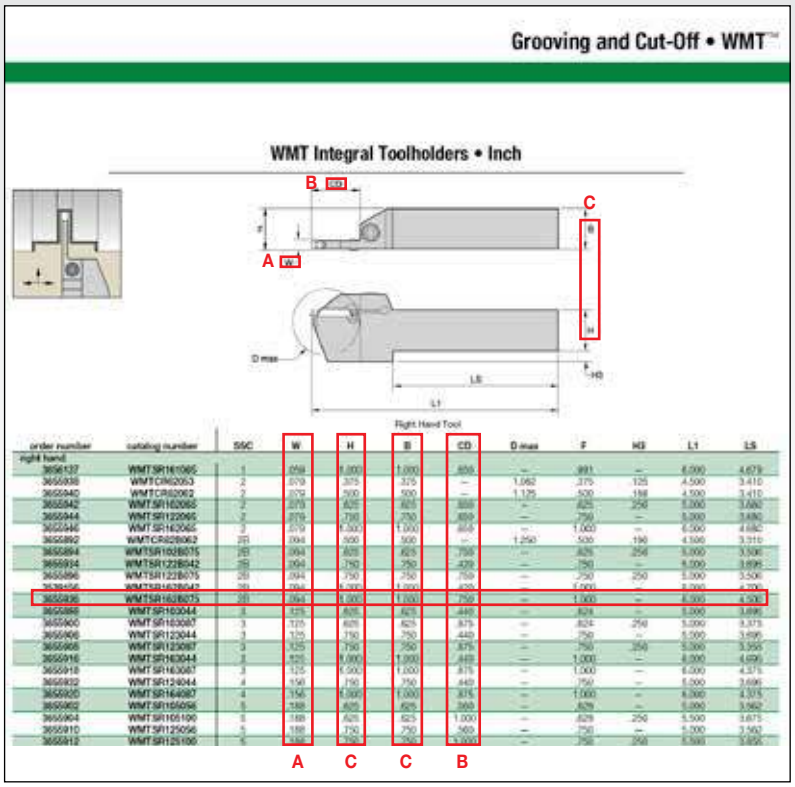
Choosing the Correct WMT Tooling

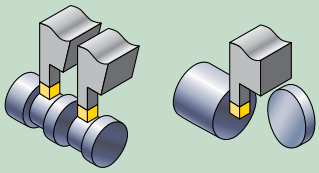
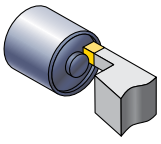
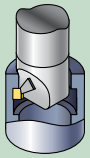
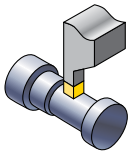
3 Select your toolholder based on the application:

A Choose the appropriate width "W" required for the application.

B Choose the shortest cutting depth "CD" dimension for increased tool rigidity.

C Select the largest toolholder shank "H" and "B" dimensions for maximum rigidity.



	application	conventional toolholders	modular blades
	O.D. Grooving and Cut-Off	pages E375–E376	page E382
	Face Grooving	page E377	page E381
	I.D. Grooving	page E379	–
	Plunge and Turn	pages E375–E376	page E382

Choosing the Correct WMT Tooling

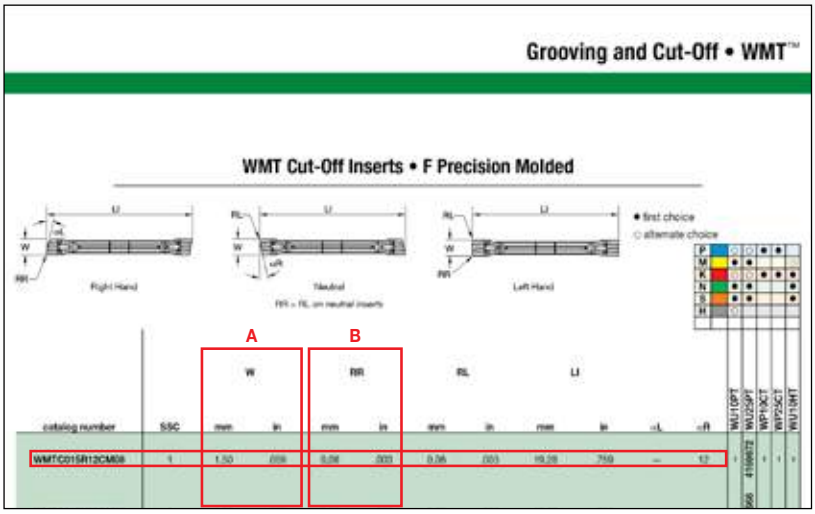
4 Select chipbreaker style for the application:

CM Cut-Off Medium
CM-W Cut-Off Medium with Wiper
PT Groove, Plunge, and Turn
PC Plunge and Contour
PH Groove, Plunge, and Turn

NOTE: Chart shows recommended starting feed rates.



A Choose the appropriate insert width "W" for your specific application.
B Select the required corner radius value "RR".



Choosing the Correct WMT Tooling

5 Select grade:

Grooving cutting condition		Recommended Grades: steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
heavily interrupted cut		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	–
lightly interrupted cut		WP25CT/ WU25PT	WU25PT	WP25CT/ WU25PT	WU25PT	WU25PT	–
varying depth of cut, casting, or forging skin		WU10PT	WU10PT	WP10CT/ WU10PT	WU10PT	WU10HT/ WU10PT	WU10PT
smooth cut, pre-turned surface		WP10CT/ WU10PT	WU10PT	WP10CT/ WU10PT	WU10PT	WU10HT/ WU10PT	WU10PT

Cut-Off cutting condition		Recommended Grades: steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
heavily interrupted cut		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	–
lightly interrupted cut		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	–
varying depth of cut, casting, or forging skin		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	WU25PT
smooth cut, pre-turned surface		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	WU25PT

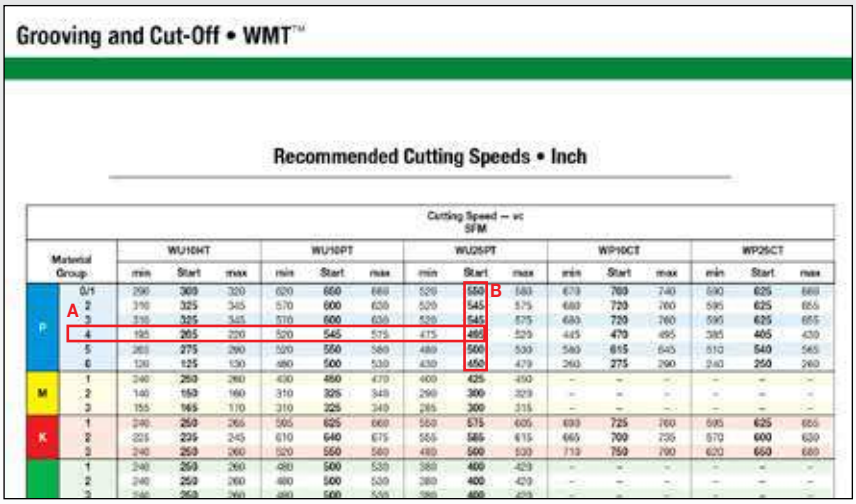
NOTE: See page E357 for Grades and Grade Descriptions.

6 Determine cutting data:

A Based on material group and grade, identify starting speed (vc).

B First choice starting speed is in bold.

NOTE: See pages E359–E360 for cutting data.


Grooving and Cut-Off • WMT™

Recommended Cutting Speeds • Inch

Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

Cut-Off

WMT	C	015	N	00	CM	08
Tooling System	Cut-Off	W in mm* 10 inch* 1000	Hand of Insert	Main Cutting Edge Lead Angle	Chipbreaker Geometry **CM** = Cut-Off Medium **CM-W** = Cut-Off Medium with Wiper	Corner Radius in mm* 10

Groove, Plunge, Turn, and Contour Inserts

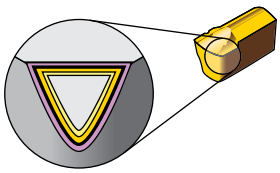
WMT	S	205	M	2	U	02	PT
Tooling System	Square	mm* 10 inch* 1000	Unit of Measurement for Width **M** = mm **I** = inch	Seat Size	Insert Tolerance	Corner Radius in mm* 10	Chipbreaker Geometry **PT** = Groove, Plunge, and Turn **PH** = Groove, Plunge, and Turn **PC** = Plunge and Contour

P = Precision ground grooving width tolerance:
± .001" (0,025mm)

U = Utility molded grooving width tolerance:

3,05–4,05:	+ .006" / -0	(+0,15mm) / -0
5,05–10,05:	+ .010" / -0	(+0,25mm) / -0

Grades and Grade Descriptions

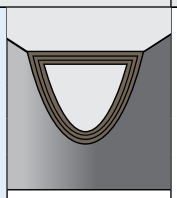
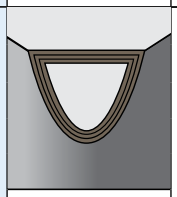
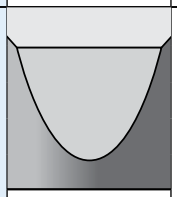
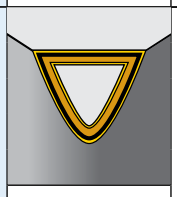
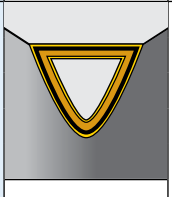


Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade

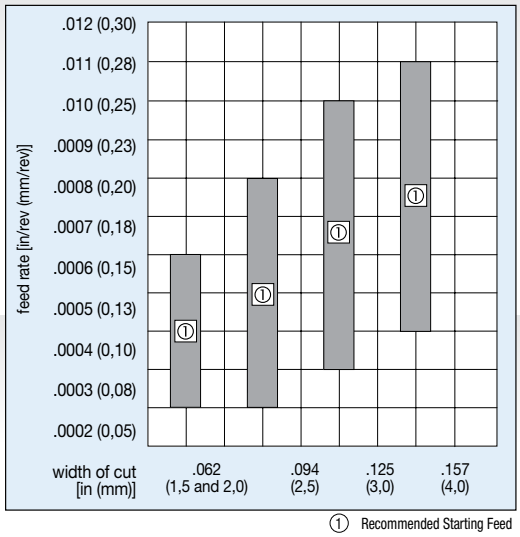
Coating	Grade Description	05	10	15	20	25	30	35	40	45
WU10PT  HC-P15	An advanced PVD-TiAlN coating over a very deformation-resistant unalloyed carbide substrate. The WU10PT™ grade's new and improved coating enables speeds to be increased by 50–100%. The WU10PT grade is ideal for finishing to general machining of most workpiece materials at higher speeds. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys under stable conditions. It also performs well machining hardened and short chipping materials.	P, M, K, N, S, H								
WU25PT  HC-P30	An advanced PVD-TiAlN-coated grade with a tough, ultra-fine-grain, unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Speeds may vary from low to medium and will handle interruptions and high feed rates.	P, M, K, N, S, H								
WU10HT  HW-K15	A hard, low binder content, unalloyed WC/Co fine-grained uncoated grade. Exceptional edge wear resistance combined with very high strength for machining titanium, cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys. Superior thermal deformation and depth-of-cut notch resistance. The grain structure is well controlled for minimal pits and flaws, which contributes to long, reliable service.	M, K, N, S								
WP10CT  HC-P10	A specially engineered, proprietary, cobalt-enriched carbide grade with thick K-MTCVD-TiCN coating layer, an Al_2O_3 layer of controlled grain size, and outer layers of TiCN and TiN for maximum wear resistance. An excellent finishing to medium machining grade for a variety of workpiece materials including most steels, ferritic and martensitic stainless steels, and cast irons. The specially engineered cobalt-enriched substrate offers a balanced combination of deformation resistance and edge toughness, while the thick coating layers offer outstanding abrasion resistance and crater wear resistance for high-speed machining. The smooth coating provides good resistance to edge build-up and microchipping and produces excellent surface finishes.	P, K								
WP25CT  HC-P25	A tough cobalt-enriched carbide grade with a newly designed multilayer K-MTCVD TiCN-Al_2O_3-TiCNTiN coating with superior interlayer adhesion. This is the industry's best general-purpose turning grade for most steels and ferritic and martensitic stainless steels. The substrate design, with cobalt-enrichment, ensures adequate deformation resistance along with excellent bulk toughness and insert edge strength. The coating layers offer good wear resistance over a wide range of machining conditions. The smoothness of the coating leads to reduced frictional heat, minimizes microchipping, and improves workpiece surface finishes.	P, K								

Feed Values for Grooving Inserts

CM Cut-Off Medium



- Double-ended, V-bottom and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.
- Ideal for 300 Series stainless steel, tool steel, titanium, INCONEL®, and other nickel-based alloys at moderate speeds and feeds.



CM-W Cut-Off Medium with Wiper

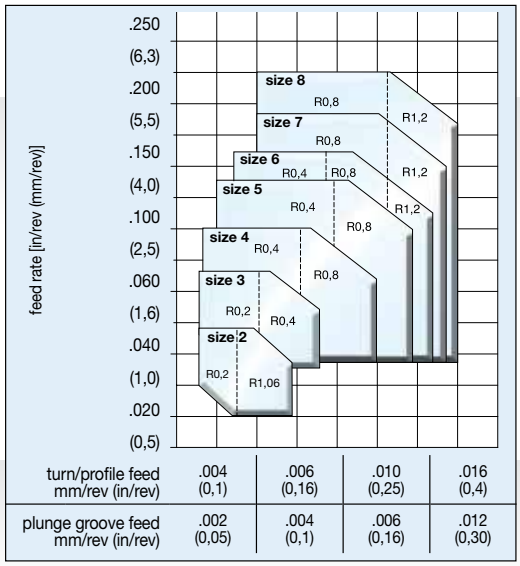


- Wiper flats where surface finish is critical.
- Double-ended, V-bottom, and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.

PT Plunge, Groove, and Turn Inserts



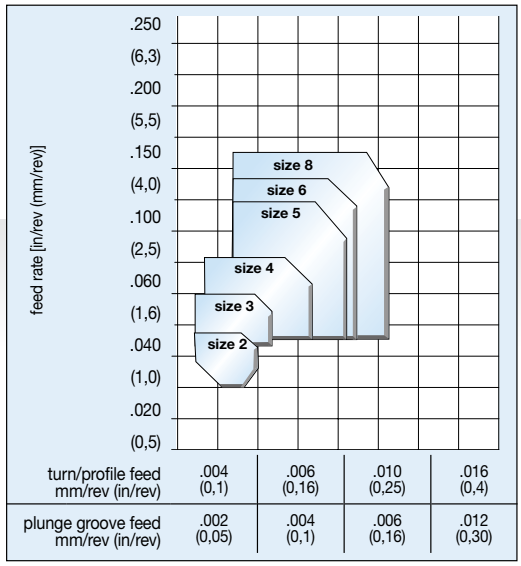
- High positive rake geometry for low cutting force, especially in soft materials.
- Deep grooving tool for plunge and turn O.D. and face grooving operations.
- Deliver chip control over full range of DOC when turning.
- Cut in both axial and radial directions.



PC Grooving and Profiling Inserts



- Superior chip control.
- Full nose radius geometry for plunge and contour operations.
- Effective cutting edge geometry exceeds 180° for increased versatility.



PH Plunge, Groove, and Turn Inserts



- Excellent performance in greater than 35 HRC.
- Deep grooving tool for plunge and turn O.D. and face grooving operations.
- Deliver chip control over full range of DOC when turning.
- Deliver superior chip control in interrupted cuts.

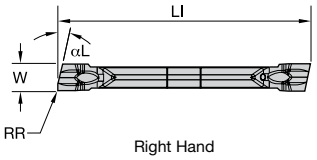
Recommended Cutting Speeds • Metric

Material Group		Cutting Speed — vc m/min														
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0/1	100	**100**	110	190	**200**	210	170	**175**	180	210	**225**	240	170	**175**	180
	2	95	**95**	105	180	**185**	190	150	**160**	170	210	**220**	230	185	**195**	205
	3	95	**95**	105	180	**185**	190	150	**160**	170	210	**220**	230	185	**195**	205
	4	70	**70**	75	165	**170**	175	135	**145**	155	140	**145**	155	125	**125**	135
	5	85	**90**	95	170	**175**	180	140	**150**	160	180	**190**	195	155	**165**	170
	6	50	**50**	50	140	**150**	160	120	**125**	130	70	**75**	80	70	**75**	80
M	1	70	**75**	80	120	**125**	130	120	**125**	130	–	**–**	–	–	**–**	–
	2	50	**50**	50	100	**100**	110	70	**75**	80	–	**–**	–	–	**–**	–
	3	50	**50**	50	95	**100**	105	85	**90**	95	–	**–**	–	–	**–**	–
K	1	85	**90**	95	190	**200**	210	155	**165**	170	215	**225**	235	180	**190**	195
	2	75	**75**	80	185	**190**	200	155	**165**	175	205	**215**	225	175	**185**	195
	3	70	**75**	80	170	**175**	180	140	**150**	160	210	**225**	240	190	**200**	210
N	1	70	**75**	80	140	**150**	160	110	**120**	130	–	**–**	–	–	**–**	–
	2	70	**75**	80	140	**150**	80	110	**120**	80	–	**–**	–	–	**–**	–
	3	70	**75**	80	140	**150**	80	110	**120**	80	–	**–**	–	–	**–**	–
	4	70	**75**	80	140	**150**	80	110	**120**	80	–	–	–	–	–	–
	5	70	**75**	80	140	**150**	80	110	**120**	80	–	**–**	–	–	**–**	–
	6	70	**75**	80	140	**150**	80	110	**120**	80	–	**–**	–	–	**–**	–
	7	70	**75**	80	140	**150**	120	110	**120**	105	–	**–**	–	–	**–**	–
S	1	20	**25**	30	70	**75**	80	60	**65**	65	–	**–**	–	–	**–**	–
	2	20	**25**	30	65	**65**	70	50	**50**	50	–	**–**	–	–	**–**	–
	3	50	**50**	50	100	**100**	110	70	**75**	80	–	**–**	–	–	**–**	–
	4	-	**–**	–	70	**75**	80	50	**50**	50	–	**–**	–	–	**–**	–
H	1	–	**–**	–	15	**30**	60	15	**30**	60	–	**–**	–	–	**–**	–
	2	–	**–**	–	15	**30**	60	15	**30**	60	–	**–**	–	–	**–**	–
	3	–	**–**	–	15	**30**	60	15	**30**	60	–	**–**	–	–	**–**	–
	4	–	**–**	–	15	**30**	60	15	**30**	60	–	**–**	–	–	**–**	–

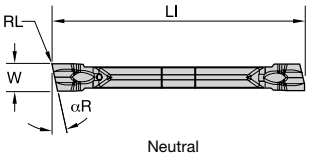
Recommended Cutting Speeds • Inch

Material Group		Cutting Speed — vc SFM														
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0/1	290	**300**	320	620	**650**	680	520	**550**	580	670	**700**	740	590	**625**	660
	2	310	**325**	345	570	**600**	630	520	**545**	575	680	**720**	760	595	**625**	655
	3	310	**325**	345	570	**600**	630	520	**545**	575	680	**720**	760	595	**625**	655
	4	195	**205**	220	520	**545**	575	475	**495**	520	445	**470**	495	385	**405**	430
	5	265	**275**	290	520	**550**	580	480	**500**	530	580	**615**	645	510	**540**	565
	6	120	**125**	130	480	**500**	530	430	**450**	470	260	**275**	290	240	**250**	260
M	1	240	**250**	260	430	**450**	470	400	**425**	450	–	**–**	–	–	**–**	–
	2	140	**150**	160	310	**325**	340	290	**300**	320	–	**–**	–	–	**–**	–
	3	155	**165**	170	310	**325**	340	285	**300**	315	–	**–**	–	–	**–**	–
K	1	240	**250**	265	595	**625**	660	550	**575**	605	690	**725**	760	595	**625**	655
	2	225	**235**	245	610	**640**	675	555	**585**	615	665	**700**	735	570	**600**	630
	3	240	**250**	260	520	**550**	580	480	**500**	530	710	**750**	790	620	**650**	680
N	1	240	**250**	260	480	**500**	530	380	**400**	420	–	**–**	–	–	**–**	–
	2	240	**250**	260	480	**500**	530	380	**400**	420	–	**–**	–	–	**–**	–
	3	240	**250**	260	480	**500**	530	380	**400**	420	–	**–**	–	–	**–**	–
	4	240	**250**	260	480	**500**	530	380	**400**	420	–	–	–	–	–	–
	5	240	**250**	260	480	**500**	530	380	**400**	420	–	**–**	–	–	**–**	–
	6	240	**250**	260	480	**500**	530	380	**400**	420	–	**–**	–	–	**–**	–
	7	240	**250**	260	480	**500**	530	380	**400**	420	–	**–**	–	–	**–**	–
S	1	110	**115**	120	235	**250**	265	215	**225**	235	–	**–**	–	–	**–**	–
	2	55	**60**	60	195	**210**	220	195	**210**	220	–	**–**	–	–	**–**	–
	3	190	**200**	210	310	**325**	340	290	**300**	320	–	**–**	–	–	**–**	–
	4	100	**100**	110	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
H	1	–	**–**	–	60	**100**	200	60	**100**	200	–	**–**	–	–	**–**	–
	2	–	**–**	–	60	**100**	200	60	**100**	200	–	**–**	–	–	**–**	–
	3	–	**–**	–	60	**100**	200	60	**100**	200	–	**–**	–	–	**–**	–
	4	–	**–**	–	60	**100**	200	60	**100**	200	–	**–**	–	–	**–**	–

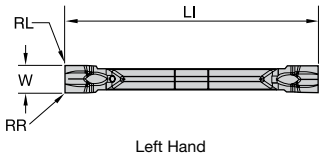
WMT Cut-Off Inserts • F Precision Molded



Right Hand



Neutral



Left Hand

RR = RL *on neutral inserts*

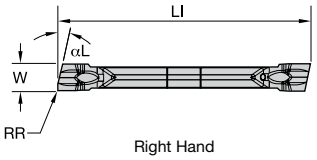
● first choice
○ alternate choice

P	○	○	●	●
M	●	●		○
K	○	○	●	●
N	●	●		●
S	●	●		●
H	○			

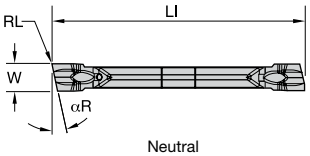
		W		RR		RL		LI								
catalog number	SSC	mm	in	mm	in	mm	in	mm	in	αL	αR	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTC015R12CM08	1	1,50	.059	0,08	.003	0,08	.003	19,28	.759	–	12	-	4169672	-	-	-
WMTC015N00CM08	1	1,50	.059	0,08	.003	0,08	.003	19,30	.760	–	–	-	4169668	-	-	-
WMTC015R05CM08	1	1,50	.059	0,08	.003	0,08	.003	19,31	.760	–	5	-	4169670	-	-	-
WMTC015L05CM08	1	1,50	.059	0,08	.003	0,08	.003	19,31	.760	5	–	-	4169671	-	-	-
WMTC020L05CM08	2	1,99	.079	0,08	.003	0,08	.003	19,21	.756	5	–	-	4169677	-	-	-
WMTC020R05CM08	2	1,99	.079	0,08	.003	0,08	.003	19,21	.756	–	5	-	4169675	-	-	-
WMTC020N00CM08	2	2,00	.079	0,08	.003	0,08	.003	19,21	.756	–	–	-	4169673	-	-	-
WMTC020L12CM08	2	2,00	.079	0,08	.003	0,08	.003	19,25	.758	12	–	-	4169680	-	-	-
WMTC020R12CM08	2	2,00	.079	0,08	.003	0,08	.003	19,26	.758	–	12	-	4169678	-	-	-
WMTC094R12CM13	2B	2,39	.094	0,13	.005	0,13	.005	22,28	.877	–	12	-	4169580	-	-	-
WMTC094N00CM13	2B	2,39	.094	0,13	.005	0,13	.005	22,32	.879	–	–	-	4169576	-	-	-
WMTC094R05CM13	2B	2,39	.094	0,13	.005	0,13	.005	22,32	.879	–	5	-	4169578	-	-	-

WMT Cut-Off Inserts • F Precision Molded

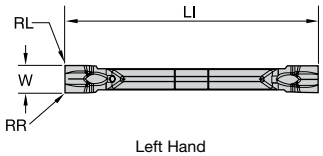
(continued)



Right Hand



Neutral



Left Hand

RR = RL *on neutral inserts*

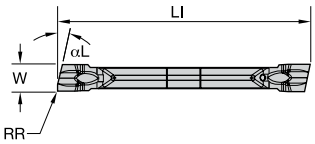
● first choice
○ alternate choice

P	○	○	●	●		
M	●	●				○
K	○	○	●	●	●	●
N	●	●				●
S	●	●				●
H	○					

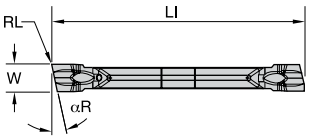
		W		RR		RL		LI								
catalog number	SSC	mm	in	mm	in	mm	in	mm	in	αL	αR	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTC030R05CM17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	–	5	-	4169684	-	-	-
WMTC030R12CM17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	–	12	-	4169688	-	-	-
WMTC030L12CM17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	12	–	-	4169690	-	-	-
WMTC030N00CM17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	–	–	-	4169682	-	-	-
WMTC030L05CM17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	5	–	-	4169686	-	-	-
WMTC125R05CM17	3	3,17	.125	0,17	.007	0,17	.007	25,40	1.000	–	5	-	4169664	-	-	-
WMTC125N00CM17	3	3,17	.125	0,17	.007	0,17	.007	25,41	1.000	–	–	-	4169582	-	-	-
WMTC125R12CM17	3	3,18	.125	0,17	.007	0,17	.007	25,40	1.000	–	12	-	4169666	-	-	-
WMTC040L12CM17	4	4,00	.157	0,17	.007	0,17	.007	25,40	1.000	12	–	-	4169697	-	-	-
WMTC040N00CM17	4	4,00	.157	0,17	.007	0,17	.007	25,40	1.000	–	–	-	4169692	-	-	-
WMTC040R12CM17	4	4,00	.157	0,17	.007	0,17	.007	25,40	1.000	–	12	-	4169696	-	-	-
WMTC040R05CM17	4	4,00	.157	0,17	.007	0,17	.007	25,40	1.000	–	5	-	4169694	-	-	-
WMTC040L05CM17	4	4,00	.157	0,17	.007	0,17	.007	25,40	1.000	5	–	-	4169695	-	-	-

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WMT Cut-Off Inserts • F Precision Molded

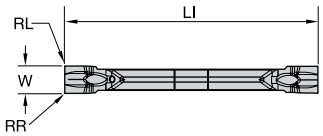


Right Hand



Neutral

RR = RL *on neutral inserts*



Left Hand

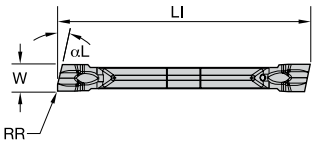
● first choice
○ alternate choice

P	○	○	●	●	
M	●	●			○
K	○	○	●	●	●
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S	●	●			●
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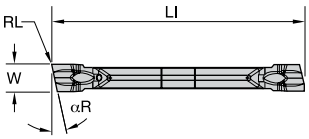
catalog number	SSC	W mm	W in	RR mm	RR in	RL mm	RL in	LI mm	LI in	αL	αR	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTC015N00CMW08	1	1,50	.059	0,08	.003	0,08	.003	19,30	.760	–	–	-	4169669	-	-	-
WMTC020R05CMW08	2	2,00	.079	0,08	.003	0,08	.003	19,20	.756	–	5	-	4169676	-	-	-
WMTC020N00CMW08	2	2,00	.079	0,08	.003	0,08	.003	19,21	.756	–	–	-	4169674	-	-	-
WMTC020L12CMW08	2	2,00	.079	0,08	.003	0,08	.003	19,27	.759	12	–	-	4169681	-	-	-
WMTC020R12CMW08	2	2,00	.079	0,08	.003	0,08	.003	19,27	.758	–	12	-	4169679	-	-	-
WMTC094R12CMW13	2B	2,39	.094	0,13	.005	0,13	.005	22,29	.877	–	12	-	4169581	-	-	-
WMTC094N00CMW13	2B	2,39	.094	0,13	.005	0,13	.005	22,32	.879	–	–	-	4169577	-	-	-
WMTC094R05CMW13	2B	2,39	.094	0,13	.005	0,13	.005	22,32	.879	–	5	-	4169579	-	-	-
WMTC030R05CMW17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	–	5	-	4169685	-	-	-
WMTC030R12CMW17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	–	12	-	4169689	-	-	-
WMTC030L12CMW17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	12	–	-	4169691	-	-	-
WMTC030N00CMW17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	–	–	-	4169683	-	-	-

WMT Cut-Off Inserts • F Precision Molded

(continued)

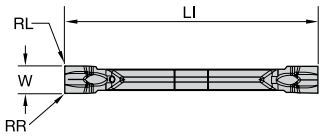


Right Hand



Neutral

RR = RL *on neutral inserts*



Left Hand

● first choice
○ alternate choice

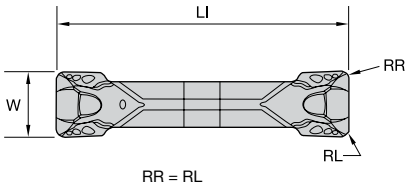
P	○	○	●	●		
M	●	●				○
K	○	○	●	●	●	●
N	●	●				●
S	●	●				●
H	○					

		W		RR		RL		LI								
catalog number	SSC	mm	in	mm	in	mm	in	mm	in	αL	αR	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTC030L05CMW17	3	3,00	.118	0,17	.007	0,17	.007	25,40	1.000	5	–	-	4169687	-	-	-
WMTC125R05CMW17	3	3,17	.125	0,17	.007	0,17	.007	25,41	1.000	–	5	-	4169665	-	-	-
WMTC125R12CMW17	3	3,17	.125	0,17	.007	0,17	.007	25,41	1.000	–	12	-	4169667	-	-	-
WMTC125N00CMW17	3	3,18	.125	0,17	.007	0,17	.007	25,41	1.000	–	–	-	4169663	-	-	-
WMTC040N00CMW17	4	4,00	.157	0,17	.007	0,17	.007	25,40	1.000	–	–	-	4169693	-	-	-

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WMT Grooving Inserts • PT Precision Molded





● first choice
○ alternate choice

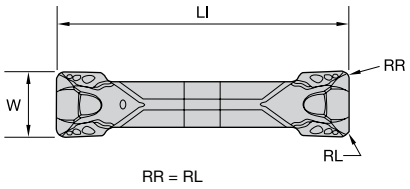
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M		●	●			○						
K		○	○	●	●	●						
N		●	●			●						
S		●	●			●						
H		○										

catalog number	SSC	W mm	W in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTS205M2U02PT	2	2,13	.084	0,15	.006	19,23	.757	4116131	4116132	4169554	4169555	-
WMTS305M3U03PT	3	3,13	.123	0,31	.012	25,81	1.016	4113568	4113569	4169556	4169557	-
WMTS305M3U06PT	3	3,13	.123	0,61	.024	25,78	1.015	4113570	4113571	4169558	4169559	-
WMTS405M4U03PT	4	4,13	.163	0,31	.012	25,53	1.005	4113577	4113578	4169560	4169561	-
WMTS405M4U06PT	4	4,13	.163	0,61	.024	25,53	1.005	4113579	4113580	4169562	4169563	-
WMTS505M5U03PT	5	5,13	.202	0,30	.012	28,76	1.320	4116148	4116149	4169564	4169565	-
WMTS505M5U06PT	5	5,13	.202	0,61	.024	28,76	1.320	4116150	4116151	4169566	4169567	-
WMTS605M6U03PT	6	6,13	.241	0,30	.012	28,76	1.320	4117253	4117254	4169568	4169569	-
WMTS605M6U06PT	6	6,13	.241	0,59	.023	28,76	1.320	4117255	4117256	4169570	4169571	-
WMTS805M8U06PT	8	8,13	.320	0,61	.024	28,70	1.130	4117261	4117262	4169572	4169573	-
WMTS805M8U15PT	8	8,13	.320	1,50	.059	28,71	1.130	4117263	4117264	4169574	4169575	-

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WMT Grooving Inserts • PT Precision Ground





● first choice
○ alternate choice

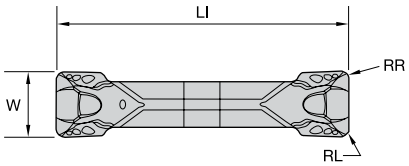
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M		●	●			○						
K		○	○	●	●	●						
N		●	●			●						
S		●	●			●						
H		○										

catalog number	SSC	W mm	W in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTS200M2P02PT	2	2,00	.079	0,15	.006	19,10	.752	4116129	4116130	-	-	-
WMTS094I2BP02PT	2B	2,38	.094	0,15	.006	22,15	.872	4118451	4118452	-	-	-
WMTS094I2BP04PT	2B	2,38	.094	0,38	.015	22,14	.872	4118583	4118584	-	-	-
WMTS300M3P03PT	3	3,00	.118	0,31	.012	25,65	1.010	4113563	4113564	-	-	4113566
WMTS300M3P06PT	3	3,00	.118	0,61	.024	25,65	1.010	4113565	4113567	-	-	-
WMTS125I3P03PT	3	3,17	.125	0,23	.009	25,40	1.000	4118585	4118586	-	-	-
WMTS125I3P08PT	3	3,17	.125	0,76	.030	25,40	1.000	4118587	4118588	-	-	-
WMTS400M4P03PT	4	4,00	.157	0,31	.012	25,40	1.000	4113572	4113574	-	-	4113573
WMTS400M4P06PT	4	4,00	.157	0,60	.024	25,40	1.000	4113575	4113576	-	-	-
WMTS188I5P03PT	5	4,76	.188	0,26	.010	28,63	1.127	4118589	4118590	-	-	-
WMTS188I5P08PT	5	4,77	.188	0,76	.030	28,63	1.127	4118591	4118592	-	-	-
WMTS500M5P03PT	5	5,00	.197	0,30	.012	28,63	1.127	4116143	4116144	-	-	4116145

WMT Grooving Inserts • PT Precision Ground

(continued)





● first choice
○ alternate choice

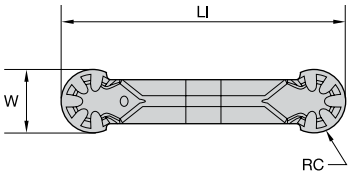
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M		●	●			○					
K		○	○	●	●	●					
N		●	●			●					
S		●	●			●					
H		○									

		W		RR		LI						
catalog number	SSC	mm	in	mm	in	mm	in	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTS500M5P06PT	5	5,00	.197	0,61	.024	28,63	1.127	4116146	4116147	-	-	-
WMTS600M6P03PT	6	6,00	.236	0,30	.012	28,63	1.127	4117239	4117240	-	-	-
WMTS600M6P06PT	6	6,00	.236	0,58	.022	28,63	1.127	4117241	4117242	-	-	-
WMTS250I6P08PT	6	6,34	.250	0,76	.030	28,63	1.127	4118595	4118596	-	-	-
WMTS250I6P03PT	6	6,35	.250	0,25	.010	28,63	1.127	4118593	4118594	-	-	-
WMTS800M8P06PT	8	8,00	.315	0,61	.024	28,57	1.125	-	4117258	-	-	-
WMTS800M8P15PT	8	8,00	.315	1,50	.059	28,57	1.125	4117259	4117260	-	-	-

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WMT Grooving Inserts • PC Full Radius Precision Molded





● first choice
○ alternate choice

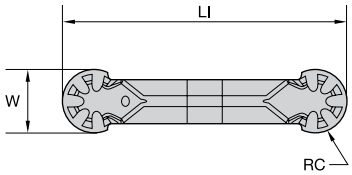
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M		●	●			○						
K		○	○	●	●	●						
N		●	●			●						
S		●	●			●						
H		○										

catalog number	SSC	W mm	W in	RC mm	RC in	LI mm	LI in	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTR305M3UPC	3	3,13	.123	1,53	.060	25,53	1.005	4170172	4170173	4170174	-	-
WMTR405M4UPC	4	4,13	.163	2,03	.080	25,58	1.007	4170177	4170178	4170179	-	-
WMTR505M5UPC	5	5,13	.202	2,53	.099	29,01	1.142	4170182	4170183	4170184	-	-
WMTR605M6UPC	6	6,12	.241	3,03	.119	28,77	1.133	4170187	4170188	4170189	-	-
WMTR805M8UPC	8	8,13	.320	4,03	.159	29,22	1.150	4170192	4170193	4170194	-	-

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WMT Grooving Inserts • PC Full Radius Precision Ground





● first choice
○ alternate choice

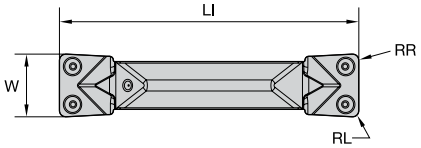
P		○	○	●	●							
M		●	●			○						
K		○	○	●	●	●						
N		●	●			●						
S		●	●			●						
H		○										

catalog number	SSC	W mm	W in	RC mm	RC in	LI mm	LI in	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTR300M3PPC	3	3,00	.118	1,50	.059	25,40	1.000	4170170	4170171	-	-	4170195
WMTR400M4PPC	4	4,00	.158	2,00	.079	25,45	1.002	4170175	4170176	-	-	4170196
WMTR188I5PPC	5	4,78	.188	2,39	.094	28,65	1.128	4170119	4170120	-	-	-
WMTR500M5PPC	5	5,00	.197	2,50	.098	28,88	1.137	4170180	4170181	-	-	-
WMTR600M6PPC	6	6,00	.236	3,00	.118	28,65	1.128	4170185	4170186	-	-	-
WMTR250I6PPC	6	6,36	.250	3,18	.125	29,01	1.142	4170121	4170122	-	-	-
WMTR312I8PPC	8	7,94	.312	3,96	.156	29,00	1.142	4170163	4170164	-	-	-
WMTR800M8PPC	8	8,00	.315	4,00	.158	29,08	1.145	4170190	4170191	-	-	-

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WMT Grooving Inserts • PH Precision Molded





RR = RL

● first choice
○ alternate choice

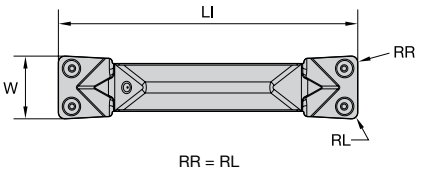
P		○	○	●	●		
M		●	●				○
K		○	○	●	●		●
N		●	●				●
S		●	●				●
H		○					

catalog number	SSC	W mm	W in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTS305M3U03PH	3	3,13	.123	0,30	.012	25,81	1.016	5346392	5346393	-	-	-
WMTS305M3U06PH	3	3,13	.123	0,60	.024	25,81	1.016	5346394	5346395	-	-	-
WMTS405M4U03PH	4	4,13	.163	0,30	.012	25,53	1.005	5346396	5346397	-	-	-
WMTS405M4U06PH	4	4,13	.163	0,60	.024	25,53	1.005	5346398	5346399	-	-	-
WMTS505M5U03PH	5	5,13	.202	0,30	.012	28,76	1.320	5346400	5346401	-	-	-
WMTS505M5U06PH	5	5,13	.202	0,60	.024	28,76	1.320	5346402	5346403	-	-	-
WMTS605M6U03PH	6	6,13	.241	0,30	.012	28,76	1.320	5346404	5346405	-	-	-
WMTS605M6U06PH	6	6,13	.241	0,60	.024	28,76	1.320	5346406	5346407	-	-	-
WMTS805M8U03PH	8	8,13	.320	0,30	.012	28,70	1.130	5346410	5346411	-	-	-
WMTS805M8U06PH	8	8,13	.320	0,60	.024	28,70	1.130	5346408	5346409	-	-	-

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WMT Grooving Inserts • PH Precision Ground





RR = RL

● first choice
○ alternate choice

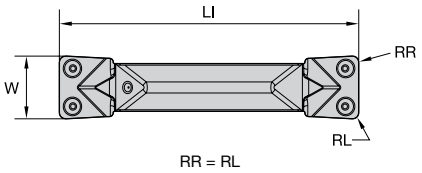
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M		●	●				○
K		○	○	●	●		●
N		●	●				●
S		●	●				●
H		○					

		W		RR		LI						
catalog number	SSC	mm	in	mm	in	mm	in	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTS300M3P03PH	3	3,00	.118	0,30	.012	25,65	1.010	5346412	5346413	-	-	5346414
WMTS300M3P06PH	3	3,00	.118	0,60	.024	25,65	1.010	5346415	5346416	-	-	5346417
WMTS125I3P03PH	3	3,18	.125	0,25	.010	25,40	1.000	5345914	5291300	-	-	-
WMTS125I3P08PH	3	3,18	.125	0,75	.030	25,40	1.000	5345915	5331093	-	-	-
WMTS156I4P03PH	4	3,95	.156	0,30	.012	25,40	1.000	5345916	5345917	-	-	-
WMTS156I4P08PH	4	3,96	.156	0,75	.030	25,40	1.000	5345918	5345919	-	-	-
WMTS400M4P03PH	4	4,00	.157	0,30	.012	25,40	1.000	5346418	5346419	-	-	5346420
WMTS400M4P06PH	4	4,00	.157	0,60	.024	25,40	1.000	5346421	5346422	-	-	5346423
WMTS188I5P03PH	5	4,77	.188	0,25	.010	28,63	1.127	5345980	5331095	-	-	-
WMTS188I5P08PH	5	4,77	.188	0,75	.030	28,63	1.127	5345981	5331097	-	-	-
WMTS500M5P03PH	5	5,00	.197	0,30	.012	28,63	1.127	-	5346425	-	-	5346426
WMTS500M5P06PH	5	5,00	.197	0,60	.024	28,63	1.127	5346427	5346428	-	-	5346429

WMT Grooving Inserts • PH Precision Ground

(continued)





● first choice
○ alternate choice

P		○	○	●	●		
M		●	●				○
K		○	○	●	●		●
N		●	●				●
S		●	●				●
H		○					

catalog number	SSC	W mm	W in	RR mm	RR in	LI mm	LI in	WU10PT	WU25PT	WP10CT	WP25CT	WU10HT
WMTS600M6P03PH	6	6,00	.236	0,30	.012	28,63	1.127	5346430	5346431	-	-	-
WMTS600M6P06PH	6	6,00	.236	0,60	.024	28,63	1.127	5346432	5346433	-	-	-
WMTS250I6P08PH	6	6,32	.249	0,75	.030	28,63	1.127	5345984	5327621	-	-	-
WMTS250I6P03PH	6	6,35	.250	0,25	.010	28,63	1.127	5345983	5327620	-	-	-
WMTS312I8P03PH	8	7,92	.312	0,25	.010	28,57	1.125	5345985	5345986	-	-	-
WMTS312I8P08PH	8	7,92	.312	0,75	.030	28,57	1.125	5345987	5345988	-	-	-
WMTS800M8P03PH	8	8,00	.315	0,30	.012	28,57	1.125	-	5346437	-	-	-
WMTS800M8P06PH	8	8,00	.315	0,60	.024	28,57	1.125	-	5346435	-	-	-

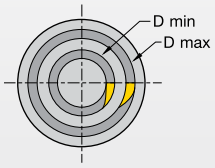
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

Catalog Numbering System

Our WMT Toolholders now have a smart new naming system.
Here are some examples of the improved nomenclature for our WMT Toolholders.

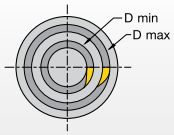
Integral Toolholders

WMT	B	R	16	3	050	—	150–200
Tooling System	Tool Style	Hand	Shank Size	Seat Size	Max Grooving Depth		Face Grooving Diameter
WMT = Groove and Turn (WMT Insert)	**S** = Straight **C** = Straight with circular support **E** = End mount **A** = Straight, face grooving, curve in **B** = Straight, face grooving, curve out	**R** = Right hand **L** = Left hand	For square shanks, the number indicates the height and width in 1/16" increments. For rectangular shanks, the first digit indicates the number of eighths of width "B" and the second digit indicates the number of quarters of height "H".	**1** **2** **2B** **3** **4** **5** **6** **8**	CD max in 1/100" *NOTE: Values <1.00" use a preceding zero (e.g., 075 = .75" max groove depth)*	D min – D max in 1/100" e.g., 275–400 = 2.75" D min 4.00" D max	Diameters are min and max for outer face groove diameter 999 = unlimited D max



Modular Blades

WMT	WGM	R	3	16	B	070-100
Tooling System	Connection Type	Hand	Seat Size	Max Grooving Depth	Tool Style	Face Grooving Diameter
		R = Right hand **L** = Left hand			**A** = Curve In **B** = Curve Out	



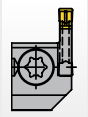
Catalog Numbering System

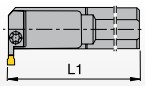
Modular Toolholders

WGM	S	R	16
Tooling System	Tool Style	Hand	Shank Size
MDG = Modular Deep Grooving **WGM** = Modular Serrated Locking System	**S** = Straight **E** = End mount	**R** = Right hand **L** = Left hand	For square shanks, the number indicates the height and width in 1/16" increments. For rectangular shanks, the first digit indicates the number of eighths of width "B" and the second digit indicates the number of quarters of height "H".

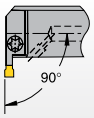
Integral Boring Bars

A	16	R	WMT	E	R	03	16	N
Steel Bar with Coolant	Bar Diameter	Bar Length	WMT Groove and Turn System	Tool Style	Hand	Seat Size	Max Grooving Depth	Tool Units





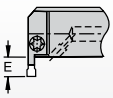
inch bars:	metric bars:
R = 8"	R = 200mm
S = 10"	S = 150mm
T = 12"	T = 300mm



E = End mounted (90°)

R = Right hand
L = Left hand

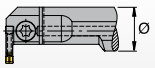
pocket seat size	cutting width (mm)
02	2,00–2,62
2B	2,39–2,62
03	3,0–3,05
04	4,0–4,05
05	5,0–5,05
06	6,0–6,05
08	8,0–8,05
10	10,0–10,05



conversions:

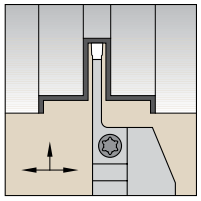
mm	inch
7mm	.28"
10mm	.39"
12mm	.47"
16mm	.63"

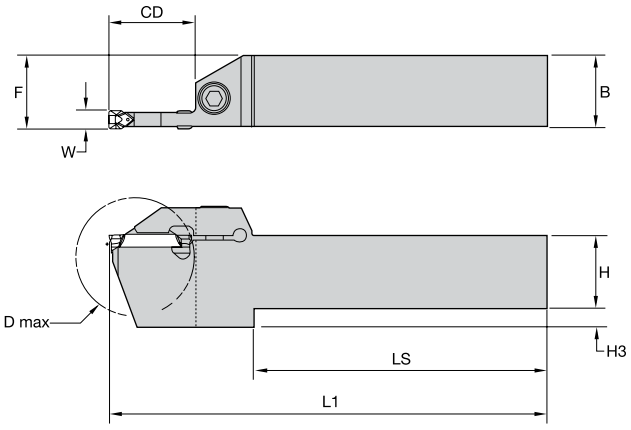
N = Inch
M = Metric



inch bars:	metric bars:
A two-digit number which indicates the bar diameter in 1/16" increments.	Bar diameter in millimeters

WMT Integral Toolholders • Inch



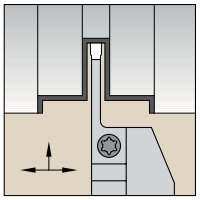


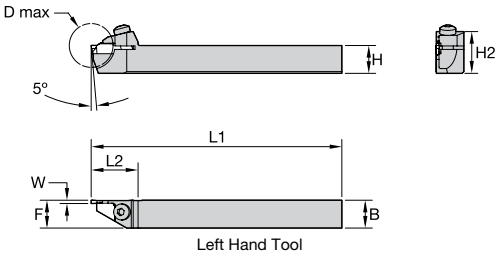
Right Hand Tool

order number	catalog number	SSC	W	H	B	CD	D max	F	H3	L1	LS
right hand											
3656137	**WMTSR161065**	1	.059	1.000	1.000	.650	—	.991	—	6.000	4.679
3655938	**WMTCR62053**	2	.079	.375	.375	—	1.062	.375	.125	4.500	3.410
3655940	**WMTCR82062**	2	.079	.500	.500	—	1.125	.500	.188	4.500	3.410
3655942	**WMTSR102065**	2	.079	.625	.625	.650	—	.625	.250	5.000	3.680
3655944	**WMTSR122065**	2	.079	.750	.750	.650	—	.750	—	5.000	3.680
3655946	**WMTSR162065**	2	.079	1.000	1.000	.650	—	1.000	—	6.000	4.680
3655892	**WMTCR82B062**	2B	.094	.500	.500	—	1.250	.500	.190	4.500	3.310
3655894	**WMTSR102B075**	2B	.094	.625	.625	.750	—	.625	.250	5.000	3.500
3655934	**WMTSR122B042**	2B	.094	.750	.750	.420	—	.750	—	5.000	3.695
3655896	**WMTSR122B075**	2B	.094	.750	.750	.750	—	.750	.250	5.000	3.500
3539156	**WMTSR162B042**	2B	.094	1.000	1.000	.420	—	1.000	—	6.000	4.700
3655936	**WMTSR162B075**	2B	.094	1.000	1.000	.750	—	1.000	—	6.000	4.500
3655898	**WMTSR103044**	3	.125	.625	.625	.440	—	.624	—	5.000	3.695
3655900	**WMTSR103087**	3	.125	.625	.625	.875	—	.624	.250	5.000	3.375
3655906	**WMTSR123044**	3	.125	.750	.750	.440	—	.750	—	5.000	3.695
3655908	**WMTSR123087**	3	.125	.750	.750	.875	—	.750	.250	5.000	3.355
3655916	**WMTSR163044**	3	.125	1.000	1.000	.440	—	1.000	—	6.000	4.695
3655918	**WMTSR163087**	3	.125	1.000	1.000	.875	—	1.000	—	6.000	4.375
3655932	**WMTSR124044**	4	.156	.750	.750	.440	—	.750	—	5.000	3.695
3655920	**WMTSR164087**	4	.156	1.000	1.000	.875	—	1.000	—	6.000	4.375
3655902	**WMTSR105056**	5	.188	.625	.625	.560	—	.629	—	5.000	3.562
3655904	**WMTSR105100**	5	.188	.625	.625	1.000	—	.629	.250	5.500	3.675
3655910	**WMTSR125056**	5	.188	.750	.750	.560	—	.750	—	5.000	3.562
3655912	**WMTSR125100**	5	.188	.750	.750	1.000	—	.750	.250	5.500	3.655
3655922	**WMTSR165056**	5	.188	1.000	1.000	.560	—	1.000	—	6.000	4.562
3655924	**WMTSR165100**	5	.188	1.000	1.000	1.000	—	1.000	—	6.000	4.175
3655914	**WMTSR126056**	6	.250	.750	.750	.560	—	.754	—	5.000	3.562
3655926	**WMTSR166056**	6	.250	1.000	1.000	.560	—	1.004	—	6.000	4.562
3655928	**WMTSR166100**	6	.250	1.000	1.000	1.000	—	1.002	—	6.000	4.174
3539139	**WMTSR168056**	8	.312	1.000	1.000	.560	—	1.000	—	6.000	4.553
3539141	**WMTSR168100**	8	.312	1.000	1.000	1.000	—	1.000	—	6.000	4.174
3539145	**WMTSR208100**	8	.312	1.250	1.250	1.000	—	1.250	—	6.000	4.174
left hand											
3656138	**WMTSL161065**	1	.059	1.000	1.000	.650	—	.991	—	6.000	4.679
3655939	**WMTCL62053**	2	.079	.375	.375	—	1.062	.375	.125	4.500	3.410
3655941	**WMTCL82062**	2	.079	.500	.500	—	1.125	.500	.188	4.500	3.410
3655945	**WMTSL122065**	2	.079	.750	.750	.650	—	.750	—	5.000	3.680
3655947	**WMTSL162065**	2	.079	1.000	1.000	.650	—	1.000	—	6.000	4.680
3655893	**WMTCL82B062**	2B	.094	.500	.500	—	1.250	.500	.190	4.500	3.310
3655895	**WMTSL102B075**	2B	.094	.625	.625	.750	—	.625	.250	5.000	3.500
3655935	**WMTSL122B042**	2B	.094	.750	.750	.420	—	.750	—	5.000	3.700
3655897	**WMTSL122B075**	2B	.094	.750	.750	.750	—	.750	.250	5.000	3.500
3655937	**WMTSL162B075**	2B	.094	1.000	1.000	.750	—	1.000	—	6.000	4.500
3655899	**WMTSL103044**	3	.125	.625	.625	.440	—	.624	—	5.000	3.695
3655901	**WMTSL103087**	3	.125	.625	.625	.875	—	.624	.250	5.000	3.375
3655907	**WMTSL123044**	3	.125	.750	.750	.440	—	.750	—	5.000	3.695
3655909	**WMTSL123087**	3	.125	.750	.750	.875	—	.750	.250	5.000	3.355
3655917	**WMTSL163044**	3	.125	1.000	1.000	.440	—	1.000	—	6.000	4.695
3655919	**WMTSL163087**	3	.125	1.000	1.000	.875	—	1.000	—	6.000	4.375
3655933	**WMTSL124044**	4	.156	.750	.750	.440	—	.750	—	5.000	3.697
3655921	**WMTSL164087**	4	.156	1.000	1.000	.875	—	1.000	—	6.000	4.375
3655923	**WMTSL165056**	5	.188	1.000	1.000	.560	—	1.000	—	6.000	4.562
3655925	**WMTSL165100**	5	.188	1.000	1.000	1.000	—	1.000	—	6.000	4.175
3655915	**WMTSL126056**	6	.250	.750	.750	.560	—	.754	—	5.000	3.562
3655927	**WMTSL166056**	6	.250	1.000	1.000	.560	—	1.004	—	6.000	4.562
3655929	**WMTSL166100**	6	.250	1.000	1.000	1.000	—	1.004	—	6.000	4.174
3539146	**WMTSL208100**	8	.312	1.250	1.207	1.000	—	1.250	—	6.000	4.174

NOTE: SSC = To correspond with the SSC on the insert.

WMT Integral Toolholders • Swiss Style • Inch



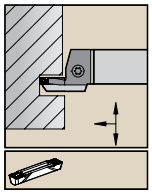


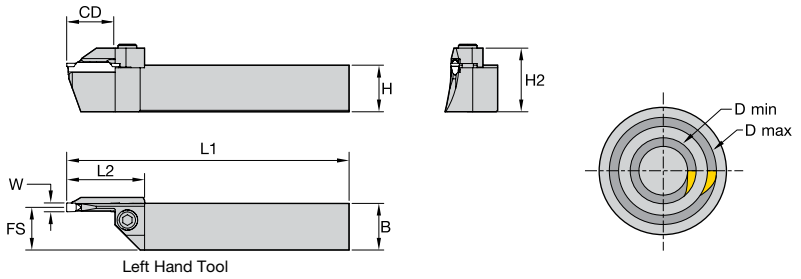
Left Hand Tool

order number	catalog number	SSC	W	H	B	D max	F	H2	L1	L2
right hand										
3655949	**WMTCR081039**	1	.059	.500	.500	.787	.500	.750	4.500	.842
3656135	**WMTCR121051**	1	.059	.750	.750	1.024	.750	1.050	5.000	.952
3656133	**WMTCR101051**	1	.059	.625	.625	1.024	.626	.925	5.000	.952
3656141	**WMTCR082039**	2	.079	.500	.500	.787	.500	.750	4.500	.843
3656143	**WMTCR102051**	2	.079	.625	.625	1.024	.625	.925	5.000	.953
3656139	**WMTCR062039**	2	.079	.375	.375	.787	.375	.625	4.500	.843
3656145	**WMTCR122051**	2	.079	.750	.750	1.024	.750	1.050	5.000	.953
left hand										
3656186	**WMTCL061039**	1	.059	.375	.375	.787	.375	.625	4.500	.842
3656101	**WMTCL081039**	1	.059	.500	.500	.787	.500	.750	4.500	.842
3656136	**WMTCL121051**	1	.059	.750	.750	1.024	.750	1.050	5.000	.952
3656140	**WMTCL062039**	2	.079	.375	.375	.787	.375	.625	4.500	.843
3656142	**WMTCL082039**	2	.079	.500	.500	.787	.500	.750	4.500	.843
3656144	**WMTCL102051**	2	.079	.625	.625	1.024	.625	.925	5.000	.953
3656146	**WMTCL122051**	2	.079	.750	.750	1.024	.750	1.050	5.000	.953

NOTE: Insert exterior edge in line with toolholder edge for .375" and .500" shank toolholders.
SSC = To correspond with the SSC on the insert.

WMT Integral Toolholders • Face Grooving • Inch



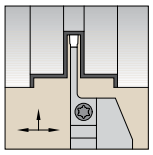


order number	catalog number	SSC	W	H	B	CD	D max	D min	FS	H2	L1	L2
right hand												
3656151	**WMTBR163063-275-400**	3	.125	.990	.990	.625	4.000	2.750	.937	1.280	6.000	1.343
left hand												
3656152	**WMTBL163063-275-400**	3	.125	.990	.990	.625	4.000	2.750	.937	1.280	6.000	1.343
3656169	**WMTBL166100-400-800**	6	.250	.990	.990	1.000	8.000	4.000	.875	1.372	6.000	1.655

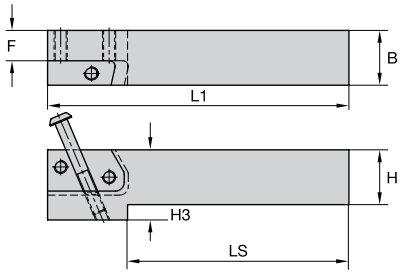
NOTE: Initial cut of tool must be between D min and D max. Due to the insert being positioned .030" above center, minimum diameter after initial cut is .850".
Toolholders that accept .125" width inserts have an integral clamp.
Toolholders that accept .187" and .250" width inserts are supplied with a detachable clamp.
SSC = To correspond with the SSC on the insert.

Blade Style	Part Shape	Left Hand	Right Hand
Curve Out			

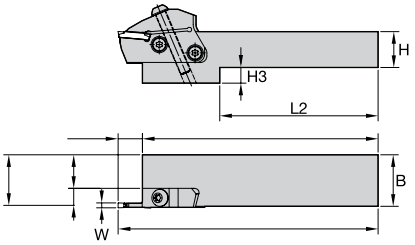
WMT Modular Toolholders • Straight Mount • Grooving, Cut-Off, Face Grooving • Inch







Right Hand Tool
2 blade screws required



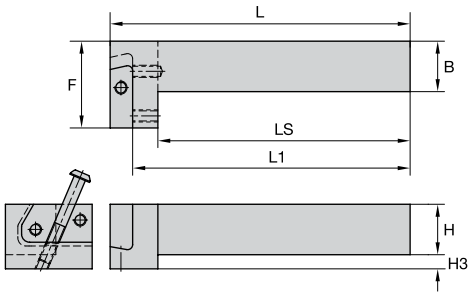
F Assy = F (Holder) + FS (Blade) +W/2
L1 Assy = L1 (Holder) + CD (Blade)

order number	catalog number	H	B	L1	LS	F	H3
right hand							
5349621	**WGMSR12**	.75	.75	4.30	2.75	.31	.49
5349622	**WGMSR16**	1.00	1.00	5.05	3.86	.56	.24
5349624	**WGMSR20**	1.25	1.25	5.05	—	.81	—
left hand							
5349609	**WGMSL12**	.75	.75	4.30	2.75	.31	.49
5349620	**WGMSL16**	1.00	1.00	5.05	3.86	.56	.24
5349623	**WGMSL20**	1.25	1.25	5.05	—	.81	—

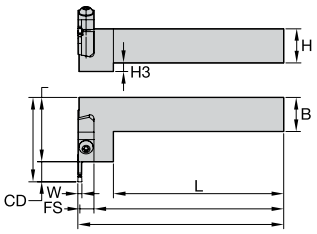
NOTE: Use the larger seat size toolholder for optimal performance.
Blade screws and clamp screw included with holder.

WMT Modular Toolholders • End Mount • Grooving, Cut-Off, Face Grooving • Inch





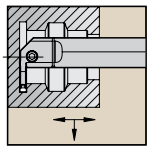
Right Hand Tool



F Assy
F Holder
L1 Holder
L1 Assy

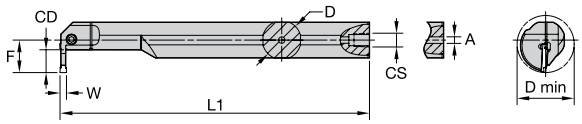
order number	catalog number	H	B	L	L1	LS	F	H3
right hand								
5514977	**WGMER16**	1.00	1.00	5.96	5.53	4.96	1.70	.24
5515022	**WGMER2050**	1.25	1.25	5.96	5.53	4.96	1.70	—
left hand								
5514976	**WGMEL16**	1.00	1.00	5.96	5.53	4.96	1.70	.24
5515023	**WGMEL2050**	1.25	1.25	5.96	5.53	4.96	1.70	—

WMT Integral I.D.Grooving Boring Bars • Inch



Steel shank with through coolant.



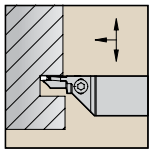


Right Hand Tool

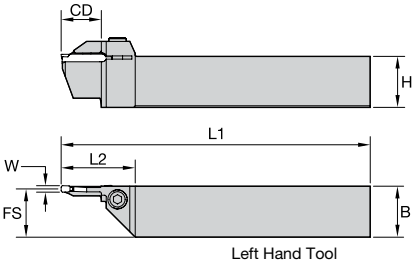
order number	catalog number	SSC	W	CD	D min	D	L1	F	A	CS
right hand										
5423448	**A16RWMTER0316N**	3	.125	.630	1.59	1.00	8.00	1.024	.25	1/4-18 NPT
5423449	**A20SWMTER0319N**	3	.125	.748	1.85	1.25	10.00	1.142	.25	1/4-18 NPT
5423840	**A16RWMTER0416N**	4	.156	.630	1.59	1.00	8.00	1.024	.25	1/4-18 NPT
5423841	**A20SWMTER0419N**	4	.156	.748	1.85	1.25	10.00	1.142	.25	1/4-18 NPT
5423842	**A20SWMTER0519N**	5	.188	.748	1.85	1.25	10.00	1.142	.25	1/4-18 NPT
5423843	**A24TWMTER0522N**	5	.188	.866	2.13	1.50	12.00	1.260	.25	1/4-18 NPT
5423844	**A20SWMTER0619N**	6	.250	.748	1.85	1.25	10.00	1.142	.25	1/4-18 NPT
5423845	**A24TWMTER0622N**	6	.250	.866	2.13	1.50	12.00	1.260	.25	1/4-18 NPT
left hand										
5423846	**A16RWMTEL0316N**	3	.125	.630	1.59	1.00	8.00	1.024	.25	1/4-18 NPT
5423847	**A20SWMTEL0319N**	3	.125	.748	1.85	1.25	10.00	1.142	.25	1/4-18 NPT
5423848	**A16RWMTEL0416N**	4	.156	.630	1.59	1.00	8.00	1.024	.25	1/4-18 NPT
5423870	**A20SWMTEL0519N**	5	.188	.748	1.85	1.25	10.00	1.142	.25	1/4-18 NPT
5423872	**A20SWMTEL0619N**	6	.250	.748	1.85	1.25	10.00	1.142	.25	1/4-18 NPT
5423873	**A24TWMTEL0622N**	6	.250	.866	2.13	1.50	12.00	1.260	.25	1/4-18 NPT

SSC = To correspond with the SSC on the insert.

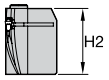
WMT Integral Toolholders • Face Grooving • Inch

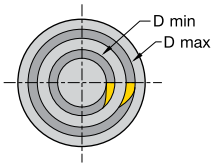






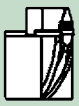
Left Hand Tool



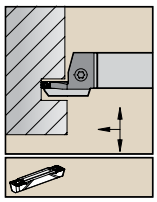


order number	catalog number	SSC	W	H	B	CD	D max	D min	FS	H2	L1	L2
right hand												
3539331	**WMTAR166100-400-800**	6	.250	.990	.990	1.000	8.000	4.000	.875	1.336	6.000	1.655

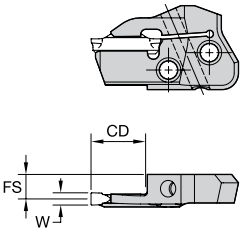
NOTE: Initial cut of tool must be between D min and D max. Due to the insert being positioned .030" above center, minimum diameter after initial cut is .850".
Toolholders that accept .125" width inserts have an integral clamp.
Toolholders that accept .187" and .250" width inserts are supplied with a detachable clamp.
SSC = To correspond with the SSC on the insert.

Blade Style	Part Shape	Left Hand	Right Hand
Curve In			

WMT Modular Blades • Face Grooving • Metric

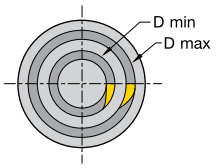






Right Hand Tool

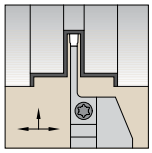




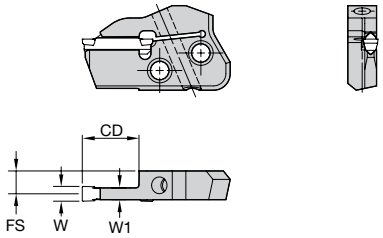
order number	catalog number	SSC	D min mm	D min in	D max mm	D max in	CD mm	CD in	W mm	W in	FS mm	FS in
right hand												
5359150	**WMTWGMR313B038-052**	3	38,00	1.496	52,00	2.047	12,70	.500	3,00	.118	11,00	.433
5359151	**WMTWGMR316B052-070**	3	52,00	2.047	70,00	2.756	15,88	.625	3,00	.118	11,00	.433
5359152	**WMTWGMR316B070-100**	3	70,00	2.756	100,00	3.937	15,88	.625	3,00	.118	11,00	.433
5359153	**WMTWGMR319B100-205**	3	100,00	3.937	205,00	8.071	19,05	.750	3,00	.118	11,00	.433
5359154	**WMTWGMR416B052-070**	4	52,00	2.047	70,00	2.756	15,88	.625	4,00	.157	10,50	.413
5359155	**WMTWGMR416B070-100**	4	70,00	2.756	100,00	3.937	15,88	.625	4,00	.157	10,50	.413
5359156	**WMTWGMR419B100-205**	4	100,00	3.937	205,00	8.071	19,05	.750	4,00	.157	10,50	.413
5359157	**WMTWGMR522B100-205**	5	100,00	3.937	205,00	8.071	22,00	.866	5,00	.197	10,00	.394
5359158	**WMTWGMR622B100-205**	6	100,00	3.937	205,00	8.071	22,00	.866	6,00	.236	10,00	.394
left hand												
5359134	**WMTWGML313B038-052**	3	38,00	1.496	52,00	2.047	12,70	.500	3,00	.118	11,00	.433
5359135	**WMTWGML316B052-070**	3	52,00	2.047	70,00	2.756	15,88	.625	3,00	.118	11,00	.433
5359136	**WMTWGML316B070-100**	3	70,00	2.756	100,00	3.937	15,88	.625	3,00	.118	11,00	.433
5359137	**WMTWGML319100-205**	3	100,00	3.937	205,00	8.071	19,05	.750	3,00	.118	11,00	.433
5359138	**WMTWGML413B038-052**	4	38,00	1.496	52,00	2.047	12,70	.500	4,00	.157	10,50	.413
5359139	**WMTWGML416B052-070**	4	52,00	2.047	70,00	2.756	15,88	.625	4,00	.157	10,50	.413
5359141	**WMTWGML419B100-205**	4	100,00	3.937	205,00	8.071	19,05	.750	4,00	.157	10,50	.413
5359142	**WMTWGML516B038-052**	5	38,00	1.496	52,00	2.047	15,88	.625	5,00	.197	10,00	.394
5359143	**WMTWGML519B052-070**	5	52,00	2.047	70,00	2.756	19,05	.750	5,00	.197	10,00	.394
5359144	**WMTWGML519B070-100**	5	70,00	2.756	100,00	3.937	19,05	.750	5,00	.197	10,00	.394
5359145	**WMTWGML522B100-205**	5	100,00	3.937	205,00	8.071	22,00	.866	5,00	.197	10,00	.394
5359147	**WMTWGML619B052-070**	6	52,00	2.047	70,00	2.756	19,05	.750	6,00	.236	10,00	.394
5359148	**WMTWGML619B070-100**	6	70,00	2.756	100,00	3.937	19,05	.750	6,00	.236	10,00	.394
5359149	**WMTWGML622B100-205**	6	100,00	3.937	205,00	8.071	22,00	.866	6,00	.236	10,00	.394

NOTE: Blade and clamp screw torque equals 71–88 in. lbs. (8–10 Nm).
SSC = To correspond with the SSC on the insert.

WMT Modular Blades • Metric







Right Hand Blade

order number	catalog number	SSC	CD mm	CD in	W mm	W in	FS mm	FS in	W1 mm	W1 in
right hand										
5359127	**WMTWGMR114S**	1	14,00	.551	1,50	.059	11,04	.435	1,22	.048
5359128	**WMTWGMR213S**	2	13,00	.512	2,00	.079	10,81	.426	1,68	.066
5359129	**WMTWGMR2B16S**	2B	16,50	.650	2,39	.094	10,71	.422	1,88	.074
5359130	**WMTWGMR319S**	3	19,00	.748	3,00	.118	10,38	.409	2,54	.100
5359131	**WMTWGMR419S**	4	19,00	.748	4,00	.157	10,00	.394	3,30	.130
5359132	**WMTWGMR522S**	5	22,00	.866	5,00	.197	9,82	.387	3,66	.144
5359133	**WMTWGMR622S**	6	22,00	.866	6,00	.236	9,26	.365	4,78	.188
left hand										
5359121	**WMTWGML213S**	2	13,00	.512	2,00	.079	10,81	.426	1,68	.066
5359122	**WMTWGML2B16S**	2B	16,50	.650	2,39	.094	10,71	.422	1,88	.074
5359123	**WMTWGML319S**	3	19,00	.748	3,00	.118	10,38	.409	2,54	.100
5359124	**WMTWGML419S**	4	19,00	.748	4,00	.157	10,00	.394	3,30	.130
5359125	**WMTWGML522S**	5	22,00	.866	5,00	.197	9,82	.387	3,66	.144
5359126	**WMTWGML622S**	6	22,00	.866	6,00	.236	9,26	.365	4,78	.188

NOTE: Blade and clamp screw torque equals 8–10 Nm (71–88 in. lbs.).
SSC = To correspond with the SSC on the insert.



widia.com

WIDIA™

TopGroove™

TopGroove for Shallow Grooving and Face Grooving

The WIDIA™ TopGroove clamping system is perfect for shallow grooving operations and features an extensive carbide grade selection to meet the most demanding application requirements. With maximum clamping rigidity and superior versatility, TopGroove inserts employ a unique top rake chip control geometry that efficiently evacuates chips and produces better quality parts.

- TopGroove clamping design features a rugged bridge clamp, which locates in a groove molded into the insert, to provide superior resistance to side and radial cutting forces.
- TopGroove inserts are available for shallow grooving, deep grooving, light turning, profiling, shallow and deep face grooving, back turning, undercutting, and Poly-Vee grooving.
- The proprietary WIDIA chip control design works in multidirectional turning as well as radial feed applications to provide excellent chip evacuation in deep grooving applications.



RIGID

Inserts feature a top rake chip control geometry for maximum clamping rigidity.

VERSATILE

The TopGroove clamping system provides a complete line of grooving geometries and an extensive grade selection to meet even the most demanding application requirements.

SHALLOW GROOVING CLAMPING SYSTEM

INSERTS

INSERT STYLE		APPLICATION	RAKE ANGLE
NG		• General-purpose grooving. • O-ring grooving. • Circlip grooving.	Neutral
NG-K		• Chip control geometry. • General-purpose grooving. • O-ring grooving. • Circlip grooving. • Light turning.	10° positive
NGC-K*		• Combined groove and chamfered edge break in one positive plunge with chip control. • Designed for DIN 471/472 standard circlip grooves.	10° positive
NGD*		• Deep grooving.	Neutral
NGD-K		• Chip control geometry. • Deep grooving. • Light turning.	10° positive
NGP		• General-purpose grooving. • O-ring grooving. • Circlip grooving.	5° positive
NF*		• Face grooving. • Additional side clearance.	Neutral
NF-K		• Face grooving with chip control. • Additional side clearance.	10° positive
NFD-K		• Deep face grooving with chip control. • Additional side clearance.	10° positive

INSERT STYLE		APPLICATION	RAKE ANGLE
NFD-KI*		• Internal deep face grooving with chip control. • For use in boring bars for internal face grooves.	10° positive
NP-K		• Turning. • Back turning positive. • Profiling with chip control.	10° positive
NR		• Full radius grooving. • Turning and profiling.	Neutral
NR-K		• Chip control geometry. • Full radius grooving, turning, and profiling.	10° positive
NRD		• Deep grooving. • Full radius end-form.	Neutral
NRP*		• Full radius grooving. • Light-turning profiling.	5° positive
NU*		• Undercutting.	Neutral
NV*		• Poly-Vee grooving.	Neutral
NB/NBD		• Blanks. • Blanks for deep grooving. • Available in uncoated grades only.	—

**Inserts are available as custom solutions.*

INDUSTRY

GENERAL ENGINEERING

TRANSPORTATION

APPLICATIONS



FACE GROOVING | GROOVING | I.D. GROOVING

Choosing the Correct TopGroove Cutter

The Most Advanced Turning Solutions in the Industry

Perfect for shallow grooving operations, the WIDIA™ TopGroove clamping system provides a complete line of grooving geometries and an extensive grade selection to meet even the most demanding application requirements. For increased rigidity, versatility, chip control, and carbide grade options, the TopGroove clamping system is the proven solution.

With maximum clamping rigidity and superior versatility, TopGroove inserts employ a unique top rake chip control geometry that efficiently evacuates chips and produces better quality parts, faster than ever before.

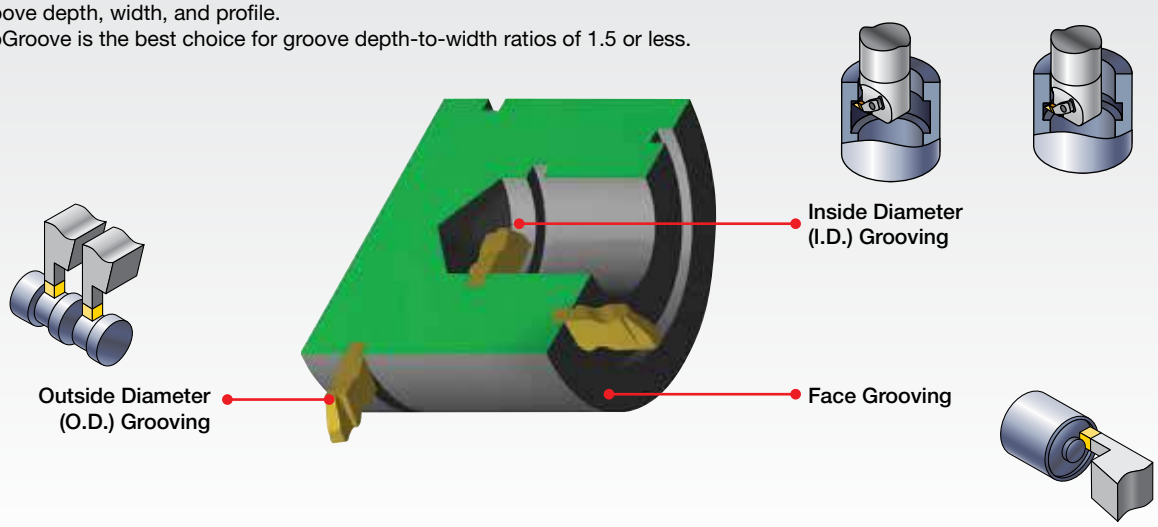
Use this comprehensive, easy-to-use guide for the information necessary to identify, choose, and select the appropriate cutting tools for your specific needs.

What you need to know:

- Material being machined.
- Groove depth, width, and profile.
- Application to be performed (face, O.D., or I.D. grooving).
- Toolholder requirements (e.g., KM™, ERICKSON™, square shank, right/left).

1 Choose the application to be performed:

Groove depth, width, and profile.
TopGroove is the best choice for groove depth-to-width ratios of 1.5 or less.



For deep grooving, use WMT™ on page E350.



TopGroove for Internal, External, and Face Grooving Applications

system capabilities			minimum	maximum
	O.D./I.D. Grooving	width	.020" (0,50mm)	.375" (9,53mm)
		depth	–	.500" (12,7mm)
	Face Grooving	width	.125" (3,2mm)	.250" (6,35mm)
		depth	–	.500" (12,7mm)
	Internal Grooving	diameter	.440" (11,2mm)	–
	Face Grooving Diameter	standard	.940" (23,9mm)	–
		deep	–	–
	Deep O.D./I.D. Grooving	width	.059" (1,50mm)	.250" (6,35mm)
		depth	–	.500" (12,7mm)
	Deep Face Grooving	width	.125" (3,18mm)	.250" (6,35mm)
		depth	–	.500" (12,7mm)

Choosing the Correct TopGroove Cutter

2 Identify the material to be machined:

Each tool has a material grid marked with a letter indicating the materials that can be machined.

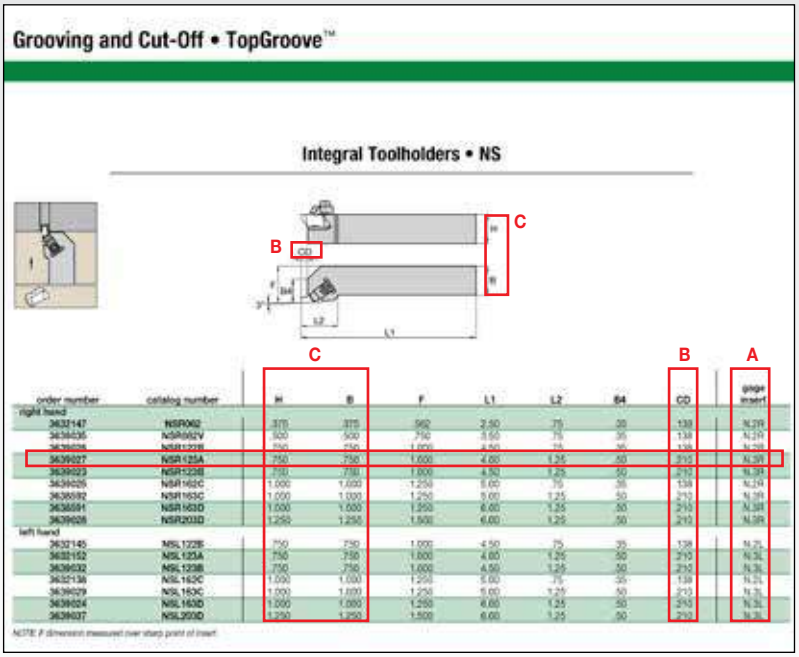
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

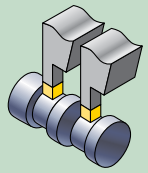
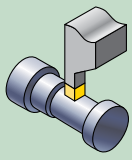
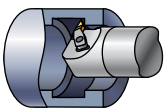
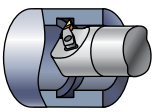
3 Select your toolholder based on the application:

A Choose the appropriate gage insert (width) required for the application.

B Choose the shortest cutting depth “CD” dimension for increased tool rigidity.

C Select the largest toolholder shank “H” and “B” dimensions for maximum rigidity.



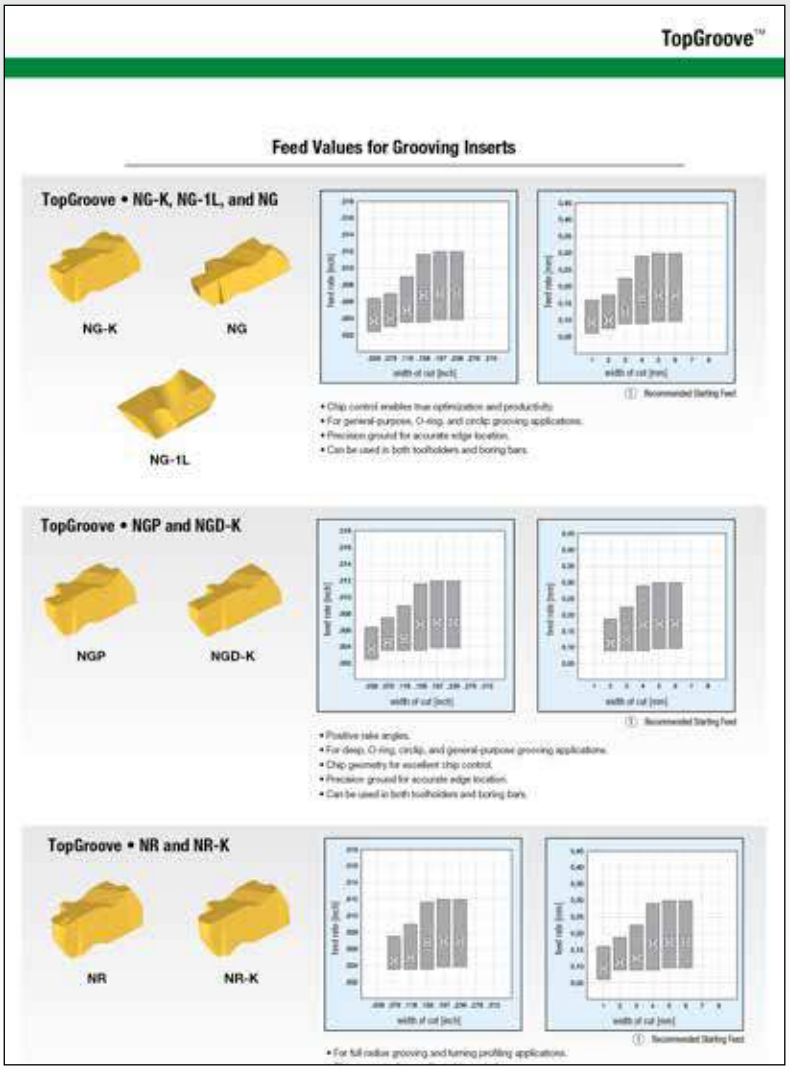
		application	conventional toolholders	modular blades
		O.D. Grooving and Plunge and Turn	E375–E376	E382
		I.D. Grooving	E379	–

Choosing the Correct TopGroove Cutter

4 Select chipbreaker style for the application:

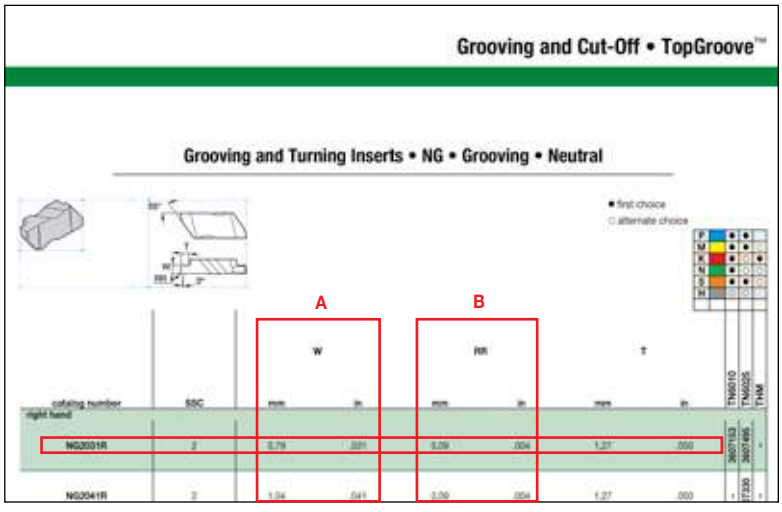
See application guide on page E392 for a complete list of insert styles.

NOTE: Chart shows recommended starting feed rates.



A Choose the appropriate insert width "W" for your specific application.

B Select the required corner radius value "RR".



Choosing the Correct TopGroove Cutter

5 Select grade:

cutting condition		Recommended Grades: steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
smooth cut, pre-turned surface		TN7110	TN6010	TN7110	TN6010/THM	TN6010	TN6010
varying depth of cut, casting, or forging skin		TN6010	TN6010	TN6010	TN6010/THM	TN6010	TN6010
lightly interrupted cut		TN6025	TN6025	TN6025	TN6010/THM	TN6010	TN6025
heavily interrupted cut		TN6025	TN6025	TN6025	TN6010/THM	TN6010	TN6025

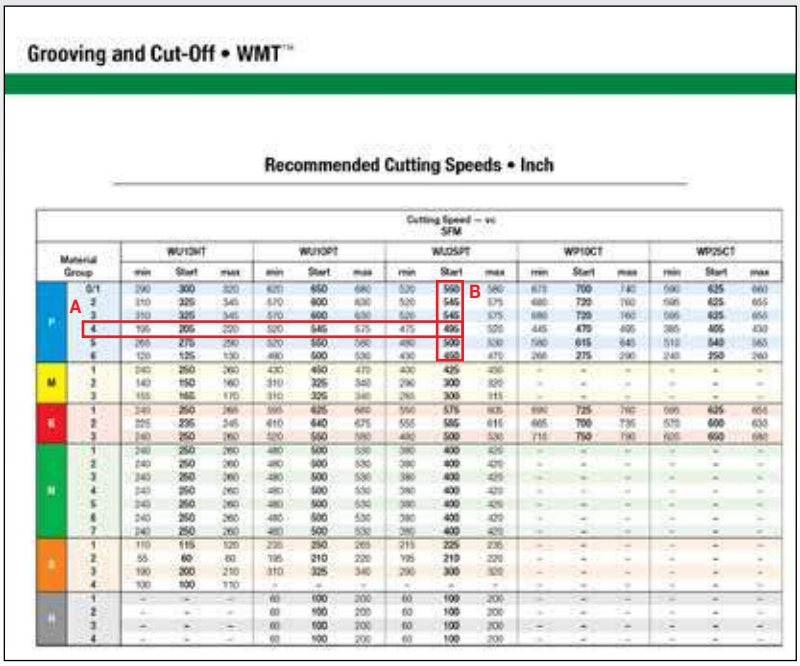
See page E357 for Grades and Grade Descriptions.

6 Determine cutting data:

A Based on material group and grade, identify starting speed (vc).

B First choice starting speed is in bold.

See page E359–E360 for cutting data.


Grooving and Cut-Off • WMT™

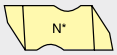
Recommended Cutting Speeds • Inch

Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

N	G	D	2	M	150	R		K	
Type of Insert	Insert Style	Additional Information	Insert Size	Size Identification	Groove Size**	Hand of Insert	Cutting Depth	Chipbreaker Design	Definition of Inserts

N — TopGroove



B — Blank (for special forms)
F — Face grooving
G — Grooving
P — Back turning
R — Full radius
U — Undercutting (or relieving)
V — Poly-Vee

D — Deep grooving
P — Positive
C — Groove and chamfer

insert number	W1 mm	W1 inch
1	2,54	.100
2	3,81	.150
3	4,95	.195
4	6,98	.255
5	9,65	.380
6	9,73	.383

M — Metric insert groove width
C — Circlip groove insert width is nominal circlip size
Blank — Indicates inch width insert

Position pertains to groove width for F-, G-, and U-style inserts, radii for R-style grooving inserts, and circlip size for groove and chamfer inserts. Dimension in .001" or 0,01mm.

Inch example: 1/32" width groove or radius equals "031" catalog position number.

Metric example: 3,25mm width groove or radius equals "325" catalog position number.

Width Tolerance: ±.001" (±0,025mm) unless otherwise specified.

L — Left hand
R — Right hand

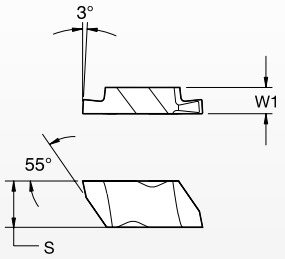
Shown for groove and chamfer inserts in .0004" increments.

K — Standard chip control
E — Hone only

Groove size
J or L — Poly-Vee inserts
I — Internal face grooving

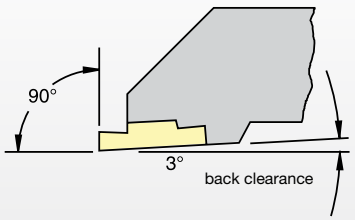
***Omit position for TopGroove NB-style blanks.*

TopGroove/TopThread Threading and Grooving Insert Dimensions



insert size	S mm	S inch	W1 mm	W1 Inch
1	2,54	.100	2,54	.100
2	5,56	.219	3,81	.150
3	8,74	.344	4,95	.195
4	11,51	.453	6,48	.255
5	17,48	.688	9,65	.380
6	11,51	.453	9,73	.383
8	7,93	.312	11,13	.438

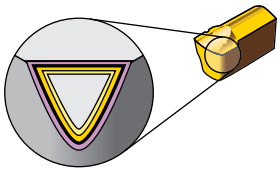
TopGroove/TopThread Holder Design



NOTE: Holders are designed to locate insert inclined to 3° to provide back clearance down open side.

WIDIA™ TopGroove and TopThread™ tooling technology combine to bring you the very best threading and grooving system available in the world today.

Grades and Grade Descriptions



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Grade	Coating		Grade Description	wear resistance ← → toughness	05	10	15	20	25	30	35	40	45
	TN6010	HC-S10	An advanced PVD TiAlN coating over a very deformation-resistant unalloyed carbide substrate. TN6010 is ideal for finishing to general machining of most workpiece materials at higher speeds. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys under stable conditions. It also performs well machining hardened and short chipping materials.	P		■	■	■					
				M		■	■	■					
				K		■	■	■					
				N		■	■	■					
				S		■	■	■					
				H		■							
	TN6025	HC-S25	An advanced PVD TiAlN-coated grade with a tough, ultra-fine-grain unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temp alloys, titanium, irons, and non-ferrous materials. Speeds may vary from low to medium and will handle interruptions and high feed rates.	P				■	■	■			
				M				■	■	■			
				K				■	■	■			
				N				■	■	■			
				S				■	■	■			
				H			■	■					
	THM	HW-K15	Uncoated carbide. Extraordinarily good balance of hardness, wear resistance, edge stability, and toughness. Light and medium machining. For cast iron and all non-ferrous metals and non-metals. Useful in unfavorable conditions.	P		■	■	■					
				M		■	■	■					
				K		■	■	■					
				N		■	■	■					
				S		■	■	■					
				H		■	■	■					

Application Guide

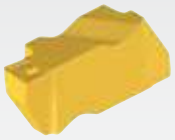
insert style	application	rake angle	page(s)
NG 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	neutral	**E397–E399**
NG-K 	• Chip control geometry. • General-purpose grooving. • O-ring grooving. • Circlip grooving. • Light turning.	10° positive	**E400–E408**
NGC-K* 	• Combined groove and chamfered edge break in one positive plunge with chip control. • Designed for DIN 471/472 standard circlip grooves.	10° positive	–
NGD* 	• Deep grooving.	neutral	–
NGD-K 	• Chip control geometry. • Deep grooving. • Light turning.	10° positive	**E409–E411**
NGP 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	5° positive	**E412**
NF* 	• Face grooving. • Additional side clearance.	neutral	–
NF-K 	• Face grooving with chip control. • Additional side clearance.	10° positive	**E413**
NFD-K 	• Deep face grooving with chip control. • Additional side clearance.	10° positive	**E414**

insert style	application	rake angle	page(s)
NFD-KI* 	• Internal deep face grooving with chip control. • For use in boring bars for internal face grooves.	10° positive	–
NP-K 	• Turning. • Back turning positive. • Profiling with chip control.	10° positive	**E415**
NR 	• Full radius grooving. • Turning and profiling.	neutral	**E416–E417**
NR-K 	• Chip control geometry. • Full radius grooving, turning, and profiling.	10° positive	**E420**
NRD 	• Deep grooving. • Full radius end-form.	neutral	**E421**
NRP* 	• Full radius grooving. • Light-turning profiling.	5° positive	–
NU* 	• Undercutting.	neutral	–
NV* 	• Poly-Vee grooving.	neutral	–
NB/NBD 	• Blanks. • Blanks for deep grooving. • Available in uncoated grades only.	–	**E396**

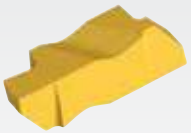
**Inserts are available as custom solutions.*

Feed Values for Grooving Inserts

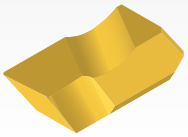
TopGroove • NG-K, NG-1L, and NG



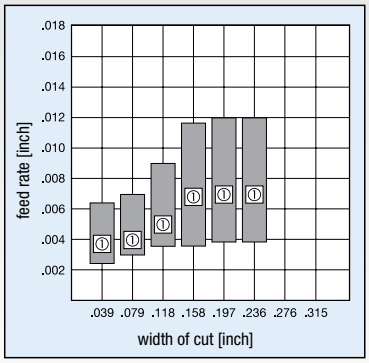
NG-K

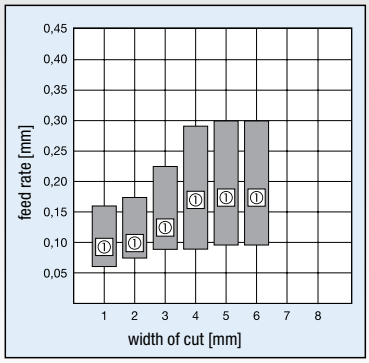


NG



NG-1L

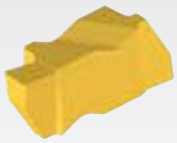




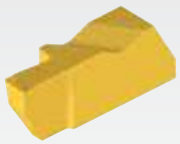
① Recommended Starting Feed

- Chip control enables true optimization and productivity.
- For general-purpose, O-ring, and circlip grooving applications.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

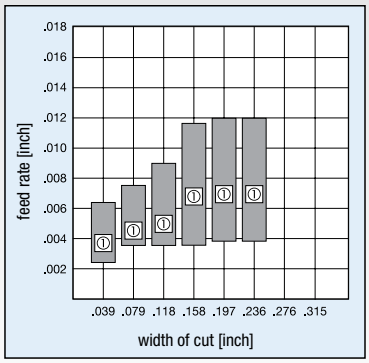
TopGroove • NGP and NGD-K

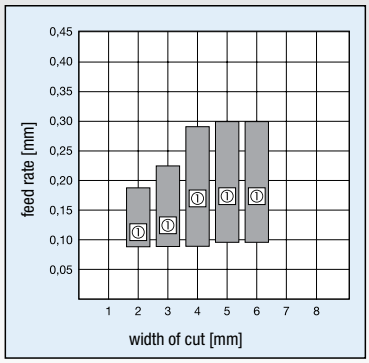


NGP



NGD-K

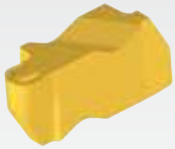




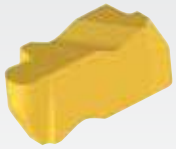
① Recommended Starting Feed

- Positive rake angles.
- For deep, O-ring, circlip, and general-purpose grooving applications.
- Chip geometry for excellent chip control.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

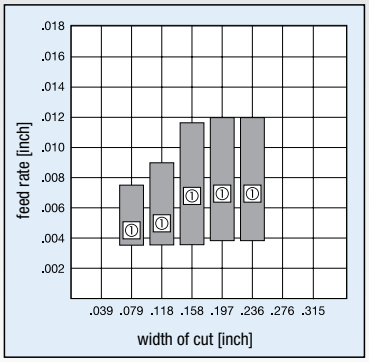
TopGroove • NR and NR-K

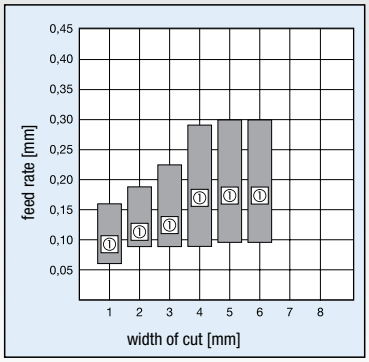


NR



NR-K





① Recommended Starting Feed

- For full radius grooving and turning profiling applications.
- Chip geometry for excellent chip control.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

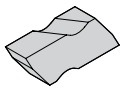
Recommended Cutting Speeds • Metric

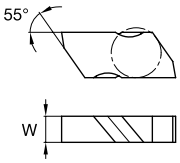
Material Group		Cutting Speed — vc m/min								
		TN6010			TN6025			THM		
		min	Start	max	min	Start	max	min	Start	max
P	0/1	140	**175**	210	130	**140**	150	90	**95**	100
	2	115	**145**	175	110	**145**	175	75	**100**	125
	3	115	**145**	175	110	**145**	175	75	**100**	125
	4	75	**100**	120	75	**95**	115	55	**65**	80
	5	105	**140**	170	100	**125**	145	70	**85**	100
	6	45	**60**	75	40	**55**	65	30	**40**	45
M	1	90	**115**	140	60	**75**	90	60	**75**	90
	2	55	**70**	90	40	**50**	55	50	**60**	75
	3	60	**80**	95	40	**50**	60	40	**50**	55
K	1	120	**150**	180	60	**80**	90	70	**90**	100
	2	120	**150**	180	60	**75**	85	50	**65**	80
	3	110	**140**	170	60	**75**	90	60	**70**	80
N	1	600	**750**	900	600	**750**	900	600	**750**	900
	2	535	**685**	835	535	**685**	835	500	**650**	800
	3	230	**300**	370	230	**300**	370	600	**750**	900
	4	135	**180**	225	135	**180**	225	500	**650**	800
	5	70	**90**	110	70	**90**	110	230	**300**	370
	6	445	**565**	690	445	**565**	690	150	**200**	250
	7	550	**700**	850	550	**700**	850	150	**200**	250
S	1	35	**40**	50	25	**35**	40	25	**35**	45
	2	20	**20**	30	15	**20**	20	20	**30**	35
	3	60	**70**	80	40	**60**	70	15	**25**	30
	4	30	**35**	45	20	**30**	35	10	**15**	20
H	1	15	**30**	60	15	**30**	60	10	**20**	35
	2	15	**30**	60	15	**30**	60	10	**20**	35
	3	15	**30**	60	15	**30**	60	10	**20**	35
	4	15	**30**	60	15	**30**	60	10	**20**	35

Recommended Cutting Speeds • Inch

Material Group		Cutting Speed — vc SFM								
		TN6010			TN6025			THM		
		min	Start	max	min	Start	max	min	Start	max
P	0/1	455	**570**	685	425	**455**	490	295	**310**	325
	2	380	**475**	575	360	**465**	575	245	**320**	405
	3	380	**475**	575	360	**465**	575	245	**320**	405
	4	245	**320**	390	235	**300**	365	170	**210**	260
	5	345	**450**	555	325	**400**	475	230	**280**	330
	6	145	**195**	245	130	**180**	210	95	**130**	145
M	1	295	**390**	490	195	**245**	295	180	**220**	270
	2	180	**245**	310	130	**160**	180	115	**145**	165
	3	195	**260**	320	130	**165**	195	225	**295**	325
K	1	390	**490**	590	195	**255**	295	195	**255**	295
	2	390	**490**	590	195	**240**	280	195	**240**	280
	3	360	**455**	555	195	**245**	295	195	**245**	295
N	1	1965	**2460**	2950	1965	**2460**	2950	1805	**2295**	2785
	2	1750	**2240**	2730	1750	**2240**	2730	1805	**2295**	2785
	3	750	**980**	1210	750	**980**	1210	1805	**2295**	2785
	4	445	**590**	730	445	**590**	730	1195	**1555**	1915
	5	230	**295**	360	230	**295**	360	620	**820**	1015
	6	1450	**1855**	2260	1450	**1855**	2260	490	**655**	820
	7	1805	**2295**	2785	1805	**2295**	2785	425	**555**	690
S	1	110	**130**	165	75	**110**	130	75	**110**	130
	2	55	**65**	90	40	**55**	65	60	**85**	105
	3	195	**235**	260	135	**195**	235	45	**60**	75
	4	–	**–**	–	–	**–**	–	35	**50**	55
H	1	60	**100**	200	60	**100**	200	35	**70**	115
	2	60	**100**	200	60	**100**	200	35	**70**	115
	3	60	**100**	200	60	**100**	200	35	**70**	115
	4	60	**100**	200	60	**100**	200	35	**70**	115

Grooving and Turning Inserts • NB • Blanks





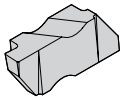
● first choice
○ alternate choice

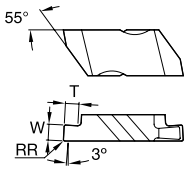
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	TN6010	TN6025	THM
right hand						
NB2R	2	3,84	.151	'	'	3607064
left hand						
NB2L	2	3,84	.151	'	'	3607016
NB3L	3	4,95	.195	'	'	3607017

NOTE: Right-hand insert shown; left-hand insert is mirror image.
SSC = To correspond with the SSC on the toolholder.

Grooving and Turning Inserts • NG • Grooving • Neutral





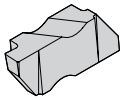
● first choice
○ alternate choice

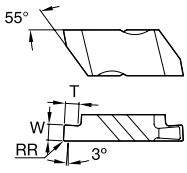
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
right hand										
NG2031R	2	0,79	.031	0,09	.004	1,27	.050	3607153	3607495	-
NG2041R	2	1,04	.041	0,09	.004	1,27	.050	-	3607330	-
NG2058R	2	1,47	.058	0,19	.008	1,27	.050	-	3607450	-
NG2062R	2	1,58	.062	0,19	.008	2,79	.110	3607167	3607453	-
NG3047R	3	1,19	.047	0,19	.008	1,91	.075	3607157	3607416	-
NG3062R	3	1,58	.062	0,19	.008	2,39	.094	3607109	3607403	3607014
NG3094R	3	2,39	.094	0,19	.008	3,81	.150	3607137	3607406	3607018
NG3125R	3	3,18	.125	0,19	.008	3,81	.150	3607110	3607375	3607020
NG4250R	4	6,35	.250	0,57	.023	6,35	.250	-	3607382	-
left hand										
NG2031L	2	0,79	.031	0,09	.004	1,27	.050	-	3607482	-
NG2058L	2	1,47	.058	0,19	.008	1,27	.050	-	3607498	-
NG2062L	2	1,58	.062	0,19	.008	2,79	.110	-	3607481	-
NG3047L	3	1,19	.047	0,19	.008	1,91	.075	3607179	3607501	-
NG3062L	3	1,57	.062	0,19	.008	2,38	.094	3607158	3607459	-

Grooving and Turning Inserts • NG • Grooving • Neutral

(continued)





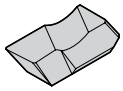
● first choice
○ alternate choice

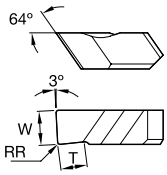
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
NG3094L	3	2,39	.094	0,19	.008	3,81	.150	3607160	3607323	-
NG3125L	3	3,18	.125	0,19	.008	3,81	.150	3607152	3607445	-
NG4250L	4	6,35	.250	0,57	.023	6,35	.250	-	3607513	-

NOTE: SSC = To correspond with the SSC on the toolholder.

Grooving and Turning Inserts • NG-1L • Grooving





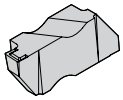
● first choice
○ alternate choice

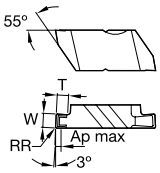
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	RR mm	RR in	T mm	T in	cutting edges	TN6010	TN6025	THM
left hand											
NG1047L	1	1,19	.047	0,19	.008	1,91	.075	1	-	3636571	-
NG1062L	1	1,58	.062	0,19	.008	1,91	.075	1	-	3636569	-
NG1094L	1	2,39	.094	0,19	.008	1,91	.075	1	-	3636570	-

NOTE: SSC = To correspond with the SSC on the toolholder.
Width tolerance is +/– .003" (+/- 0,076mm) on NG-1L inserts.

Grooving and Turning Inserts • NG-K • Grooving with Chip Breaker





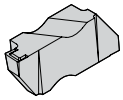
● first choice
○ alternate choice

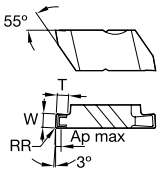
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K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
right hand												
NG2M050RK	2	0,50	.020	0,64	.025	0,09	.004	0,64	.025	3606991	3607394	-
NG2031RK	2	0,79	.031	0,76	.030	0,09	.004	1,27	.050	3607090	3607313	-
NG2M080RK	2	0,80	.032	0,76	.030	0,09	.004	1,27	.050	3606903	3607291	-
NG2M100RK	2	1,00	.039	0,76	.030	0,09	.004	1,28	.050	3607129	3607218	-
NG2M120RK	2	1,20	.047	0,76	.030	0,09	.004	1,27	.050	3606679	3607299	-
NG2047RK	2	1,19	.047	0,76	.030	0,09	.004	1,27	.050	3607123	3607404	-
NG2M140RK	2	1,40	.055	0,76	.030	0,09	.004	1,28	.050	3607151	3607318	-
NG2M150RK	2	1,50	.059	1,09	.043	0,19	.008	2,81	.110	-	3607234	-
NG2062RK	2	1,56	.062	1,09	.043	0,19	.008	2,79	.110	3607089	3607215	-
NG2M170RK	2	1,70	.067	1,09	.043	0,19	.008	2,81	.110	-	3607242	-
NG2M175RK	2	1,75	.069	1,09	.043	0,19	.008	2,81	.110	-	3607379	-

Grooving and Turning Inserts • NG-K • Grooving with Chip Breaker

(continued)





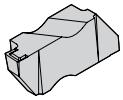
● first choice
○ alternate choice

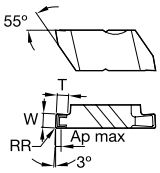
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
NG2M195RK	2	1,95	.077	1,09	.043	0,19	.008	2,81	.110	3606829	3607417	-
NG2M200RK	2	2,00	.079	1,09	.043	0,19	.008	2,81	.110	3607100	3607071	-
NG2M220RK	2	2,20	.087	1,09	.043	0,19	.008	2,81	.110	-	3607521	-
NG2M225RK	2	2,25	.089	1,09	.043	0,19	.008	2,81	.110	3606828	3607411	-
NG2094RK	2	2,39	.094	1,09	.043	0,19	.008	2,79	.110	3607146	3607317	-
NG2M250RK	2	2,50	.098	1,09	.043	0,19	.008	2,81	.110	-	3607324	-
NG2M275RK	2	2,75	.108	1,09	.043	0,19	.008	2,81	.110	3606916	3607409	-
NG2M300RK	2	3,00	.118	1,09	.043	0,19	.008	2,81	.110	3606676	3607340	-
NG2125RK	2	3,18	.125	1,09	.043	0,19	.008	2,79	.110	3607155	3607381	-
NG2M325RK	2	3,25	.128	1,09	.043	0,19	.008	2,79	.110	-	3607533	-
NG3M100RK	3	1,00	.039	0,76	.030	0,20	.008	1,91	.075	-	3607219	-
NG3M120RK	3	1,20	.047	0,76	.030	0,19	.008	1,91	.075	-	3607412	-

Grooving and Turning Inserts • NG-K • Grooving with Chip Breaker

(continued)





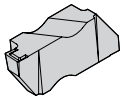
● first choice
○ alternate choice

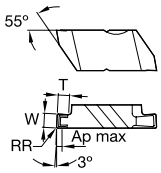
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
NG3047RK	3	1,19	.047	0,76	.030	0,19	.008	1,91	.075	3607084	3607238	-
NG3M150RK	3	1,50	.059	1,02	.040	0,19	.008	2,39	.094	-	3607221	-
NG3062RK	3	1,57	.062	1,02	.040	0,19	.008	2,39	.094	3607055	3607070	-
NG3M175RK	3	1,75	.069	1,02	.040	0,19	.008	2,39	.094	-	3607418	-
NG3072RK	3	1,83	.072	1,02	.040	0,19	.008	2,39	.094	-	3607332	-
NG3078RK	3	1,98	.078	1,02	.040	0,19	.008	2,39	.094	3607111	3607309	-
NG3M200RK	3	2,00	.079	1,02	.040	0,19	.008	2,39	.094	-	3607208	-
NG3M220RK	3	2,20	.087	1,02	.040	0,19	.008	2,39	.094	-	3607336	-
NG3M225RK	3	2,24	.088	1,02	.040	0,19	.008	2,39	.094	3606674	3607310	-
NG3094RK	3	2,39	.094	1,02	.040	0,19	.008	3,81	.150	3606660	3607069	-
NG3M250RK	3	2,50	.098	1,02	.040	0,19	.008	3,81	.150	-	3607217	-
NG3M275RK	3	2,75	.108	1,02	.040	0,19	.008	3,81	.150	3606677	3607337	-

Grooving and Turning Inserts • NG-K • Grooving with Chip Breaker

(continued)





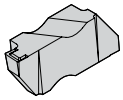
● first choice
○ alternate choice

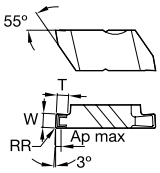
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M	●	●	○
K	●	○	●
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catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
NG3M300RK	3	3,00	.118	1,02	.040	0,19	.008	3,81	.150	3607138	3607072	-
NG3125RK	3	3,18	.125	1,02	.040	0,19	.008	3,81	.150	3607057	3607068	-
NG3M320RK	3	3,20	.126	1,02	.040	0,19	.008	3,81	.150	-	3607365	-
NG3M350RK	3	3,50	.138	2,92	.115	0,32	.013	3,81	.150	-	3607302	-
NG3156RK	3	3,96	.156	2,92	.115	0,19	.008	3,81	.150	3607127	3607456	-
NG3M400RK	3	4,00	.158	2,92	.115	0,32	.013	3,81	.150	3606678	3607235	-
NG3M425RK	3	4,25	.167	2,92	.115	0,32	.013	3,81	.150	3606914	-	-
NG3M450RK	3	4,50	.177	2,92	.115	0,32	.013	3,81	.150	-	3607362	-
NG3189RK	3	4,80	.189	2,92	.115	0,57	.023	3,81	.150	3607108	3607305	-
NG4M300RK	4	3,00	.118	1,02	.040	0,19	.008	3,81	.150	-	3607388	-
NG4125RK	4	3,18	.125	1,06	.040	0,19	.008	3,81	.150	3607163	3607449	-
NG4M350RK	4	3,50	.138	2,92	.115	0,57	.023	6,35	.250	-	3607370	-

Grooving and Turning Inserts • NG-K • Grooving with Chip Breaker

(continued)





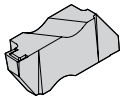
● first choice
○ alternate choice

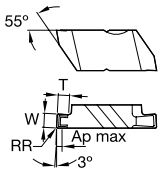
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catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
NG4M400RK	4	4,00	.158	2,92	.115	0,57	.023	6,35	.250	3606908	-	-
NG4M450RK	4	4,50	.177	2,92	.115	0,57	.023	6,35	.250	-	3607390	-
NG4189RK	4	4,80	.189	2,92	.115	0,57	.023	6,35	.250	3607103	3607220	-
NG4M550RK	4	5,50	.217	3,81	.150	0,58	.023	6,35	.250	-	3607383	-
NG4250RK	4	6,35	.250	3,81	.150	0,57	.023	6,35	.250	-	3607304	-
left hand												
NG2M050LK	2	0,50	.020	0,64	.025	0,09	.004	0,64	.025	-	3607463	-
NG2031LK	2	0,79	.031	0,76	.030	0,09	.004	1,27	.050	3607112	3607443	-
NG2M080LK	2	0,80	.032	0,76	.030	0,09	.004	1,27	.050	3606911	3607534	-
NG2M100LK	2	1,00	.039	0,76	.030	0,09	.004	1,27	.050	-	3607239	-
NG2M120LK	2	1,20	.047	0,76	.030	0,09	.004	1,27	.050	3606827	3607334	-
NG2047LK	2	1,19	.047	0,76	.030	0,09	.004	1,27	.050	-	3607376	-

Grooving and Turning Inserts • NG-K • Grooving with Chip Breaker

(continued)





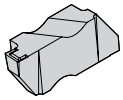
● first choice
○ alternate choice

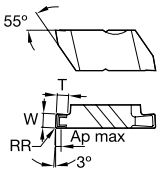
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
NG2M140LK	2	1,40	.055	0,76	.030	0,09	.004	1,27	.050	3606904	3607338	-
NG2M150LK	2	1,50	.059	1,09	.043	0,19	.008	2,79	.110	-	3607294	-
NG2062LK	2	1,58	.062	1,09	.043	0,19	.008	2,79	.110	3607126	3607307	-
NG2M170LK	2	1,70	.067	1,09	.043	0,19	.008	2,79	.110	3606905	3607327	-
NG2M175LK	2	1,75	.069	1,09	.043	0,19	.008	2,79	.110	-	3607421	-
NG2M195LK	2	1,95	.077	1,09	.043	0,19	.008	2,79	.110	-	3607420	-
NG2M200LK	2	2,00	.079	1,09	.043	0,19	.008	2,79	.110	3607144	3607207	-
NG2M220LK	2	2,20	.087	1,09	.043	0,19	.008	2,79	.110	-	3607367	-
NG2M225LK	2	2,25	.089	1,09	.043	0,19	.008	2,79	.110	-	3607413	-
NG2094LK	2	2,39	.094	1,09	.043	0,19	.008	2,79	.110	3607149	3607380	-
NG2M250LK	2	2,50	.098	1,09	.043	0,19	.008	2,79	.110	-	3607518	-
NG2M275LK	2	2,75	.108	1,09	.043	0,19	.008	2,80	.110	-	3607292	-

Grooving and Turning Inserts • NG-K • Grooving with Chip Breaker

(continued)





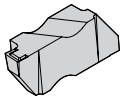
● first choice
○ alternate choice

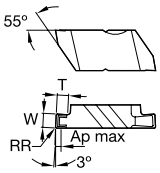
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
NG2M300LK	2	3,00	.118	1,09	.043	0,19	.008	2,80	.110	-	3607326	-
NG2125LK	2	3,18	.125	1,09	.043	0,19	.008	2,79	.110	3607165	3607444	-
NG2M325LK	2	3,25	.128	1,09	.043	0,19	.008	2,79	.110	-	3607368	-
NG3M100LK	3	1,00	.039	0,76	.030	0,20	.008	1,91	.075	-	3607419	-
NG3M120LK	3	1,20	.047	0,76	.030	0,19	.008	1,91	.075	-	3607384	-
NG3047LK	3	1,19	.047	0,76	.030	0,19	.008	1,90	.075	3607105	3607374	-
NG3M150LK	3	1,50	.059	1,02	.040	0,19	.008	2,39	.094	-	3607308	-
NG3062LK	3	1,58	.062	1,02	.040	0,19	.008	2,39	.094	3607092	3607213	-
NG3M175LK	3	1,75	.069	1,02	.040	0,19	.008	2,39	.094	-	3607331	-
NG3072LK	3	1,83	.072	1,02	.040	0,19	.008	2,39	.094	-	3607454	-
NG3078LK	3	1,98	.078	1,02	.040	0,19	.008	2,39	.094	3607106	3607460	-
NG3M200LK	3	2,00	.079	1,02	.040	0,19	.008	2,39	.094	-	3607211	-

Grooving and Turning Inserts • NG-K • Grooving with Chip Breaker

(continued)





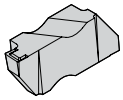
● first choice
○ alternate choice

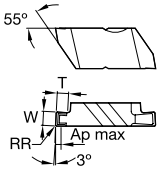
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
NG3M220LK	3	2,20	.087	1,02	.040	0,19	.008	2,39	.094	-	3607516	-
NG3M225LK	3	2,25	.089	1,02	.040	0,19	.008	2,39	.094	-	3607329	-
NG3094LK	3	2,39	.094	1,02	.040	0,19	.008	3,81	.150	3607058	3607204	-
NG3M250LK	3	2,50	.098	1,02	.040	0,19	.008	3,81	.150	-	3607300	-
NG3M275LK	3	2,75	.108	1,02	.040	0,19	.008	3,81	.150	-	3607297	-
NG3M300LK	3	3,00	.118	1,02	.040	0,19	.008	3,81	.150	3606522	3607212	-
NG3125LK	3	3,18	.125	1,02	.040	0,19	.008	3,81	.150	3607061	3607203	-
NG3M320LK	3	3,20	.126	1,02	.040	0,19	.008	3,81	.150	-	3607372	-
NG3M325LK	3	3,25	.128	1,02	.040	0,19	.008	3,81	.150	-	3607315	-
NG3M350LK	3	3,50	.138	2,92	.115	0,32	.013	3,81	.150	-	3607519	-
NG3156LK	3	3,96	.156	2,92	.115	0,19	.008	3,81	.150	3607177	3607335	-
NG3M400LK	3	4,00	.158	2,92	.115	0,32	.013	3,81	.150	3606906	3607237	-

Grooving and Turning Inserts • NG-K • Grooving with Chip Breaker

(continued)





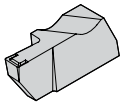
● first choice
○ alternate choice

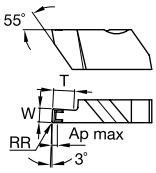
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
NG3M450LK	3	4,50	.177	2,92	.115	0,32	.013	3,81	.150	-	3607369	-
NG3189LK	3	4,80	.189	2,92	.115	0,57	.023	3,81	.150	3607107	3607320	-
NG4125LK	4	3,18	.125	1,06	.400	0,19	.008	3,81	.150	-	3607448	-
NG4M400LK	4	4,00	.158	2,92	.115	0,57	.023	6,35	.250	-	3607363	-
NG4189LK	4	4,80	.189	2,92	.115	0,57	.023	6,35	.250	3607140	3607377	-
NG4M600LK	4	6,00	.236	3,81	.150	0,57	.023	6,34	.250	-	3607387	-
NG4250LK	4	6,35	.250	3,81	.150	0,57	.023	6,35	.250	-	3607311	-

NOTE: SSC = To correspond with the SSC on the toolholder.

Grooving and Turning Inserts • NGD-K • Deep Grooving with Chip Breaker





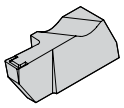
● first choice
○ alternate choice

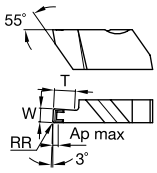
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	cutting edges	TN6010	TN6025	THM
right hand													
NGD2M150RK	2	1,50	.059	1,09	.043	0,19	.008	4,06	.160	1	-	3607503	-
NGD2M200RK	2	2,00	.079	1,09	.043	0,19	.008	5,08	.200	1	3606938	3607465	-
NGD2M250RK	2	2,50	.098	1,09	.043	0,19	.008	5,08	.200	1	-	3607504	-
NGD3062RK	3	1,58	.062	1,02	.040	0,19	.008	3,18	.125	2	3607104	3607233	-
NGD3M200RK	3	2,00	.079	1,02	.040	0,19	.008	4,06	.160	1	3606945	3607505	-
NGD3094RK	3	2,39	.094	1,02	.040	0,19	.008	6,35	.250	1	3607083	3607205	3607029
NGD3M250RK	3	2,50	.098	1,02	.040	0,19	.008	6,35	.250	1	3606946	3607425	-
NGD3M300RK	3	3,00	.118	1,02	.040	0,19	.008	6,35	.250	1	3606922	3607426	-
NGD3125RK	3	3,18	.125	1,02	.040	0,19	.008	6,35	.250	1	3607088	3607210	-
NGD3M350RK	3	3,50	.138	2,92	.115	0,32	.013	6,35	.250	1	-	3607506	-
NGD3M400RK	3	4,00	.158	2,92	.115	0,32	.013	6,35	.250	1	-	3607427	-

Grooving and Turning Inserts • NGD-K • Deep Grooving with Chip Breaker

(continued)





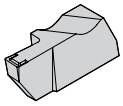
● first choice
○ alternate choice

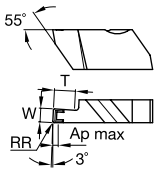
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	cutting edges	TN6010	TN6025	THM
NGD3189RK	3	4,80	.189	2,92	.115	0,58	.023	6,35	.250	1	3607170	3607373	-
NGD4125RK	4	3,18	.125	1,02	.040	0,19	.008	6,35	.250	2	3607133	3607312	-
NGD4M400RK	4	4,00	.157	2,92	.115	0,57	.023	9,53	.375	1	-	3607507	-
NGD4M450RK	4	4,50	.177	2,92	.115	0,57	.023	12,70	.500	1	-	3607508	-
NGD4189RK	4	4,80	.189	2,92	.115	0,57	.023	9,53	.375	1	3607161	3607321	-
NGD4M500RK	4	5,00	.197	2,92	.115	0,57	.023	12,70	.500	1	3606988	-	-
NGD4250RK	4	6,35	.250	3,81	.150	0,57	.023	12,70	.500	1	3607134	3607414	-
left hand													
NGD2M150LK	2	1,50	.059	1,09	.043	0,19	.008	4,06	.160	1	3606935	3607402	-
NGD2M200LK	2	2,00	.079	1,09	.043	0,19	.008	5,08	.200	1	3606936	3607399	-
NGD2M250LK	2	2,50	.098	1,09	.043	0,19	.008	5,08	.200	1	3606992	3607391	-
NGD3062LK	3	1,57	.062	1,02	.040	0,19	.008	3,18	.125	2	3607098	3607451	-

Grooving and Turning Inserts • NGD-K • Deep Grooving with Chip Breaker

(continued)





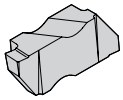
● first choice
○ alternate choice

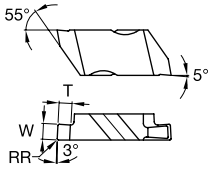
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M	●	●
K	●	○
N	●	○
S	●	●
H	○	○

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	cutting edges	TN6010	TN6025	THM
NGD3M200LK	3	2,00	.079	1,02	.040	0,19	.008	4,06	.160	1	3606941	3607487	-
NGD3094LK	3	2,39	.094	1,02	.040	0,19	.008	6,34	.250	1	3607096	3607240	3607035
NGD3M250LK	3	2,50	.098	1,02	.040	0,19	.008	6,35	.250	1	3606942	3607423	-
NGD3M300LK	3	3,00	.118	1,02	.040	0,19	.008	6,35	.250	1	3606943	3607400	-
NGD3125LK	3	3,18	.125	1,02	.040	0,19	.008	6,35	.250	1	3607097	3607209	-
NGD3M350LK	3	3,50	.138	2,92	.115	0,32	.013	6,35	.250	1	-	3607488	-
NGD3M400LK	3	4,00	.158	2,92	.115	0,32	.013	6,35	.250	1	-	3607424	-
NGD3189LK	3	4,80	.189	2,92	.115	0,57	.023	6,35	.250	1	3607148	3607410	-
NGD4125LK	4	3,18	.125	1,02	.040	0,19	.008	6,35	.250	2	-	3607316	-
NGD4M400LK	4	4,00	.158	2,92	.115	0,58	.023	9,52	.375	1	-	3607489	-
NGD4M450LK	4	4,50	.177	2,92	.115	0,57	.023	12,70	.500	1	-	3607490	-
NGD4189LK	4	4,80	.189	2,92	.115	0,57	.023	9,53	.375	1	3607147	3607314	-
NGD4M500LK	4	5,00	.197	2,92	.115	0,58	.023	12,70	.500	1	-	3607491	-
NGD4250LK	4	6,35	.250	3,80	.150	0,57	.023	12,70	.500	1	-	3607422	-

NOTE: SSC = To correspond with the SSC on the toolholder.

Grooving and Turning Inserts • NGP • Grooving • Positive





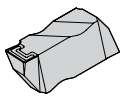
● first choice
○ alternate choice

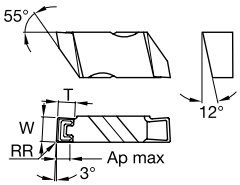
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
right hand										
NGP2M150R	2	1,50	.059	0,19	.008	2,79	.110	-	-	3607045
NGP2062R	2	1,58	.062	0,19	.008	2,79	.110	3607128	-	-
NGP2M200R	2	2,00	.079	0,19	.008	2,79	.110	-	-	3607046
NGP2M300R	2	3,00	.118	0,19	.008	2,79	.110	3606978	-	-
NGP3M150R	3	1,50	.059	0,19	.008	1,90	.075	3606979	-	-
left hand										
NGP2062L	2	1,57	.062	0,19	.008	2,79	.110	3607182	-	-
NGP2M200L	2	2,00	.079	0,19	.008	2,79	.110	3606968	-	-
NGP3M250L	3	2,50	.098	0,19	.008	3,81	.150	3606973	-	-

NOTE: SSC = To correspond with the SSC on the toolholder.

Grooving and Turning Inserts • NF-K • Face Grooving with Chip Breaker





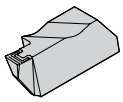
● first choice
○ alternate choice

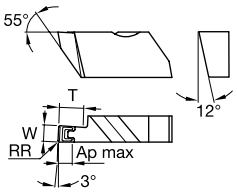
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	TN6010	TN6025	THM
right hand												
NF3M200RK	3	2,00	.079	1,02	.040	0,19	.008	1,78	.070	-	3607511	-
NF3M300RK	3	3,00	.118	1,02	.040	0,19	.008	3,81	.150	-	3607512	-
NF3125RK	3	3,18	.125	1,02	.040	0,19	.008	3,81	.150	-	3607241	-
left hand												
NF3M200LK	3	2,00	.079	1,02	.040	0,19	.008	1,78	.070	-	3607428	-
NF3M300LK	3	3,00	.118	1,02	.040	0,19	.008	3,81	.150	-	3607429	-
NF3125LK	3	3,18	.125	1,02	.040	0,19	.008	3,81	.150	-	3607322	-
NF3156LK	3	3,96	.156	2,92	.115	0,19	.008	3,81	.150	-	3607333	-

NOTE: SSC = To correspond with the SSC on the toolholder.

Grooving and Turning Inserts • NFD-K • Deep Face Grooving with Chip Breaker





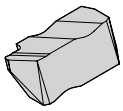
● first choice
○ alternate choice

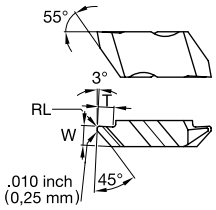
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	cutting edges	TN6010	TN6025	THM
right hand													
NFD3M300RK	3	3,00	.118	1,02	.040	0,19	.008	6,35	.250	1	-	3607523	-
NFD3125RK	3	3,18	.125	1,02	.040	0,19	.008	6,35	.250	1	-	3607296	-
NFD4189RK	4	4,80	.189	2,92	.115	0,57	.023	9,53	.375	1	-	3607325	-
left hand													
NFD3M300LK	3	3,00	.118	1,02	.040	0,19	.008	6,35	.250	1	-	3607464	-
NFD3125LK	3	3,18	.125	1,02	.040	0,19	.008	6,35	.250	1	-	3607293	-
NFD4189LK	4	4,80	.189	2,92	.115	0,57	.023	9,53	.375	1	-	3607415	-

NOTE: SSC = To correspond with the SSC on the toolholder.

Grooving and Turning Inserts • NP-K • Profiling with Chip Control





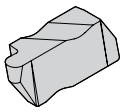
● first choice
○ alternate choice

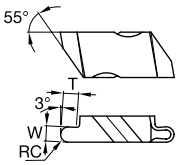
P		●	●
M		●	●
K		●	○
N		●	○
S		●	●
H		○	○

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RL mm	RL in	T mm	T in	TN6010	TN6025	THM
right hand												
NP2002RK	2	3,73	.147	2,75	.108	0,09	.004	2,81	.110	3607136	3607477	-
NP3002RK	3	4,88	.192	3,84	.151	0,09	.004	5,08	.200	3607154	3607493	-
NP3012RK	3	4,90	.193	3,86	.152	0,34	.014	5,08	.200	-	3607328	-

NOTE: SSC = To correspond with the SSC on the toolholder.
Right-hand insert shown; left-hand insert is mirror image.
Width tolerance is +/– .005" (+/- 0,13mm).

Grooving and Turning Inserts • NR • Full Radius





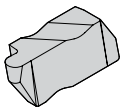
● first choice
○ alternate choice

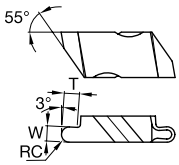
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	RC mm	RC in	T mm	T in	TN6010	TN6025	THM
right hand										
NR2M050R	2	1,00	.039	0,50	.020	1,27	.050	3606957	3607393	-
NR2M075R	2	1,50	.059	0,75	.030	2,79	.110	3606929	3607469	-
NR2031R	2	1,58	.062	0,79	.031	2,79	.110	3607174	3607301	-
NR2M100R	2	2,00	.079	1,00	.039	2,79	.110	3606930	3607470	-
NR2047R	2	2,39	.094	1,19	.047	2,79	.110	-	3607494	-
NR2M150R	2	3,00	.118	1,50	.059	2,79	.110	-	3607472	-
NR2M175R	2	3,50	.138	1,75	.069	2,79	.110	-	3607483	-
NR3031R	3	1,58	.062	0,79	.031	2,39	.094	3607125	3607475	-
NR3M100R	3	2,00	.079	1,00	.039	2,39	.094	3606958	3607397	-
NR3047R	3	2,39	.094	1,19	.047	3,81	.150	3607093	3607502	-
NR3M125R	3	2,50	.098	1,25	.049	3,81	.150	-	3607439	-

Grooving and Turning Inserts • NR • Full Radius

(continued)





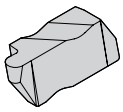
● first choice
○ alternate choice

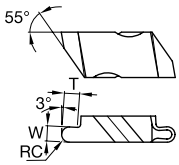
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	RC mm	RC in	T mm	T in	TN6010	TN6025	THM
NR3M150R	3	3,00	.118	1,50	.059	3,81	.150	3606960	3607440	-
NR3062R	3	3,18	.125	1,59	.063	3,81	.150	3607131	3607473	-
NR3M175R	3	3,50	.138	1,75	.069	3,81	.150	-	3607441	-
NR3M200R	3	4,00	.157	2,00	.079	3,81	.150	-	3607398	-
NR3M225R	3	4,50	.177	2,25	.089	3,81	.150	-	3607442	-
NR3094R	3	4,78	.188	2,39	.094	3,81	.150	3607180	3607476	-
NR4M200R	4	4,00	.157	2,00	.079	6,35	.250	-	3607484	-
NR4M250R	4	5,00	.197	2,50	.098	6,35	.250	-	3607486	-
NR4125R	4	6,35	.250	3,18	.125	6,35	.250	3607130	3607500	-
left hand										
NR2M050L	2	1,00	.039	0,50	.020	1,27	.050	3606948	3607401	-
NR2M075L	2	1,50	.059	0,75	.030	2,79	.110	3606924	3607430	-

Grooving and Turning Inserts • NR • Full Radius

(continued)





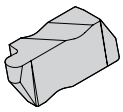
● first choice
○ alternate choice

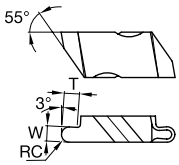
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	RC mm	RC in	T mm	T in	TN6010	TN6025	THM
NR2031L	2	1,58	.062	0,79	.031	2,79	.110	3607176	3607319	-
NR2M100L	2	2,00	.079	1,00	.039	2,79	.110	-	3607431	-
NR2047L	2	2,39	.094	1,19	.047	2,79	.110	-	3607446	-
NR2M125L	2	2,50	.098	1,25	.049	2,79	.110	-	3607432	-
NR2M150L	2	3,00	.118	1,50	.059	2,79	.110	3606927	3607433	-
NR2M175L	2	3,50	.138	1,75	.069	2,79	.110	-	3607434	-
NR3031L	3	1,58	.062	0,79	.031	2,39	.094	3607139	3607478	-
NR3M100L	3	2,00	.079	1,00	.039	2,39	.094	3606949	-	-
NR3047L	3	2,39	.094	1,19	.047	3,81	.150	3607135	3607479	-
NR3M125L	3	2,50	.098	1,25	.049	3,81	.150	-	3607435	-
NR3M150L	3	3,00	.118	1,50	.059	3,81	.150	-	3607436	-
NR3062L	3	3,18	.125	1,59	.063	3,81	.150	3607171	3607497	3607032

Grooving and Turning Inserts • NR • Full Radius

(continued)





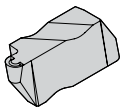
● first choice
○ alternate choice

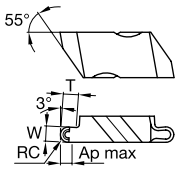
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M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	RC mm	RC in	T mm	T in	TN6010	TN6025	THM
NR3M175L	3	3,50	.138	1,75	.069	3,81	.150	-	3607437	-
NR3M200L	3	4,00	.157	2,00	.079	3,81	.150	3606953	3607396	-
NR3M225L	3	4,50	.177	2,25	.089	3,81	.150	-	3607438	-
NR3094L	3	4,78	.188	2,39	.094	3,81	.150	-	3607339	-
NR4M250L	4	5,00	.197	2,50	.098	6,35	.250	3606956	-	-
NR4125L	4	6,35	.250	3,18	.125	6,35	.250	-	3607514	-

NOTE: SSC = To correspond with the SSC on the toolholder.

Grooving and Turning Inserts • NR-K • Full Radius with Chip Breaker





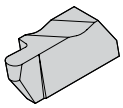
● first choice
○ alternate choice

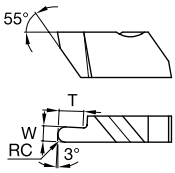
P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	Ap max mm	Ap max in	RC mm	RC in	T mm	T in	TN6010	TN6025	THM
right hand												
NR3031RK	3	1,57	.062	1,97	.078	0,79	.031	2,39	.094	3607062	3607206	-
NR3047RK	3	2,39	.094	1,91	.075	1,19	.047	3,81	.150	3607086	3607214	-
NR3062RK	3	3,18	.125	2,92	.115	1,59	.063	3,81	.150	3607056	3607236	-
NR3078RK	3	3,97	.156	2,54	.100	1,98	.078	3,81	.150	-	3607407	-
NR4062RK	4	3,18	.125	2,92	.115	1,59	.063	3,81	.150	-	3607461	-
NR4125RK	4	6,35	.250	3,81	.150	3,18	.125	6,35	.250	-	3607303	-
left hand												
NR3031LK	3	1,58	.062	1,98	.078	0,79	.031	2,39	.094	3607095	3607222	-
NR3047LK	3	2,39	.094	3,81	.150	1,20	.047	3,81	.150	3607102	3607408	-
NR3062LK	3	3,18	.125	2,92	.115	1,59	.063	3,81	.150	3607091	3607216	-
NR3078LK	3	3,96	.156	2,54	.100	1,98	.078	3,81	.150	3607172	3607306	-
NR4062LK	4	3,18	.125	2,92	.115	1,59	.063	3,81	.150	3607156	-	-
NR4094LK	4	4,79	.188	3,81	.150	2,39	.094	6,35	.250	3607150	3607452	-
NR4125LK	4	6,36	.250	3,81	.150	3,18	.125	6,35	.250	-	3607458	-

NOTE: SSC = To correspond with the SSC on the toolholder.

Grooving and Turning Inserts • NRD • Deep Grooving • Full Radius





● first choice
○ alternate choice

P	●	●	
M	●	●	○
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	SSC	W mm	W in	RC mm	RC in	T mm	T in	cutting edges	TN6010	TN6025	THM
right hand											
NRD3031R	3	1,58	.062	0,79	.031	3,18	.125	2	3607087	3607457	-
NRD3062R	3	3,17	.125	1,59	.063	6,35	.250	1	3607099	3607474	-
NRD4062R	4	3,18	.125	1,59	.063	6,35	.250	2	-	3607499	-
NRD4125R	4	6,35	.250	3,18	.125	12,70	.500	1	-	3607496	-
left hand											
NRD3031L	3	1,58	.062	0,79	.031	3,18	.125	2	3607085	3607455	-
NRD3062L	3	3,17	.125	1,59	.063	6,35	.250	1	3607124	3607462	-
NRD4062L	4	3,18	.125	1,59	.063	6,35	.250	2	-	3607295	-

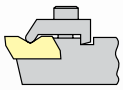
NOTE: SSC = To correspond with the SSC on the toolholder.

TopGroove Holder • Catalog Numbering System

N	S	R		16	3	D
Insert Holding Method	Insert Mounting Location	Hand of Tool	Drop Head	Shank Size	Insert Size	Qualified Surface and Length

N — Insert Holding Method

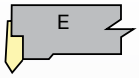
N — TopGroove*



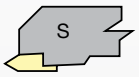
*Proprietary standard only.

S — Insert Mounting Location

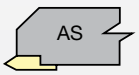
End mount



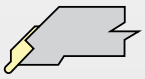
Side mount Offset



Side mount No offset for swiss machining

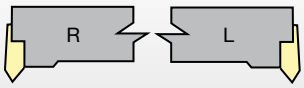


NRR undercut

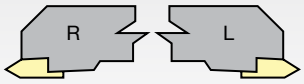


R — Hand of Tool

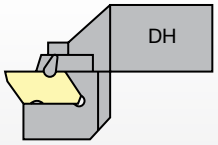
End mount



Side mount



Drop Head



16 — Shank Size

Inch:
For shanks 5/8" square and larger, the number represents the number of sixteenths of width and height. For shanks under 5/8" square,the number of sixteenths of cross section is preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.

3 — Insert Size



insert size	W1
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

D — Qualified Surface and Length

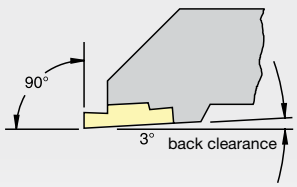
A — Qualified back and end, 4" long

B — Qualified back and end, 4.5" long

C — Qualified back and end, 5" long

D — Qualified back and end, 6" long

E — Qualified back and end, 7" long

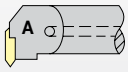


NOTE: Holders are designed to locate insert inclined to 3° to provide back clearance down open side.

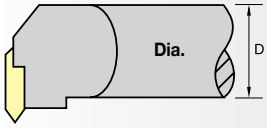
TopGroove Boring Bar • Catalog Numbering System

A	32	N	E	R	3
Bar Type	Bar Diameter	Insert Holding Method	Insert Location	Hand of Tool	Insert Size

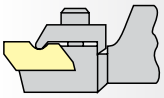
A — Steel with coolant



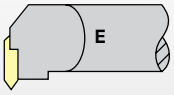
32 — A two-digit number that indicates the bar diameter in 1/16" increments.



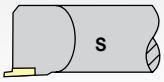
N — TopGroove



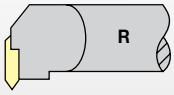
E — End mount



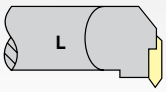
Side mount



R — Right hand



Left hand

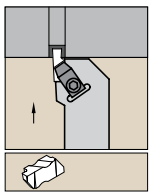


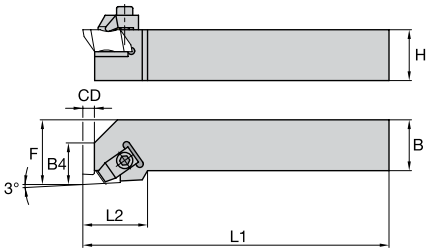
3



insert size	W1
1	.100"
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

Integral Toolholders • NS

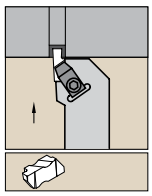


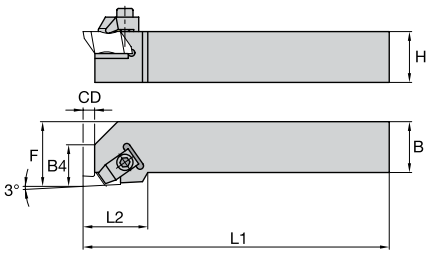


order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert
right hand									
3632147	**NSR062**	.375	.375	.562	2.50	.75	.35	.138	N.2R
3639035	**NSR082V**	.500	.500	.750	3.50	.75	.35	.138	N.2R
3639026	**NSR122B**	.750	.750	1.000	4.50	.75	.35	.138	N.2R
3639027	**NSR123A**	.750	.750	1.000	4.00	1.25	.50	.210	N.3R
3639023	**NSR123B**	.750	.750	1.000	4.50	1.25	.50	.210	N.3R
3639025	**NSR162C**	1.000	1.000	1.250	5.00	.75	.35	.138	N.2R
3638592	**NSR163C**	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R
3638591	**NSR163D**	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R
3639028	**NSR203D**	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R
left hand									
3632145	**NSL122B**	.750	.750	1.000	4.50	.75	.35	.138	N.2L
3632152	**NSL123A**	.750	.750	1.000	4.00	1.25	.50	.210	N.3L
3639032	**NSL123B**	.750	.750	1.000	4.50	1.25	.50	.210	N.3L
3632138	**NSL162C**	1.000	1.000	1.250	5.00	.75	.35	.138	N.2L
3639029	**NSL163C**	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3L
3639024	**NSL163D**	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3L
3639037	**NSL203D**	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3L

NOTE: F dimension measured over sharp point of insert.

Integral Toolholders • NS • with Shim

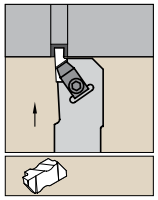


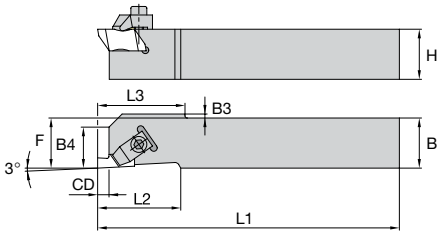


order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert
right hand									
3639031	**NSR164C**	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4R
3639033	**NSR164D**	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4R
3632153	**NSR166D**	1.000	1.000	1.250	6.00	1.38	.67	.334	N.6R
3637539	**NSR168D**	1.000	1.000	1.250	6.00	1.25	.72	.225	N.8R
3637472	**NSR206D**	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6R
3637526	**NSR854D**	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4R
left hand									
3639040	**NSL164D**	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4L
3639036	**NSL204D**	1.250	1.250	1.500	6.00	1.38	.54	.294	N.4L

NOTE: SSC = To correspond with the SSC on the insert.

Integral Toolholders • NAS

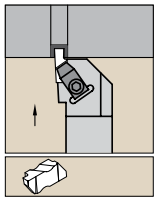


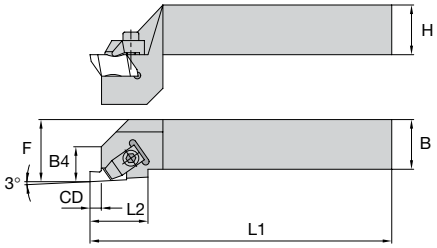


order number	catalog number	H	B	F	L1	L2	B4	CD	B3	L3	gage insert
right hand											
3636529	**NASR082D**	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2R
3639042	**NASR083D**	.500	.500	.500	6.00	1.25	.50	.210	.13	1.32	N.3R
3639039	**NASR102B**	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2R
3636532	**NASR103B**	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3R
left hand											
3636534	**NASL082D**	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2L
3636524	**NASL103B**	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3L

NOTE: F dimension measured over sharp point of insert.
Insert exterior edge in line with toolholder edge.

Integral Toolholders • NS-DH

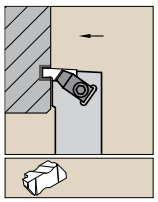


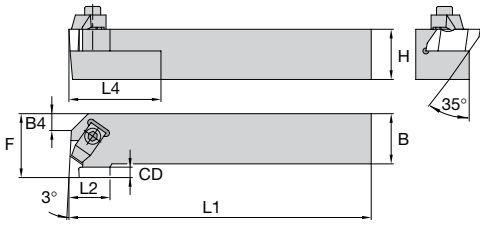


order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert
right hand									
3637528	**NSRDH163D**	1.000	1.000	1.250	6.00	1.25	.58	.210	N.3R

NOTE: SSC = To correspond with the SSC on the insert.

Integral Toolholders • NE



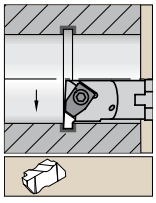


Right-hand toolholder shown.

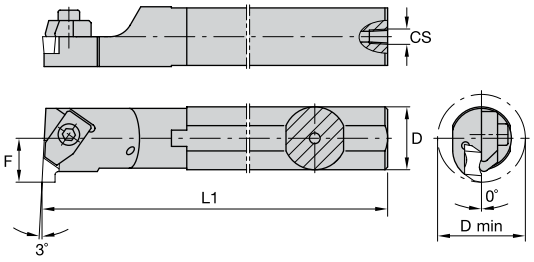
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert
right hand									
3632133	**NER123B**	.750	.750	1.125	4.50	.75	—	.210	N.3L
3637486	**NER162C**	1.000	1.000	1.250	5.00	.50	.41	.138	N.2L
3639038	**NER163C**	1.000	1.000	1.250	5.00	.75	—	.210	N.3L
3639030	**NER163D**	1.000	1.000	1.250	6.00	.75	—	.210	N.3L
3639043	**NER164D**	1.000	1.000	1.375	6.00	.75	—	.294	N.4L
3637522	**NER244D**	1.500	1.500	2.000	6.00	.75	.65	.294	N.4L
left hand									
3637503	**NEL122B**	.750	.750	1.000	4.50	.50	.29	.138	N.2R
3637500	**NEL162C**	1.000	1.000	1.250	5.00	.50	.41	.138	N.2R
3632155	**NEL163C**	1.000	1.000	1.250	5.00	.75	—	.210	N.3R
3639041	**NEL163D**	1.000	1.000	1.250	6.00	.75	—	.210	N.3R
3632159	**NEL204D**	1.250	1.250	1.625	6.00	.75	.27	.294	N.4R

NOTE: F dimension measured over sharp point of insert.

Integral I.D. Grooving Boring Bars • A-NE



Steel shank with through coolant.

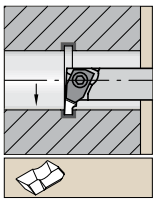


Right-hand toolholder shown.

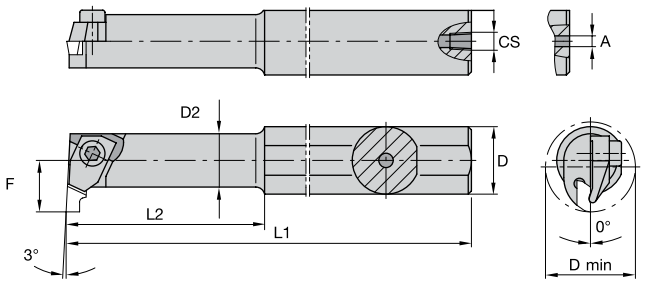
order number	catalog number	D	D min	L1	F	CS	gage insert
right hand							
3632117	**A08NER2**	.500	.730	8.000	.437	1/16-27 NPT	N.2L
3632114	**A10SNER2**	.625	1.000	10.000	.500	1/8-27 NPT	N.2L
3632118	**A12SNER2**	.750	1.125	10.000	.562	1/8-27 NPT	N.2L
3632113	**A16NER3**	1.000	1.375	12.000	.688	1/4-18 NPT	N.3L
3632130	**A16TNER2**	1.000	1.375	12.000	.688	1/4-18 NPT	N.2L
3632116	**A20NER3**	1.250	1.750	14.000	.875	1/4-18 NPT	N.3L
3632115	**A24NER3**	1.500	2.000	14.000	1.000	1/4-18 NPT	N.3L
3632123	**A28NER4**	1.750	2.500	14.000	1.250	1/4-18 NPT	N.4L
3632122	**A32NER3**	2.000	2.500	16.000	1.250	1/4-18 NPT	N.3L
left hand							
3632131	**A08NEL2**	.500	.730	8.000	.437	1/16-27 NPT	N.2R
3632127	**A10SNEL2**	.625	1.000	10.000	.500	1/8-27 NPT	N.2R
3632126	**A12SNEL2**	.750	1.125	10.000	.562	1/8-27 NPT	N.2R
3632142	**A16NEL2**	1.000	1.375	12.000	.688	1/4-18 NPT	N.2R
3632120	**A16NEL3**	1.000	1.375	12.000	.688	1/4-18 NPT	N.3R
3632124	**A20NEL3**	1.250	1.750	14.000	.875	1/4-18 NPT	N.3R
3632128	**A24NEL3**	1.500	2.000	14.000	1.000	1/4-18 NPT	N.3R
3632141	**A28NEL4**	1.750	2.500	14.000	1.250	1/4-18 NPT	N.4R
3632149	**A32NEL4**	2.000	2.750	16.000	1.375	1/4-18 NPT	N.4R

NOTE: Minimum bore capability varies with depth of groove. See page E430 for details.
F dimension measured over sharp point of insert.

Integral I.D. Grooving Boring Bars • A-NE-1



Necked steel shank with through coolant.

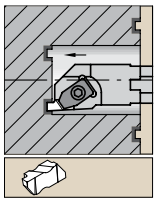


Right-hand toolholder shown.

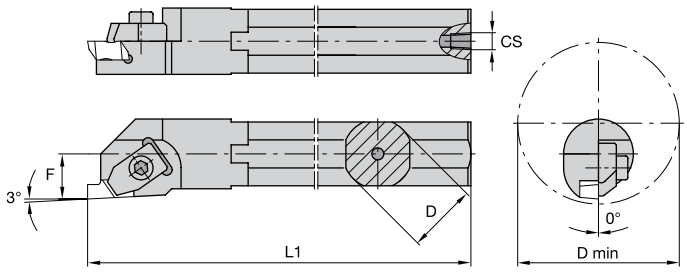
order number	catalog number	D	D min	D2	L1	L2	F	A	CS	gage insert
right hand										
3632121	**A06NER1**	.375	.440	.312	6	1.250	.258	.125	—	N.1L
3632119	**A08NER1**	.500	.440	.310	8	1.290	.258	.094	1/16-27 NPT	N.1L

NOTE: Minimum bore capability varies with depth of groove. See page E430 for details.
F dimension measured over sharp point of insert.

Integral I.D. Grooving Boring Bars • A-NS



Steel shank with through coolant.



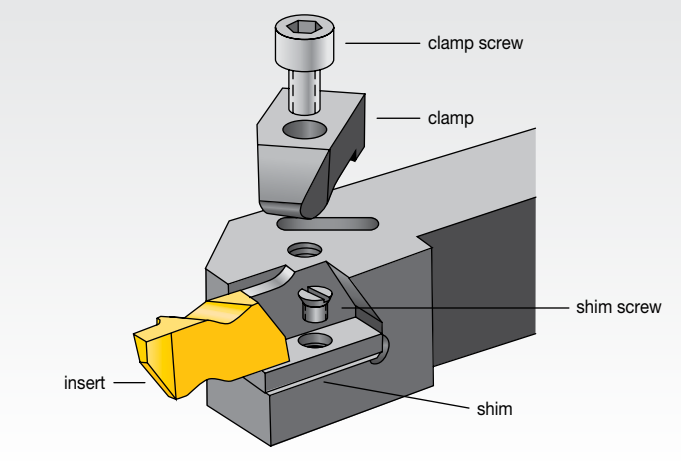
Right-hand tool holder shown.

order number	catalog number	D	D min	L1	F	CS	gage insert
right hand							
3632129	**A16TNSR3**	1.000	2.250	12.000	.640	1/4-18 NPT	N.3R
3632135	**A20UNSR3**	1.250	2.250	14.000	.765	1/4-18 NPT	N.3R
left hand							
3632137	**A16TNSL3**	1.000	2.250	12.000	.640	1/4-18 NPT	N.3L
3637502	**A32VNSL3**	2.000	2.375	16.000	1.281	1/4-18 NPT	N.3L

NOTE: Minimum bore capability varies with depth of groove. See page E430 for details.
F dimension measured over sharp point of insert.

Hardware

TopGroove Toolholders and Boring Bars



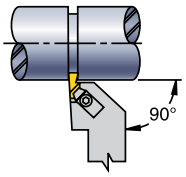
insert size and style	clamp	clamp screw	shim	shim screw
NG-1L	CM-109	S-304	–	–
NG-2R	CM-182	S-310	–	–
NG-2L	CM-183	S-310	–	–
NG-2R	CM-74	S-310	–	–
NG-2L	CM-75	S-310	–	–
NG-3R	CM-184	S-412	–	–
NG-3L	CM-185	S-412	–	–
NG-3R	CM-72	S-412	–	–
NG-3L	CM-73	S-412	–	–
NG-3R*	CM-78	S-412	–	–
NG-3L*	CM-70	S-412	–	–
NG-4R	CM-72	S-412	SM-420	SL-344
NG-4L	CM-73	S-412	SM-420	SL-344
NG-5R	CM-80	S-352	–	–
NG-5L	CM-81	S-352	–	–
NG-6R	CM-120	S-412	SM-416	S-111
NG-6L	CM-121	S-412	SM-416	S-111
TopGroove relief grooving				
NU-3125R	CM-72	S-412	–	–
NU-3125L	CM-73	S-412	–	–
NU-3125R**	CM-72	S-618	–	–
NU-3125L**	CM-73	S-618	–	–
Utility threading				
NTU-4R	CM-72	S-412	–	–
NTU-4L	CM-73	S-412	–	–

**25mm diameter boring head.*
***Boring head.*

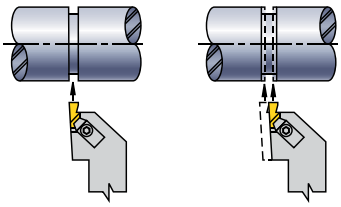
Grooving Tool Failure and Solution Guide

Practical Solutions to Common Grooving Problems

Holder Position for Grooving Operation

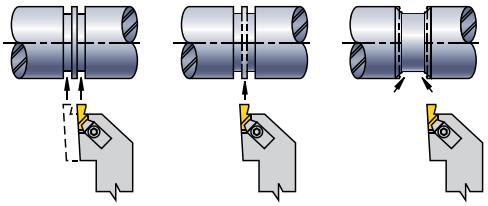


How to Cut a Groove Slightly Wider than the Groove Tool



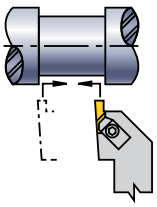
1. Plunge the center of the groove.
2. Plunge each side of the groove to get the specified width. Use a slower feed rate when cutting groove sides.

How to Cut Wider Grooves



1. Plunge out both sides of groove width.
2. Plunge center area to remove web of material remaining.
3. Plunge both sides of groove at the required angle, using approximately one-half the width of the grooving tool for maximum width of cut.

Finish Turning the Groove



1. Follow recommendations explained above.
2. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined here.
3. Use the lightest depth of cut that still enables good chip surface finishing.

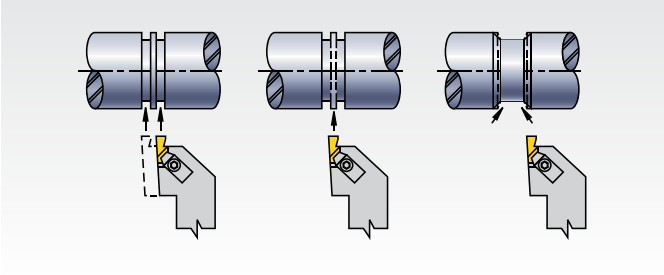
problem	solution
bur	1. Ensure tool center height. 2. Use sharp tool (index more often). 3. Use positive rake PVD-coated insert. 4. Use correct grade for workpiece material. 5. Use correct geometry (e.g., positive rake for work-hardening material). 6. Chamfer before grooving. 7. Change tool path.
poor surface finish	1. Increase speed. 2. Use sharp tool (index more often). 3. Dwell tool in bottom 1–3 revolutions (max). 4. Use proper chip control geometry. 5. Increase coolant flow/concentration. 6. Ensure proper setup (overhang, shank size). 7. Use correct geometry (e.g., positive rake for work-hardening material).
groove bottom that is not flat	1. Use sharp tool (index more often). 2. Dwell tool in bottom 1–3 revolutions (max). 3. Reduce tool overhang (increase rigidity). 4. Ensure correct tool alignment. 5. Reduce feed rate at groove bottom. 6. Use a wider insert. 7. Ensure tool center height.
poor chip control	1. Use “K” chip control geometry insert. 2. Use sharp tool (index more often). 3. Increase coolant concentration. 4. Adjust feed rate (usually increase first).
chatter	1. Reduce tool and workpiece overhang. 2. Adjust speed and feed (usually increase first). 3. Ensure center height.
insert chipping	1. Use correct grade for workpiece material. 2. Increase speed. 3. Reduce feed. 4. Use a stronger grade. 5. Increase tool and setup rigidity.
side walls not straight	1. Check tool alignment for square. 2. Use correct insert hand. 3. Reduce workpiece and tool overhang. 4. Use sharp insert (index more often).

Machining Guidelines

Machining Guidelines for Chip Control • Grooving

When the proper cutter diameter is not available, proper cutter positioning will provide positive results.

- Center height of insert should be positioned at the center of the workpiece or up to .005" (0,13mm) above.
- Dwell time in the bottom of the groove (more than three revolutions) is not recommended.
- Chip control is feed rate related and should be adjusted to fit the particular situation.
  Recommended feed range is .003–.012 IPR (0,08–0,3 mm/rev).

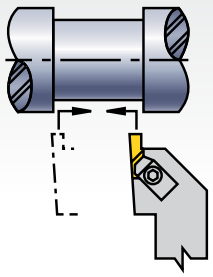


Machining Guidelines for Chip Control • Turning/Profiling

Maximum depth of cut for side cutting (turning/profiling) depends on the material being cut and the width of the tool.

- .031–.062" (0,79–1,6mm) wide insert can cut up to .025" (0,6mm) deep.
- .067–.128" (1,7–3,3mm) wide insert can cut up to .040" (1mm) deep.
- .138–.189" (3,5–4,8mm) wide insert can cut up to .080" (2mm) deep.
- .197–.250" (5–6,35mm) wide insert can cut up to .120" (3mm) deep.

Finish Turning the Groove



1. Plunge both sides of groove width.
2. Plunge center area to remove web of material remaining.
3. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined.
4. Use the lightest depth of cut that still allows good chipbreaking, tool life, and surface finish.

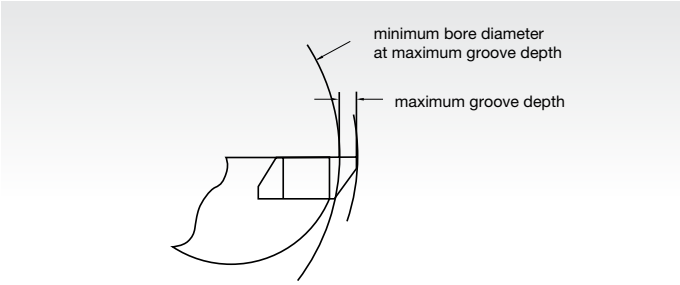
Groove Limits				
insert catalog number	maximum internal groove depth		minimum bore diameter	
	inch	mm	inch	mm
NG-1094L	.075	1,91	.800	20,32
—	.040	1,02	.440	11,18
NG-2031R/L	.050	1,27	.730	18,54
NG-2041R/L	—	—	—	—
NG-2047R/L	—	—	—	—
NG-2058R/L	—	—	—	—
—	.110	2,79	2.500	63,50
NG-2062R/L	.102	2,59	1.750	44,45
NG-2094R/L	.098	2,49	1.500	38,10
NG-2125R/L	.080	2,03	1.000	25,40
—	.055	1,40	.730	18,54
NG-3047R/L	—	—	—	—
NG-3062R/L	.094	2,39	1.750	44,45
NG-3072R/L	.090	2,29	1.625	41,28
NG-3078R/L	.075	1,91	1.375	34,93
NG-3088R/L	—	—	—	—
NG-3094R/L	—	—	—	—
NG-3097R/L	.150	3,81	2.375	60,33
NG-3105R/L	—	—	—	—
NG-3110R/L	.145	3,68	2.125	53,98
NG-3122R/L	—	—	—	—
NG-3125R/L	.138	3,51	1.875	47,63
NG-3142R/L	—	—	—	—
NG-3156R/L	.125	3,18	1.625	41,28
NG-3178R/L	—	—	—	—
NG-3185R/L	.110	2,79	1.375	34,93
NG-3189R/L	—	—	—	—
NG-4125R/L	.150	3,81	2.750	69,85
—	.250	6,35	5.750	146,05
NG-4189R/L	.245	6,22	5.000	127,00
NG-4213R/L	.240	6,10	4.500	114,30
NG-4219R/L	.218	5,54	3.250	82,55
NG-4250R/L	.200	5,08	2.500	63,50

NOTE: The same maximum groove depth and minimum bore diameter values also apply to metric, NG-K (chip control), and NR (full radius) inserts of similar size.
The same internal grooving depth limits are a function of bar clearance versus bore diameters.

Machining Guidelines

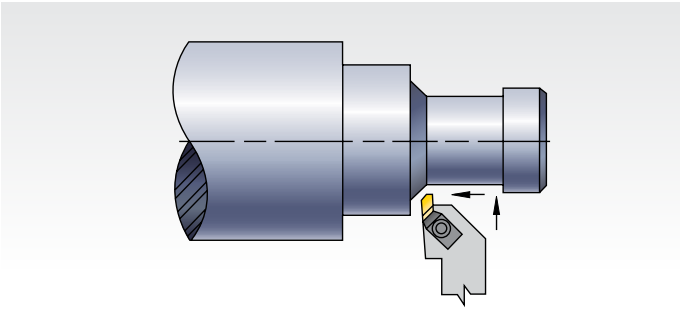
Internal Groove Depth versus Bar Interference

NOTE: Internal grooving depth limits are a function of bar clearance versus bore diameters.



Machining Guidelines for Back Turning/ Turning/Profiling

The NP-K-style TopGroove inserts were engineered specifically for back turning on small automatic lathes, but they also find applications for other light turning and profiling operations. For general applications, maximum depth of cut should not exceed .108" (2,74mm) for size 2 inserts or .151" (3,84mm) for size 3 inserts.



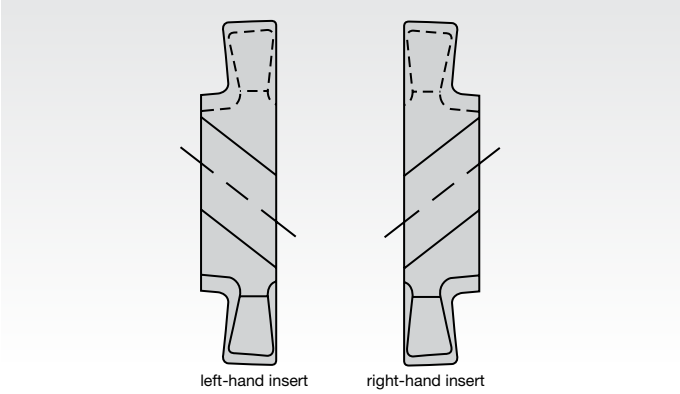
Machining Guidelines for Using TopGroove Deep Grooving Inserts (NGD)

Typically, those NGD- and NRD-style inserts with two cutting edges require no machine offset changes. However, those inserts with only one cutting edge do require offset changes. Refer to the chart here to ensure proper offset adjustments.

insert catalog number	add to C dimension		add to F dimension	
	inch	mm	inch	mm
NGD-3062	.000	0,00	.000	0,00
NGD-3094	.100	2,54	.100	2,54
NGD-3125	.100	2,54	.100	2,54
NGD-3189	.100	2,54	.100	2,54
NGD-4125	.000	0,00	.000	0,00
NGD-4189	.125	3,18	.125	3,18
NGD-4250	.250	6,35	.250	6,35
NRD-3031	.000	0,00	.000	0,00
NRD-3062	.100	2,54	.100	2,54
NRD-4062	.000	0,00	.000	0,00
NRD-4094	.250	6,35	.250	6,35
NRD-4125	.250	6,35	.250	6,35

TopGroove Insert Selection Guide

- All TopGroove inserts are precision ground to provide accurate edge location and secure locking of the insert in the toolholder pocket.
- TopGroove inserts can be used in either toolholders or boring bars.
- Right-hand TopGroove toolholders use right-hand inserts. Left-hand TopGroove toolholders use left-hand inserts.
- Right-hand TopGroove boring bars use left-hand inserts. Left-hand TopGroove boring bars use right-hand inserts.

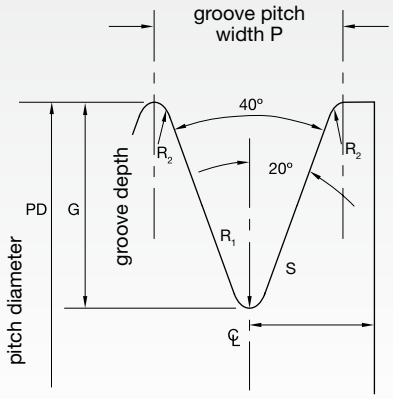


Machining Guidelines

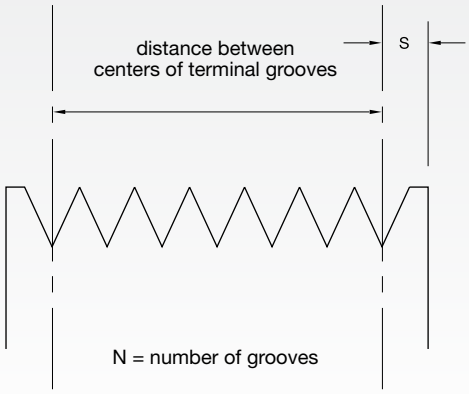
Machining Guidelines for Poly-Vee Grooving with Custom Solution and TopGroove NV Inserts (NV3-J and NV4-L)

- To machine cross section “J”, use insert NV3-J.
- To machine cross section “L”, use insert NV4-L.

Section J



Section L



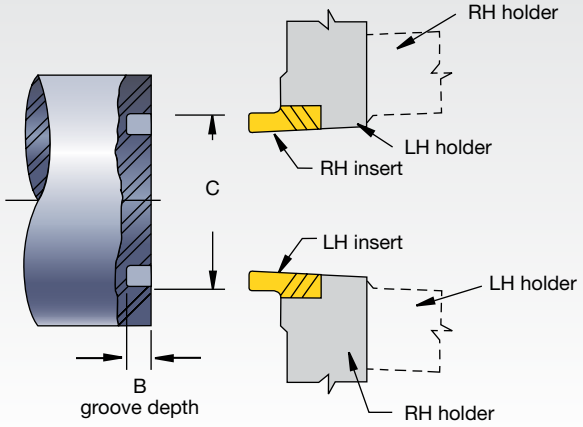
Groove Dimensions and Tolerances for Sheaves

groove cross section	pitch width (P)	groove depth (G)	minimum radius (R2)	radius (R1)	terminal distance	distance between centers of terminal grooves and maximum accumulated tolerance
J	.092 ±.001	.087 ±.005	.008	.0125 ±.0025	1/8	(N-1).092 ±.010
L	.185 ±.002	.201 ±.005	.015	.0125 ±.0025	3/8	(N-1).185 ±.010

Machining Guidelines

Machining Guidelines for Face Grooving Operations • External

Toolholders

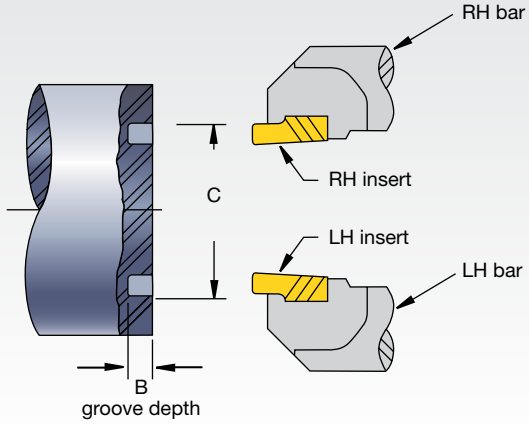


Standard NF/NDF Inserts

insert family	maximum groove depth B		minimum groove diameter C	
	inch	mm	inch	mm
NF-3	.060	1,52	.94	23,9
NF-3	.094	2,39	1.20	30,5
NF-3	.125	3,18	1.42	36,1
NF-3	.150	3,81	1.63	41,3
NFD-3	.250	6,35	1.88	47,6
NFD-4	.375	9,53	2.25	57,2
NFD-4	.500	12,70	2.25	57,2

Machining Guidelines for Face Grooving Operations • External

Boring Bars



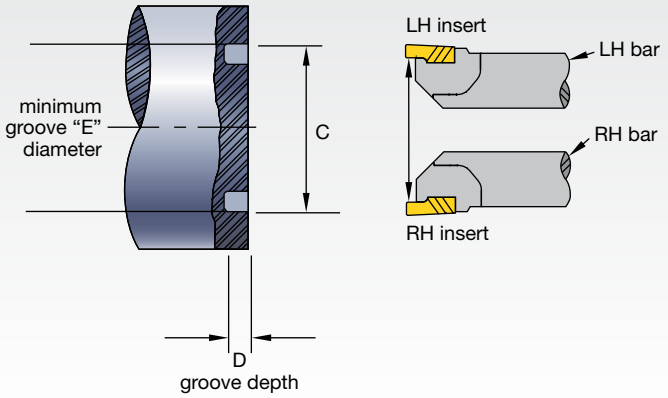
Standard NG/NGD Inserts

insert family	maximum groove depth B		minimum groove diameter C	
	inch	mm	inch	mm
NG-2	.050	1,27	2.13	54,0
NG-2	.110	2,79	3.50	88,9
NG-3	.094	2,39	4.00	101,6
NG-3	.125	3,18	5.00	127,0
NG-3	.150	3,81	5.50	139,7
NGD-3	.250	6,35	6.88	174,6
NG-4	.150	3,81	6.00	152,4
NG-4	.250	6,35	8.25	209,6
NGD-4	.375	9,53	8.75	222,3
NGD-4	.500	12,70	8.75	222,3

Machining Guidelines

Machining Guidelines for Face Grooving Operations • Internal

Boring Bars



Standard NG/NGD Inserts

insert family	maximum groove depth B		minimum groove diameter C	
	inch	mm	inch	mm
NFD-3-KI	.250	6,35	2.250	63,5

NOTE: Also check minimum bore diameter of boring bar. See page E430.



widia.com

WIDIA™

LG Grooving

Large-Width Grooving

The LG Grooving platform is designed for large-width grooving using periphery ground inserts for close tolerances. (+/-.05mm)



- Inserts available from 8.15–16.20mm.
- Inserts feature a bottom 'V' for secure seating on the pocket seat.
- Grade WU35CT with easy-wear identification.
- The chip groove design with positive rake enables good chip control and reduced forces.

ENERGY

Primarily used in the Energy segment for grooving operations on turbine rotors.

BENEFITS

VERSATILITY

Single-sided, versatile grooving and cut-off solution with smooth surface finish.

STABILITY

Insert seating and clamping mechanism ensures stability and reliability in heavy-duty applications.

APPLICATIONS

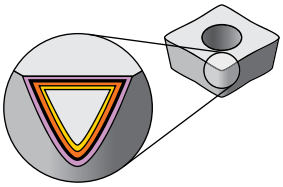


O.D. GROOVING



DEEP GROOVING

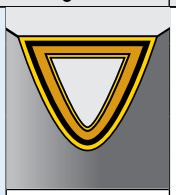
Grades and Grade Descriptions



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ⟷ toughness

Grade	Coating	Grade Description		05	10	15	20	25	30	35	40	45
WU35CT	 –	Coated carbide MT-CVD/CVD – TiN-TiCN-Al_2O_3-TiN. A good combination of tough substrate and wear-resistant, multi-layer CVD coating. Suitable for rough turning in most steels and also stainless steel.	P									
			M									

Feed Values for Grooving Inserts

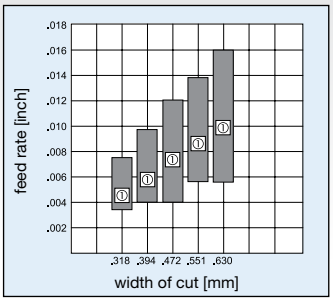
LG System • 0



0

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Inserts with wide range of applications in grooving and deep grooving. With additional chip control element for good chip control, even with varying widths of cut.



① Recommended Starting Feed

Recommended Cutting Speeds • Metric

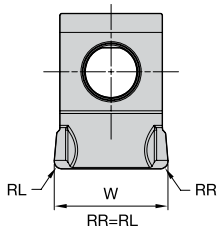
Material Group		Cutting Speed — vc m/min WU35CT		
		min	Start	max
P	0/1	140	**175**	210
	2	115	**145**	175
	3	115	**145**	175
	4	75	**100**	120
	5	105	**140**	170
	6	45	**60**	75
M	1	–	–	–
	2	–	–	–
	3	–	–	–
K	1	–	–	–
	2	–	–	–
	3	–	–	–
N	1	–	–	–
	2	–	–	–
	3	–	–	–
	4	–	–	–
	5	–	–	–
	6	–	–	–
	7	–	–	–
S	1	–	–	–
	2	–	–	–
	3	–	–	–
	4	–	–	–
H	1	–	–	–
	2	–	–	–
	3	–	–	–
	4	–	–	–

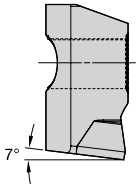
Recommended Cutting Speeds • Inch

Material Group		Cutting Speed — vc SFM WU35CT		
		min	Start	max
P	0 / 1	455	**570**	685
	2	380	**475**	575
	3	380	**475**	575
	4	245	**320**	390
	5	345	**450**	555
	6	145	**195**	245
M	1	–	–	–
	2	–	–	–
	3	–	–	–
K	1	–	–	–
	2	–	–	–
	3	–	–	–
N	1	–	–	–
	2	–	–	–
	3	–	–	–
	4	–	–	–
	5	–	–	–
	6	–	–	–
	7	–	–	–
S	1	–	–	–
	2	–	–	–
	3	–	–	–
	4	–	–	–
H	1	–	–	–
	2	–	–	–
	3	–	–	–
	4	–	–	–

Grooving Inserts • LG LGN0







● first choice
○ alternate choice

P	●
M	○
K	
N	
S	
H	

catalog number	W mm	W in	RR mm	RR in	WU35CT
123568080	8,15	0.32	0,80	0.03	6909025
123568100	10,15	0.40	0,80	0.03	6909026
123568120	12,20	0.48	0,80	0.03	6909027
123568140	14,20	0.56	0,80	0.03	6909028
123568160	16,20	0.64	0,80	0.03	6909029

TopThread™

Top Thread Demanding Threading Applications

Count on the WIDIA™ TopThread system for when high heat, high edge-line load concentrated to a small nose radius, and high feed rates combine to place tremendous demands on carbide threading inserts. TopThread insert technology brings superior chip control to high-demand applications like machining Acme, Buttress, and API threads.





TOOLHOLDERS

- Reduced inconsistencies and better workpiece finish.
- TopThread inserts are precision-ground to provide accurate edge location and secure locking of the insert in the toolholder pocket.
- Excellent choice for special thread forms and toolholder designs.
- TopThread inserts are available in TN6010™ and TN6025™ grades to withstand the demands placed on the cutting edge of the threading insert.

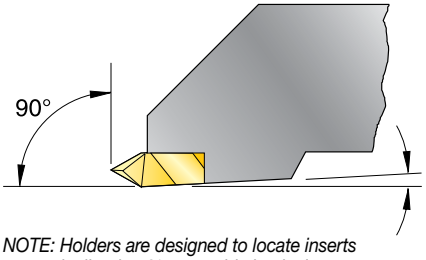
INSERTS

- Rigid design for increased stability during threading applications.
- Good quality threads, improved tool life, and improved surface finishes.
- Locking forces in three directions for superior resistance to tangential force.
- Unique 3° insert relief angle for back clearance.
- Available in partial profile inserts for 60° thread forms.

THE SIMPLE SOLUTION

VERSATILE

The versatility of the TopThread steel enables you to use both threading and grooving inserts in the same toolholder.



NOTE: Holders are designed to locate inserts inclined to 3° to provide back clearance down open side.

TOP THREAD DEMANDING THREADING APPLICATIONS

TopThread™

INSERT STYLE	OPTIMUM CUTTING CONDITIONS	FIRST CHOICE	MATERIALS
Chip control or neutral 	**TN6010** 160–750	**TN6025** 130–650	P
Chip control or positive 	**TN6010** 160–600	**TN6025** 130–450	M
Neutral 	**TN6010** 230–700	**TN6025** 200–475	K
Positive 	–	**TN6025** 160–1150	N
Positive 	**TN6010** 65–400	**TN6025** 35–330	S

INDUSTRY

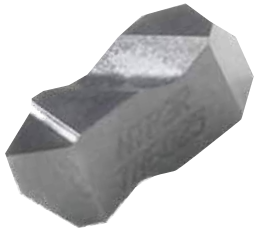
GENERAL ENGINEERING

AEROSPACE

TRANSPORTATION







Threading Selection Guide

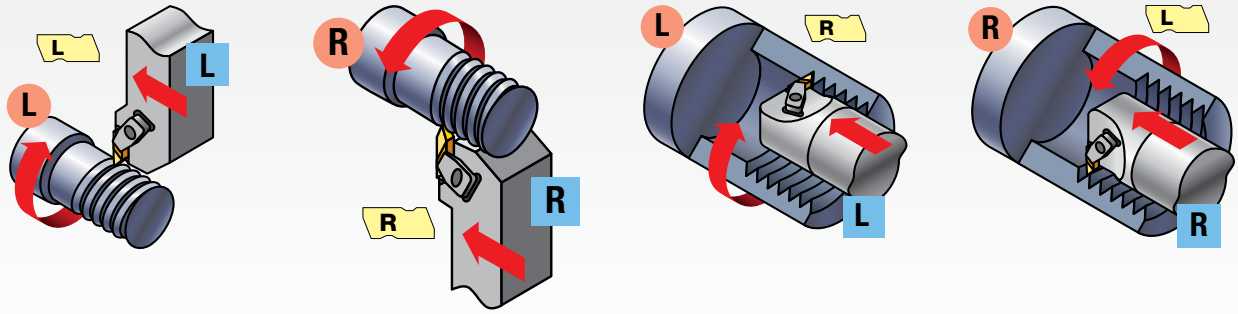
Step 1 • Select Threading Method and Hand of Tooling

Required Information:
- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.



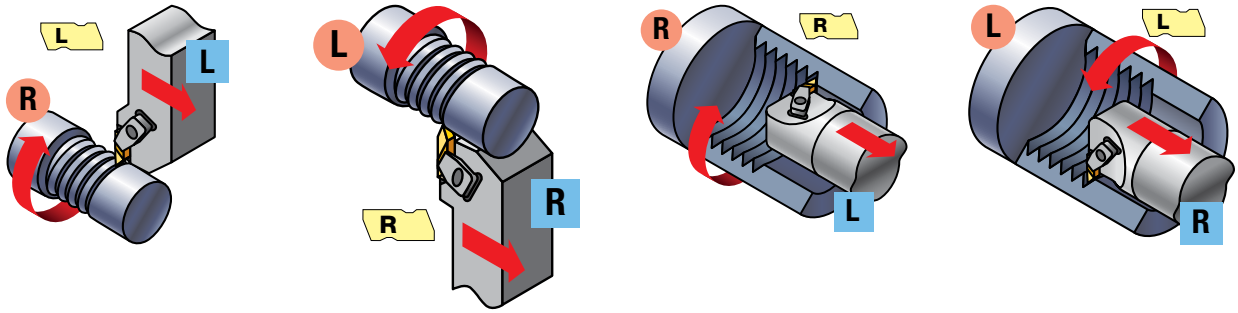
hand of thread | hand of toolholder | hand of insert

Feed direction toward the chuck • RECOMMENDED



external left-hand thread | external right-hand thread | internal left-hand thread | internal right-hand thread

Feed direction away from the chuck



external right-hand thread | external left-hand thread | internal right-hand thread | internal left-hand thread

Step 2 • Select Holder from Catalog Page

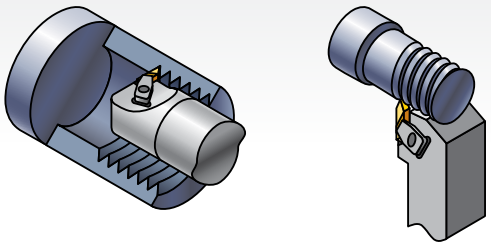
The insert size must match the gage insert size of your toolholder selection:

Required Information:
- External/internal operation.
- Minimum bore diameter (for internal operations).
- Hand of tool.
- Insert size (gage insert).

catalog number	gage insert
NSR-163D	N.3R
NSR-164D	N.4R

NOTE: TopThread toolholders and boring bars are listed with a gage insert to indicate the size and hand required. They are compatible with both grooving and threading inserts of the same size.

Select the appropriate holder for the insert size and hand:



NOTE: Optimize your threading operation by using the proper infeed method and the recommended infeed values.

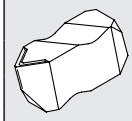
See the Technical section on pages E506–E507 of this catalog.

For internal threading, minimum bore varies depending on thread type. See page E430 for details.

Threading Selection Guide

Step 3 • Choose Insert for Application

- See threading insert overview on page E444.
- Select cresting inserts for fully controlled thread form including diameter control. Cresting inserts eliminate the need for deburring.
- Non-cresting partial profile inserts can cut a variety of thread pitches.
- Note insert size for toolholder selection.



insert size	catalog number	TN6025	TN6010
2	NT-2RK	•	•
3	NT-3RK	•	•
4	NT-4RK	•	•

Step 4 • Select Grade and Speed

Recommendations for Grade and Speed Selection — m/min (SFM)

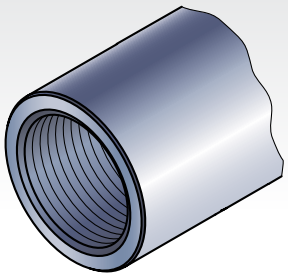
workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
insert style	chip control or neutral 	chip control or positive 	neutral 	positive 	positive 
optimum cutting conditions	**TN6010** 50–230n (160–750)	**TN6010** 50–185 (160–600)	**TN6010** 70–210 (230–700)	—	**TN6010** 20–120 (65–400)
first choice	**TN6025** 40–200 (130–650)	**TN6025** 40–135 (130–450)	**TN6025** 60–145 (200–475)	**TN6025** 50–360 (160–1150)	**TN6025** 10–100 (35–330)

Examples:
Chip Control: NT-K or NT-CK (partial profile only)
Neutral: NT, NT-C, NTF, NTC, NJ, NJF, NDC-V, NA, NDC, NTB-A/B
Positive: NTP, NTK, NJP, NJK

TopThread Threading Example:

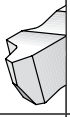
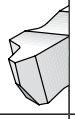
application: 8 TPI Acme internal right-hand thread
material: alloy steel
workpiece diameter: 4.5" (114,3mm) good cutting conditions feed towards the chuck

Recommendation:
insert: NA3L8
grade: TN6010
insert size: 3
boring bar: A40NER3
gage insert: N.3L
speed: 500 SFM (150 m/min)
infeed passes*: 12 passes

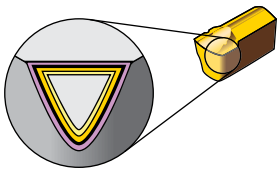


** Infeed recommendations provided in technical data section on pages E506–E507.*

Insert Overview

style						thread profile	standard	tolerance class	cresting	application	page(s)
chip control — K		neutral		positive							
NT-K		NT		NTP		Partial Profile 60°	–	–	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**E449–E451**
NT-CK						Partial Profile 60° — coarse pitch	–	–	N	Coarse pitch 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**E452**
		NTF		NTK		Partial Profile 60° — fine pitch	–	–	N	Fine pitch 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches — able to thread close to shoulders.	**E452–E453**
		NTC				American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60° V-form for all industries.	**E454**
				NJP		UNJ	SAEA588791	3A/3B	N	Controlled root radius on external threads for military and aerospace industries.	**E455**
				NJK		UNJ — fine pitch	SAEA588790	3A/3B	N	Controlled root radius on external threads for military and aerospace industries — able to thread close to shoulders.	**E455**
		NDC-V				NPT	ANSI/ACME B1.201: 1983	Standard NPT	Y	National Pipe Thread standard forms for pipe fittings.	**custom solution**
		NDC-V-M				NPT — multi-tooth	ANSI/ACME B1.201: 1983	Standard NPT	Y	High-productivity multi-tooth threading inserts for NPT threads.	**custom solution**
		NWC-E				Whitworth, BSW, BSP	BS 84:1956, ISO 228/1: 1982, DIN 259	Medium Class A	Y	Widely used 55° form for gas and water connections.	**E456**
		NDC-RD				API Round	API STD. 5B:1979	Standard API RD	Y	60° V-form with large radius for casing, tubing, and line pipe in the oil and gas industry, including 8 and 10 round forms.	**E456**
		NA				Acme	ANSI B1.5:1988	3G	N	29° truncated thread form for motion applications in a wide variety of industries.	**E457**
		NAS				Stub Acme	ANSI B1.8:1988	2G	N	Shallow depth 29° truncated thread form for motion applications in a wide variety of industries.	**E458**
		NTB-B				American Buttress — 45° clearance flank leading (Pull)	ANSI B1.9:1973	Class 2	N	Sawtooth form for axial load bearing applications in a variety of industries — use the “B” style when the 45° clearance flank is the leading flank.	**E458**

Grades and Grade Descriptions

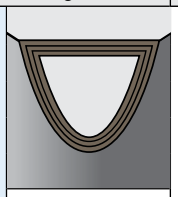
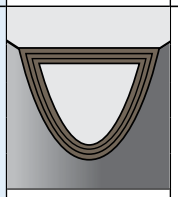
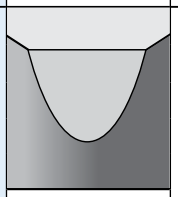


Coatings provide high-speed capability and are engineered for finishing to light roughing.

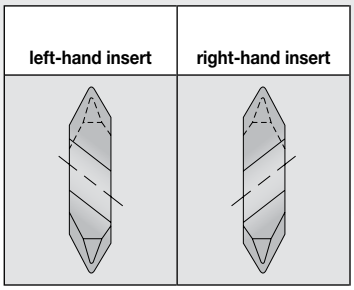
- Reduce cycle times — high-speed capability.
- Longer tool life — new multilayer coating provides better wear resistance.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade	Coating		Grade Description		05	10	15	20	25	30	35	40	45
TN6010	 HC-P10		An advanced PVD TiAlN coating over a very deformation-resistant unalloyed carbide substrate. TN6010 is ideal for finishing to general machining of most workpiece materials at higher speeds. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys under stable conditions. It also performs well machining hardened and short chipping materials.	P		■	■	■					
				M		■	■	■					
				K		■	■	■					
				N		■	■	■					
				S		■	■	■					
				H		■							
TN6025	 HC-P25		An advanced PVD TiAlN-coated grade with a tough, ultra-fine-grain unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temp alloys, titanium, irons, and non-ferrous materials. Speeds may vary from low to medium and will handle interruptions and high feed rates.	P				■	■	■			
				M				■	■	■			
				K				■	■	■			
				N				■	■	■			
				S				■	■	■			
THM	 HW-K15		Uncoated carbide for light and medium machining. For cast iron, all non-ferrous metals, and non-metals. Also capable of machining hardened materials at low cutting speeds.										
				K		■	■	■					
				N		■	■	■					
				S		■	■	■					

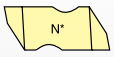
- All TopThread inserts are precision-ground to provide accurate edge location and secure locking of the insert in the toolholder pocket.
- TopThread inserts can be used in either toolholders or boring bars.
- All non-cresting-type threading inserts can be used for either external or internal applications. All cresting-type inserts are designated specifically for external or internal use.
- Right-hand TopThread toolholders use right-hand inserts. Left-hand TopThread toolholders use left-hand inserts.
- Right-hand TopThread boring bars use left-hand inserts. Left-hand TopThread boring bars use right-hand inserts.
- See this page for carbide grade selection and more technical information.



Catalog Numbering System

N	D	C	3	8RD	R	75	
Type of Insert	Insert	Additional Information	Insert Size	Industry Thread Identification	Hand of Insert	Definition of Insert	Additional Information

N — TopThread



A — Acme

D — API or NPT

J — UNJ thread

T — 60° V thread

W — 55° V Whitworth

B — Buttress

F — Fine pitch

S — Stub Acme

C — Cresting

P — Positive rake

K — Fine pitch, positive

Indicates API or drilling industry form designation (e.g., 10RD, 8RD, .038) or controlled root radius threading inserts indicate the root radius in .001" increments (NJ, NJF, NJP, NJK) or M indicates metric ISO thread

R — Right hand

L — Left hand

- Threads per inch or pitch (for metric)
- "A" or "B" type Buttress insert
- Taper per foot — API threads

I — Internal thread

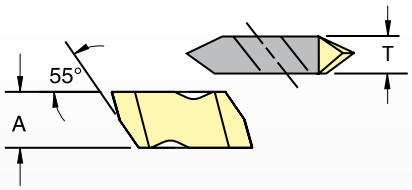
E — External thread (used only if internal and external thread forms are different)

M — Multiple tooth

K — Standard chip control

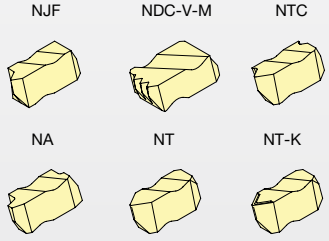
C — Coarse pitch

D — Dryseal



TopThread insert dimensions

insert size	A mm	T mm
1	2,54	2,54
2	*5,56*	*3,81*
3	8,74	4,95
4	11,51	6,48
5	17,48	9,65
6	11,51	9,73
8	7,93	11,13



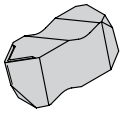
Recommended Cutting Speeds • Metric

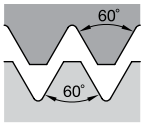
		Cutting Speed — vc m/min								
		TN6010			TN6025			THM		
	Material Group	min	Start	max	min	Start	max	min	Start	max
P	0/1	140	**175**	210	130	**140**	150	90	**95**	100
	2	115	**145**	175	110	**145**	175	75	**100**	125
	3	115	**145**	175	110	**145**	175	75	**100**	125
	4	75	**100**	120	75	**95**	115	55	**65**	80
	5	105	**140**	170	100	**125**	145	70	**85**	100
	6	45	**60**	75	40	**55**	65	30	**40**	45
M	1	90	**115**	140	60	**75**	90	60	**75**	90
	2	55	**70**	90	40	**50**	55	50	**60**	75
	3	60	**80**	95	40	**50**	60	40	**50**	55
K	1	120	**150**	180	60	**80**	90	70	**90**	100
	2	120	**150**	180	60	**75**	85	50	**65**	80
	3	110	**140**	170	60	**75**	90	60	**70**	80
N	1	600	**750**	900	600	**750**	900	600	**750**	900
	2	535	**685**	835	535	**685**	835	500	**650**	800
	3	230	**300**	370	230	**300**	370	600	**750**	900
	4	135	**180**	225	135	**180**	225	500	**650**	800
	5	70	**90**	110	70	**90**	110	230	**300**	370
	6	445	**565**	690	445	**565**	690	150	**200**	250
	7	550	**700**	850	550	**700**	850	150	**200**	250
S	1	35	**40**	50	25	**35**	40	25	**35**	45
	2	20	**20**	30	15	**20**	20	20	**30**	35
	3	60	**70**	80	40	**60**	70	15	**25**	30
	4	30	**35**	45	20	**30**	35	10	**15**	20
H	1	15	**30**	60	–	**–**	–	–	**–**	–
	2	15	**30**	60	–	**–**	–	–	**–**	–
	3	15	**30**	60	–	**–**	–	–	**–**	–
	4	15	**30**	60	–	–	–	–	**–**	–

Recommended Cutting Speeds • Inch

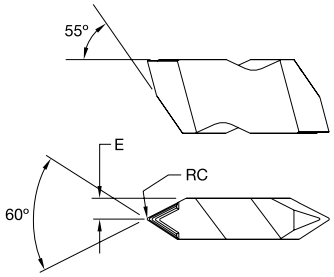
Material Group		Cutting Speed — vc SFM								
		TN6010			TN6025			THM		
		min	Start	max	min	Start	max	min	Start	max
P	0/1	455	**570**	685	425	**455**	490	295	**310**	325
	2	380	**475**	575	360	**465**	575	245	**320**	405
	3	380	**475**	575	360	**465**	575	245	**320**	405
	4	245	**320**	390	235	**300**	365	170	**210**	260
	5	345	**450**	555	325	**400**	475	230	**280**	330
	6	145	**195**	245	130	**180**	210	95	**130**	145
M	1	295	**390**	490	195	**245**	295	180	**220**	270
	2	180	**245**	310	130	**160**	180	115	**145**	165
	3	195	**260**	320	130	**165**	195	225	**295**	325
K	1	390	**490**	590	195	**255**	295	195	**255**	295
	2	390	**490**	590	195	**240**	280	195	**240**	280
	3	360	**455**	555	195	**245**	295	195	**245**	295
N	1	1965	**2460**	2950	1965	**2460**	2950	1805	**2295**	2785
	2	1750	**2240**	2730	1750	**2240**	2730	1805	**2295**	2785
	3	750	**980**	1210	750	**980**	1210	1805	**2295**	2785
	4	445	**590**	730	445	**590**	730	1195	**1555**	1915
	5	230	**295**	360	230	**295**	360	620	**820**	1015
	6	1450	**1855**	2260	1450	**1855**	2260	490	**655**	820
	7	1805	**2295**	2785	1805	**2295**	2785	425	**555**	690
S	1	110	**130**	165	75	**110**	130	75	**110**	130
	2	55	**65**	90	40	**55**	65	60	**85**	105
	3	195	**235**	260	135	**195**	235	45	**60**	75
	4	95	**115**	145	65	**95**	115	35	**50**	55
H	1	60	**100**	200	–	**–**	–	–	**–**	–
	2	60	**100**	200	–	**–**	–	–	**–**	–
	3	60	**100**	200	–	**–**	–	–	**–**	–
	4	60	**100**	200	–	**–**	–	–	**–**	–

Threading Inserts • NT-K





Partial Profile 60°



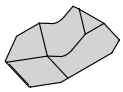
● first choice
○ alternate choice

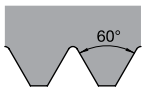
P		●	●									
M		●	●									
K		●	○	●								
N		●	○	○								
S		●	●	○								
H		○	○									

	RC		E									
catalog number	mm	in	mm	in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NT2RK	0,10	.004	1,90	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607651	3607837	-
NT4RK	0,16	.007	3,24	.128	4	1,25-6,25	2,0-6,25	4-20	4-12	-	3607846	-
NT3RK	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607643	3607824	-
left hand												
NT2LK	0,10	.004	1,90	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607674	3607833	-
NT3LK	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607645	3607828	-

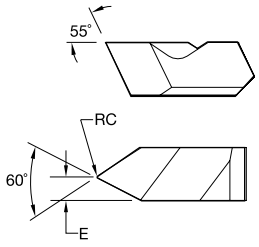
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NT-1L





Partial Profile 60°
Internal



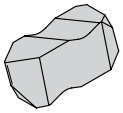
● first choice
○ alternate choice

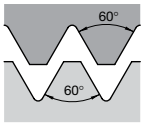
P		●	●									
M		●	●									
K		●	○	●								
N		●	○	○								
S		●	●	○								
H		○	○									

	RC		E									
catalog number	mm	in	mm	in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
left hand												
NT1L	0,08	.003	1,09	.043	1	–	1,0-2,0	–	12-24	3636551	3636555	-

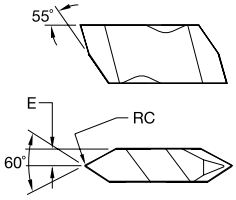
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NT





Partial Profile 60°



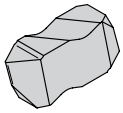
● first choice
○ alternate choice

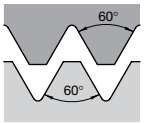
P	●	●	
M	●	●	
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NT2R	0,10	.004	1,90	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607647	3607843	-
NT3R	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607530	3607825	-
NT4R	0,17	.007	3,25	.128	4	1,25-6,25	2,0-6,25	4-20	4-12	3607676	3607834	-
left hand												
NT2L	0,10	.004	1,90	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607675	3607835	-
NT3L	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607532	3607826	-
NT4L	0,17	.007	3,25	.128	4	1,25-6,25	2,0-6,25	4-20	4-12	-	3607849	-

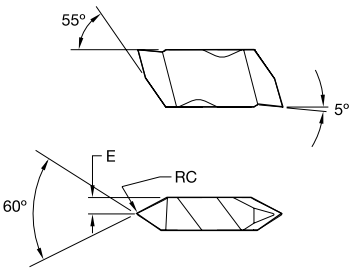
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NTP





Partial Profile 60°



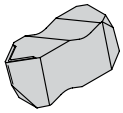
● first choice
○ alternate choice

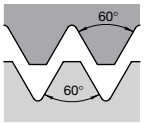
P	●	●		
M	●	●		
K	●	○	●	
N	●	○	○	
S	●	●	○	
H	○	○		

catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NTP2R	0,10	.004	1,91	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607677	3607841	-
NTP3R	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607644	3607823	-
NTP4R	0,17	.007	3,25	.128	4	1,25-6,25	2,0-6,25	4-20	4-12	-	3607839	-
left hand												
NTP2L	0,10	.004	1,91	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607678	3607840	-
NTP3L	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607650	3607831	-

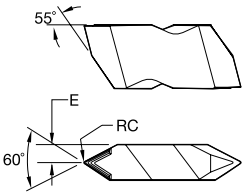
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NT-CK





Partial Profile 60°



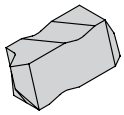
● first choice
○ alternate choice

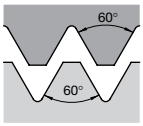
P	● ●
M	● ●
K	● ○ ●
N	● ○ ○
S	● ● ○
H	○ ○

catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NT3RCK	0,34	.014	2,46	.097	3	2,5-4,0	4,0	6-11	6	-	3607838	-

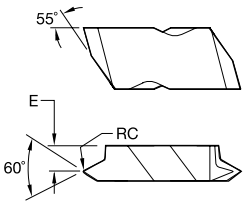
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NTF





Partial Profile 60°



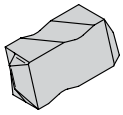
● first choice
○ alternate choice

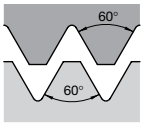
P	● ●
M	● ●
K	● ○ ●
N	● ○ ○
S	● ● ○
H	○ ○

catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NTF2R	0,08	.003	2,79	.110	2	0,60-1,75	1,0-2,0	14-44	12-24	3607673	3607852	-
NTF3R	0,08	.003	3,58	.141	3	0,60-2,5	1,0-2,5	10-44	9-24	3607531	3607830	-
left hand												
NTF3L	0,08	.003	3,58	.141	3	0,60-2,5	1,0-2,5	10-44	9-24	3607652	3607832	-

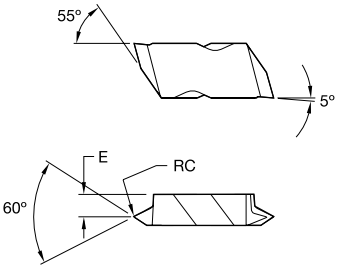
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NTK





Partial Profile 60°



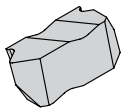
● first choice
○ alternate choice

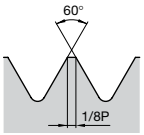
P	●	●		
M	●	●		
K	●	○	●	
N	●	○	○	
S	●	●	○	
H	○	○		

catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NTK2R	0,08	.003	2,79	.110	2	0,60-1,75	1,0-2,0	14-44	12-24	3607646	3607836	-
NTK3R	0,08	.003	3,58	.141	3	0,60-2,50	1,0-2,5	10-44	9-24	3607528	3607827	-
left hand												
NTK3L	0,08	.003	3,58	.141	3	0,60-2,50	1,0-2,5	10-44	9-24	-	3607853	-

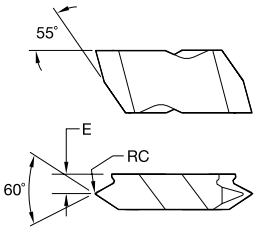
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NTC-E





American
UN-External



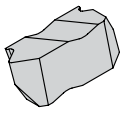
● first choice
○ alternate choice

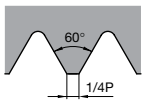
P	●	●	
M	●	●	
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NTC3R16E	0,19	.008	3,76	.148	3	–	–	16	–	-	3636557	-
NTC3R14E	0,22	.009	3,76	.148	3	–	–	14	–	3636554	-	-
NTC3R12E	0,25	.010	3,76	.148	3	–	–	12	–	3636549	3636562	-

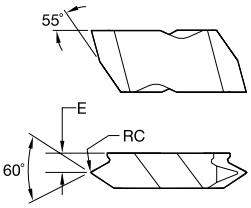
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NTC-I





American
UN-Internal



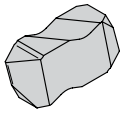
● first choice
○ alternate choice

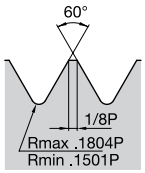
P	●	●	
M	●	●	
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
left hand												
NTC3L12I	0,10	.004	3,76	.148	3	–	–	–	12	-	3636556	-

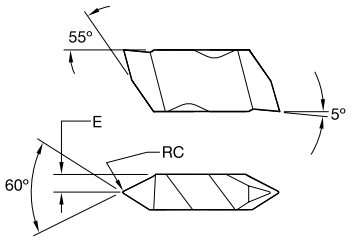
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NJP





UNJ External



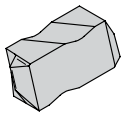
● first choice
○ alternate choice

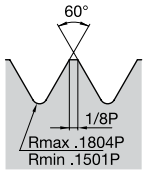
P	●	●		
M	●	●		
K	●	○	●	
N	●	○	○	
S	●	●	○	
H	○	○		

catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NJP3014R12	0,33	.013	2,49	.098	3	–	–	12	–	-	3607850	-

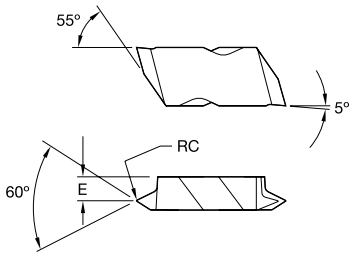
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NJK





UNJ External



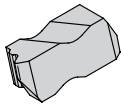
● first choice
○ alternate choice

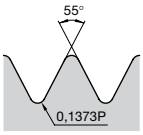
P	●	●		
M	●	●		
K	●	○	●	
N	●	○	○	
S	●	●	○	
H	○	○		

catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NJK3008R20	0,20	.008	3,58	.141	3	–	–	20	–	3607648	-	-

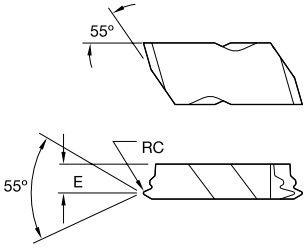
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NWC-E





Whitworth BSW,
BSP-External

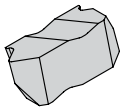


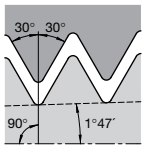
● first choice
○ alternate choice

								TN6010	TN6025	THM
	RC		E							
catalog number	mm	in	mm	in	SSC	TPI	TPF			
right hand										
NWC3R14E	0,24	.009	3,43	.135	3	14	–	▪	3811638	▪
NWC3R11E	0,30	.012	3,43	.135	3	11	–	▪	3811639	▪

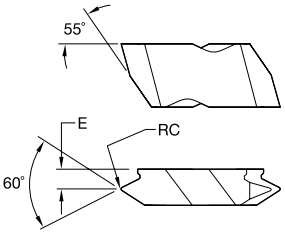
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NDC-RD





API Round

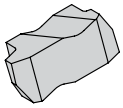


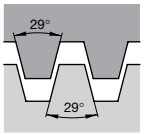
● first choice
○ alternate choice

								TN6010	TN6025	THM
	RC		E							
catalog number	mm	in	mm	in	SSC	TPI	TPF			
right hand										
NDC38RDR75	0,43	.017	3,18	.125	3	8	.750	▪	3636558	▪
left hand										
NDC310RDL75	0,36	.014	3,18	.125	3	10	.750	▪	3636565	▪
NDC38RDL75	0,43	.017	3,18	.125	3	8	.750	▪	3636559	▪

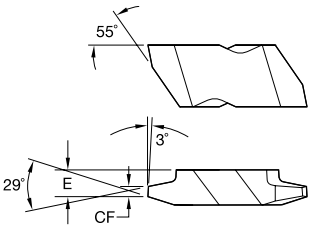
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NA





ACME



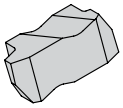
● first choice
○ alternate choice

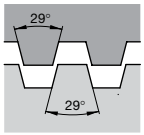
P	●	●	
M	●	●	
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

catalog number	CF mm	CF in	E mm	E in	SSC	TPI	TN6010	TN6025	THM
right hand									
NA3R8	1,04	.041	3,79	.149	3	8	-	3607854	-
NA3R6	1,44	.057	3,79	.149	3	6	-	3607851	-
NA3R4	2,22	.088	3,38	.133	3	4	-	3607848	-
NA4R4	2,22	.088	5,13	.202	4	4	-	3636566	-
NA6R3	3,01	.118	7,19	.283	6	3	-	3636564	-
NA6R2	4,58	.180	7,19	.283	6	2	-	3636567	-
left hand									
NA3L8	1,04	.041	3,79	.149	3	8	-	3607855	-
NA3L6	1,44	.057	3,79	.149	3	6	-	3607847	-
NA3L4	2,22	.088	3,38	.133	3	4	-	3607842	-
NA4L4	2,22	.088	5,13	.202	4	4	-	3636560	-
NA6L3	3,01	.118	7,19	.283	6	3	-	3636561	-
NA6L2	4,58	.180	7,19	.283	6	2	-	3636568	-

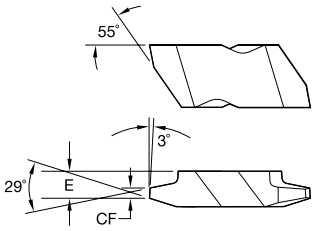
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NAS





Stub ACME



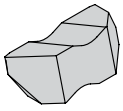
● first choice
○ alternate choice

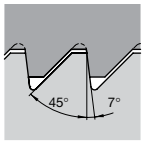
P		●	●						
M		●	●						
K		●	○	●					
N		●	○	○					
S		●	●	○					
H		○	○						

catalog number	CF mm	CF in	E mm	E in	SSC	TPI	TN6010	TN6025	THM
right hand									
NAS3R8	1,21	.048	3,79	.149	3	8	-	3607856	-
left hand									
NAS3L8	1,21	.048	3,79	.149	3	8	-	3607845	-
NAS3L6	1,66	.065	3,79	.149	3	6	-	3607829	-

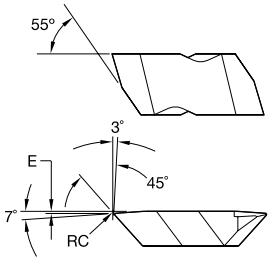
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NTB-B





American
Buttress-Pull



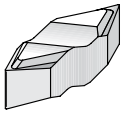
● first choice
○ alternate choice

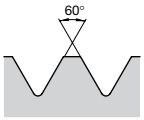
P		●	●						
M		●	●						
K		●	○	●					
N		●	○	○					
S		●	●	○					
H		○	○						

catalog number	RC mm	RC in	E mm	E in	SSC	TPI	TPF	TN6010	TN6025	THM
left hand										
NTB3LB	0,17	.007	0,31	.012	3	8-16	–	-	3636563	-

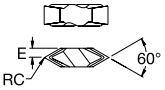
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • NTU





Partial Profile 60°
External



● first choice
○ alternate choice

P	●	●	
M	●	●	
K	●	○	●
N	●	○	○
S	●	●	○
H	○	○	

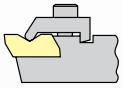
catalog number	RC mm	RC in	E mm	E in	SSC	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NTU4R	0,11	.005	3,18	.125	4U	1,25-6,25	—	4-20	—	▪	3811640	▪

NOTE: SSC = To correspond with the SSC on the toolholder.

TopThread • Catalog Numbering System

N	S	R		16	3	D
Insert Holding Method	Insert Mounting Location	Hand of Tool	Drop Head	Shank Size	Insert Size	Qualified Surface and Length

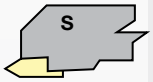
N — TopThread



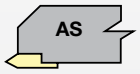
End mount



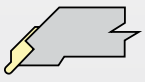
Side mount Offset



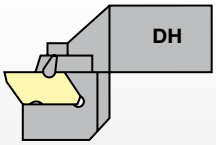
Side mount No offset for swiss machining



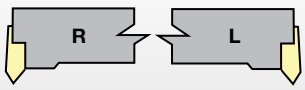
NRR undercut



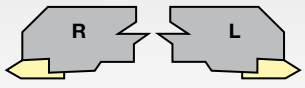
Inch:
For shanks 5/8" square and larger, the number represents the number of sixteenths of width and height. For shanks under 5/8" square,the number of sixteenths of cross section is preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.



End mount



Side mount



W1



insert size	W1
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

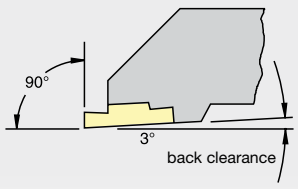
A — Qualified back and end, 4" long

B — Qualified back and end, 4.5" long

C — Qualified back and end, 5" long

D — Qualified back and end, 6" long

E — Qualified back and end, 7" long



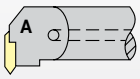
NOTE: Holders are designed to locate insert inclined to 3° to provide back clearance down open side.

TopThread • Catalog Numbering System

A	32	N	E	R	3
Bar Type	Bar Diameter	Insert Holding Method	Insert Location	Hand of Tool	Insert Size

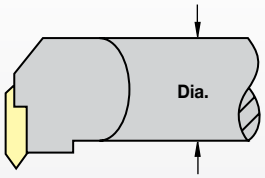
A — Bar Type

Steel with coolant



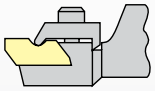
32 — Bar Diameter

A two-digit number that indicates the bar diameter in 1/16" increments.



N — Insert Holding Method

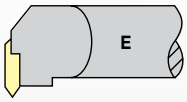
N — TopThread*



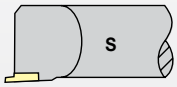
*Proprietary standard only.

E — Insert Location

End mount

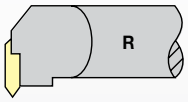


Side mount

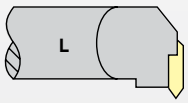


R — Hand of Tool

Right hand

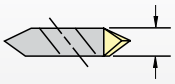


Left hand



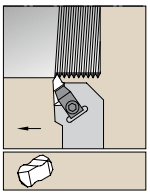
3 — Insert Size

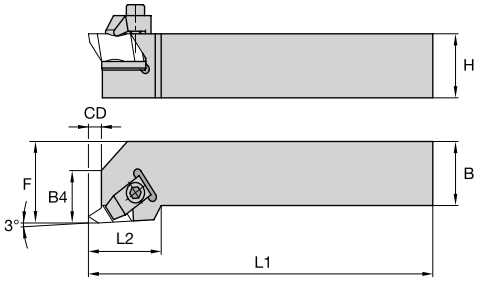
W1



insert size	W1
1	.100"
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

Integral Toolholders • NS



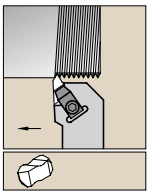


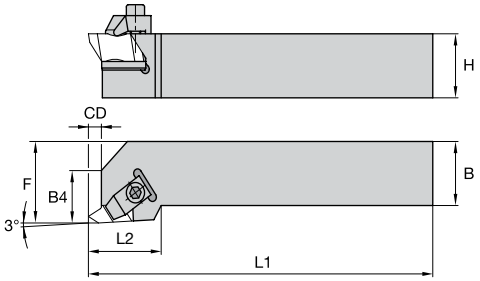
Right Hand Tool

order number	catalog number	SSC	H	B	F	L1	L2	B4	CD	gage insert
right hand										
3632147	**NSR062**	2	.375	.375	.562	2.50	.75	.35	.138	N.2R
3641660	**NSR1212F2**	2	.472	.474	.630	3.15	.75	.35	.138	N.2R
3639035	**NSR082V**	2	.500	.500	.750	3.50	.75	.35	.138	N.2R
3636542	**NSR1616H2**	2	.630	.630	.787	3.94	.75	.35	.138	N.2R
3639026	**NSR122B**	2	.750	.750	1.000	4.50	.75	.35	.138	N.2R
3638589	**NSR2020K2**	2	.787	.787	.984	4.92	.75	.35	.138	N.2R
3638590	**NSR2525M2**	2	.984	.984	1.260	5.91	.75	.35	.138	N.2R
3639025	**NSR162C**	2	1.000	1.000	1.250	5.00	.75	.35	.138	N.2R
3639027	**NSR123A**	3	.750	.750	1.000	4.00	1.25	.50	.210	N.3R
3639023	**NSR123B**	3	.750	.750	1.000	4.50	1.25	.50	.210	N.3R
3638588	**NSR2020K3**	3	.787	.787	.984	4.92	1.26	.50	.210	N.3R
3636536	**NSR2525M3**	3	.984	.984	1.260	5.91	1.26	.50	.210	N.3R
3638592	**NSR163C**	3	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R
3638591	**NSR163D**	3	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R
3639028	**NSR203D**	3	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R
3641666	**NSR3232P3**	3	1.260	1.260	1.575	6.69	1.26	.50	.210	N.3R
3636540	**NSR2525M4**	4	.984	.984	1.260	5.91	1.38	.54	.294	N.4R
3641669	**NSR3232P4**	4	1.260	1.260	1.575	6.69	1.38	.54	.294	N.4R
left hand										
3632145	**NSL122B**	2	.750	.750	1.000	4.50	.75	.35	.138	N.2L
3639045	**NSL2020K2**	2	.787	.787	.984	4.92	.75	.35	.138	N.2L
3639047	**NSL2525M2**	2	.984	.984	1.260	5.91	.75	.35	.138	N.2L
3632138	**NSL162C**	2	1.000	1.000	1.250	5.00	.75	.35	.138	N.2L
3632152	**NSL123A**	3	.750	.750	1.000	4.00	1.25	.50	.210	N.3L
3639032	**NSL123B**	3	.750	.750	1.000	4.50	1.25	.50	.210	N.3L
3639046	**NSL2020K3**	3	.787	.787	1.260	4.92	1.26	.50	.210	N.3L
3636539	**NSL2525M3**	3	.984	.984	1.260	5.91	1.26	.50	.210	N.3L
3639029	**NSL163C**	3	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3L
3639024	**NSL163D**	3	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3L
3639037	**NSL203D**	3	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3L
3636544	**NSL2525M4**	4	.984	.984	1.260	5.91	1.38	.54	.294	N.4L

NOTE: F dimension measured over sharp point of insert.
SSC = To correspond with the SSC on the insert.

Integral Toolholders • NS • with Shim



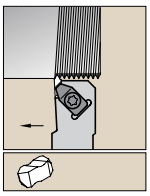


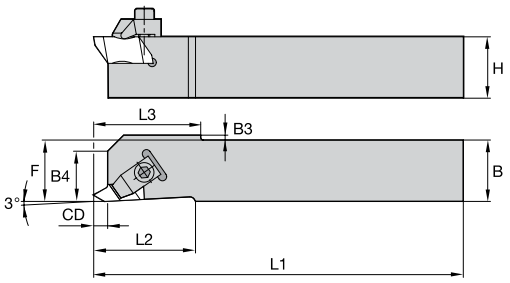
Right Hand Tool

order number	catalog number	SSC	H	B	F	L1	L2	B4	CD	gage insert
right hand										
3639031	**NSR164C**	2	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4R
3639033	**NSR164D**	2	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4R
3632153	**NSR166D**	3	1.000	1.000	1.250	6.00	1.38	.67	.334	N.6R
3637472	**NSR206D**	3	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6R
3637539	**NSR168D**	4	1.000	1.000	1.250	6.00	1.25	.72	.225	N.8R
3637526	**NSR854D**	4	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4R
left hand										
3639036	**NSL204D**	1	1.250	1.250	1.500	6.00	1.38	.54	.294	N.4L
3639040	**NSL164D**	6	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4L

NOTE: F dimension measured over sharp point of insert.
SSC = To correspond with the SSC on the insert.

Integral Toolholders • NAS



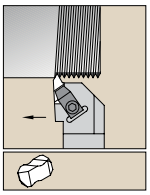


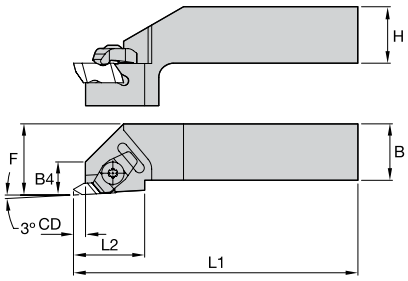
Right Hand Tool

order number	catalog number	SSC	H	B	F	L1	L2	B4	CD	B3	L3	gage insert
right hand												
3636529	**NASR082D**	2	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2R
3639039	**NASR102B**	2	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2R
3639042	**NASR083D**	3	.500	.500	.500	6.00	1.25	.50	.210	.125	1.32	N.3R
3636532	**NASR103B**	3	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3R
left hand												
3636534	**NASL082D**	2	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2L
3636524	**NASL103B**	3	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3L

NOTE: F dimension measured over sharp point of insert.
SSC = To correspond with the SSC on the insert.

Integral Toolholders • NS-DH



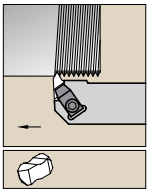


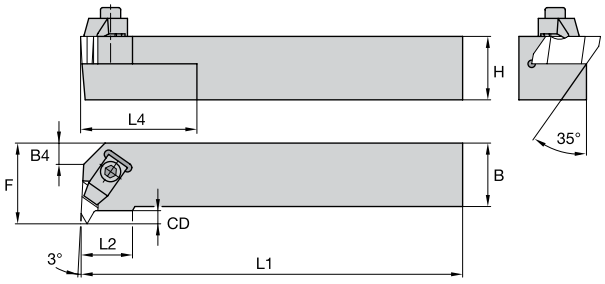
Right Hand Tool

order number	catalog number	SSC	H	B	F	L1	L2	B4	CD	gage insert
right hand										
3637528	**NSRDH163D**	3	1.000	1.000	1.250	6.00	1.25	.58	.210	N.3R

NOTE: F dimension measured over sharp point of insert.
SSC = To correspond with the SSC on the insert.

Integral Toolholders • NE





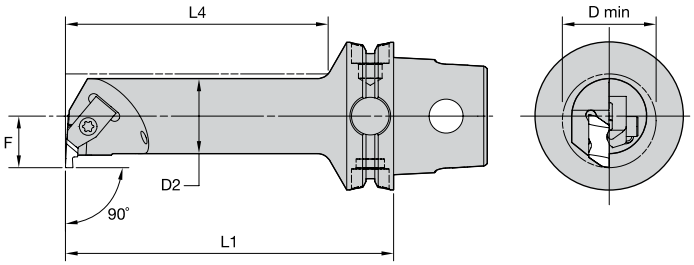
Right Hand Tool

order number	catalog number	SSC	H	B	F	L1	L2	L4	B4	CD	gage insert
right hand											
3637486	**NER162C**	2	1.000	1.000	1.250	5.00	.50	1.00	.41	.138	N.2L
3632133	**NER123B**	3	.750	.750	1.125	4.50	.75	2.00	—	.210	N.3L
3639038	**NER163C**	3	1.000	1.000	1.250	5.00	.75	2.00	—	.210	N.3L
3639030	**NER163D**	3	1.000	1.000	1.250	6.00	.75	2.00	—	.210	N.3L
3639043	**NER164D**	4	1.000	1.000	1.375	6.00	.75	2.00	—	.294	N.4L
3637522	**NER244D**	4	1.500	1.500	2.000	6.00	.75	2.00	.65	.294	N.4L
left hand											
3637503	**NEL122B**	2	.750	.750	1.000	4.50	.50	1.00	.29	.138	N.2R
3637500	**NEL162C**	2	1.000	1.000	1.250	5.00	.50	1.00	.41	.138	N.2R
3632155	**NEL163C**	3	1.000	1.000	1.250	5.00	.75	2.00	—	.210	N.3R
3639041	**NEL163D**	3	1.000	1.000	1.250	6.00	.75	2.00	—	.210	N.3R
3632159	**NEL204D**	4	1.250	1.250	1.625	6.00	.75	2.00	.27	.294	N.4R

NOTE: F dimension measured over sharp point of insert.
SSC = To correspond with the SSC on the insert.

Cutting Units • KM40TS • Steel • NE90° • Metric

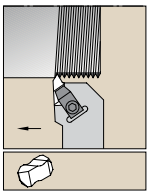


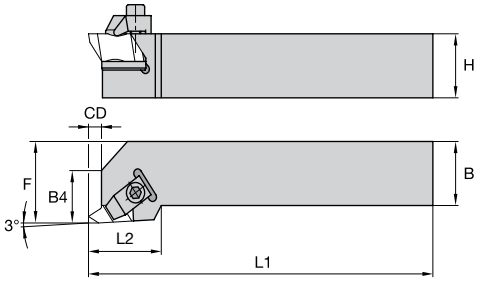


KM QUICK CHANGE

		D2		D min		F		L4		L1				
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	gage insert	kg	lbs
right hand														
3955481	**KM40TSS12ENER2**	12	.472	19	.73	11	.433	42	1.65	70	2.756	NG2L	0,27	.58
3955483	**KM40TSS16FNER2**	16	.630	20	.79	11	.433	56	2.21	80	3.150	NG2L	0,28	.62
3955485	**KM40TSS20GNER2**	20	.787	25	.98	13	.512	70	2.76	90	3.543	NG2L	0,35	.76
3955487	**KM40TSS25ENER2**	25	.984	32	1.26	17	.669	55	2.17	70	2.756	NG2L	0,34	.75
3955491	**KM40TSS25ENER3**	25	.984	34	1.34	17	.669	55	2.17	70	2.756	NG3L	0,35	.77
3955489	**KM40TSS25HNER2**	25	.984	32	1.26	17	.669	75	2.95	100	3.937	NG2L	0,49	1.08
3955493	**KM40TSS25HNER3**	25	.984	34	1.34	17	.669	75	2.95	100	3.937	NG3L	0,49	1.09
3955497	**KM40TSS32GNER3**	32	1.260	40	1.57	22	.866	76	2.99	90	3.543	NG3L	0,55	1.21
3955495	**KM40TSS32JNER3**	32	1.260	40	1.57	22	.866	96	3.78	110	4.331	NG3L	0,67	1.48
left hand														
3955480	**KM40TSS12ENEL2**	12	.472	19	.73	11	.433	42	1.65	70	2.756	NG2R	0,27	.59
3955482	**KM40TSS16FNEL2**	16	.630	20	.79	11	.433	56	2.21	80	3.150	NG2R	0,28	.62
3955484	**KM40TSS20GNEL2**	20	.787	25	.98	13	.512	70	2.76	90	3.543	NG2R	0,35	.76
3955486	**KM40TSS25ENEL2**	25	.984	32	1.26	17	.669	55	2.17	70	2.756	NG2R	0,34	.75
3955490	**KM40TSS25ENEL3**	25	.984	34	1.34	17	.669	55	2.17	70	2.756	NG3R	0,35	.77
3955488	**KM40TSS25HNEL2**	25	.984	32	1.26	17	.669	75	2.95	100	3.937	NG2R	0,49	1.08
3955492	**KM40TSS25HNEL3**	25	.984	34	1.34	17	.669	75	2.95	100	3.937	NG3R	0,49	1.09
3955496	**KM40TSS32GNEL3**	32	1.260	40	1.57	22	.866	76	2.99	90	3.543	NG3R	0,55	1.21
3955494	**KM40TSS32JNEL3**	32	1.260	40	1.57	22	.866	96	3.78	110	4.331	NG3R	0,67	1.48

Integral Toolholders • NS





Right Hand Tool

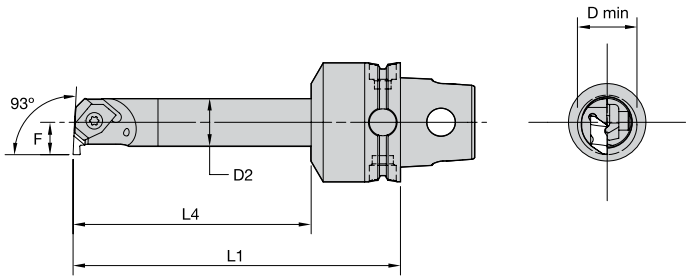
order number	catalog number	SSC	H	B	F	L1	L2	B4	CD	gage insert
right hand										
3632147	**NSR062**	2	10	10	14	64	19	9	3,5	N.2R
3639035	**NSR082V**	2	13	13	19	89	19	9	3,5	N.2R
3639026	**NSR122B**	2	19	19	25	114	19	9	3,5	N.2R
3639025	**NSR162C**	2	25	25	32	127	19	9	3,5	N.2R
3639027	**NSR123A**	3	19	19	25	102	32	13	5,3	N.3R
3639023	**NSR123B**	3	19	19	25	114	32	13	5,3	N.3R
3638592	**NSR163C**	3	25	25	32	127	32	13	5,3	N.3R
3638591	**NSR163D**	3	25	25	32	152	32	13	5,3	N.3R
3639028	**NSR203D**	3	32	32	38	152	32	13	5,3	N.3R
left hand										
3632145	**NSL122B**	2	19	19	25	114	19	9	3,5	N.2L
3632138	**NSL162C**	2	25	25	32	127	19	9	3,5	N.2L
3632152	**NSL123A**	3	19	19	25	102	32	13	5,3	N.3L
3639032	**NSL123B**	3	19	19	25	114	32	13	5,3	N.3L
3639029	**NSL163C**	3	25	25	32	127	32	13	5,3	N.3L
3639024	**NSL163D**	3	25	25	32	152	32	13	5,3	N.3L
3639037	**NSL203D**	3	32	32	38	152	32	13	5,3	N.3L

NOTE: F dimension measured over sharp point of insert.
SSC = To correspond with the SSC on the insert.

Cutting Units • KM40TS • Carbide • NE90° • Metric

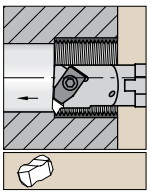


KM QUICK CHANGE

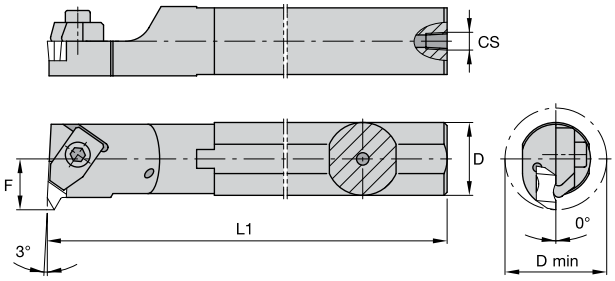


order number	catalog number	D2 mm	D2 in	D min mm	D min in	F mm	F in	L4 mm	L4 in	L1 mm	L1 in	gage insert	kg	lbs
right hand														
3951836	**KM40TSE16JNER2**	16	.630	20	.79	11	.433	80	3.15	110	4.331	NG2L	0,41	.90
left hand														
3951835	**KM40TSE16JNEL2**	16	.630	20	.79	11	.433	80	3.15	110	4.331	NG2R	0,41	.90

Integral I.D. Threading Boring Bars • A-NE



Steel shank with through coolant.

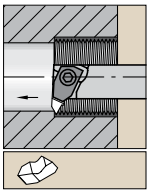


Right Hand Tool

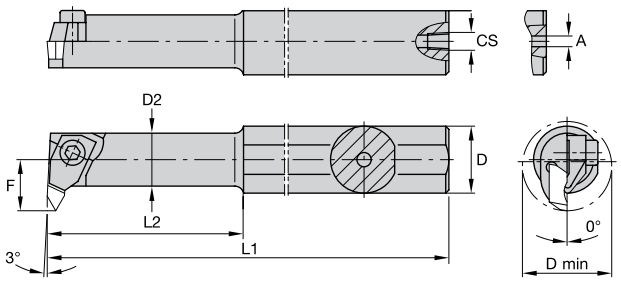
order number	catalog number	SSC	D	D min	F	L1	CS	gage insert
right hand								
3632117	**A08NER2**	2	.500	.730	.437	8	1/16-27 NPT	N.2L
3632114	**A10SNER2**	2	.625	1.000	.500	10	1/8-27 NPT	N.2L
3632118	**A12SNER2**	2	.750	1.125	.562	10	1/8-27 NPT	N.2L
3632130	**A16TNER2**	2	1.000	1.375	.688	12	1/4-18 NPT	N.2L
3632113	**A16NER3**	3	1.000	1.375	.688	12	1/4-18 NPT	N.3L
3632116	**A20NER3**	3	1.250	1.750	.875	14	1/4-18 NPT	N.3L
3632115	**A24NER3**	3	1.500	2.000	1.000	14	1/4-18 NPT	N.3L
3632122	**A32NER3**	3	2.000	2.500	1.250	16	1/4-18 NPT	N.3L
3632123	**A28NER4**	4	1.750	2.500	1.250	14	1/4-18 NPT	N.4L
left hand								
3632131	**A08NEL2**	2	.500	.730	.437	8	1/16-27 NPT	N.2R
3632127	**A10SNEL2**	2	.625	1.000	.500	10	1/8-27 NPT	N.2R
3632126	**A12SNEL2**	2	.750	1.125	.562	10	1/8-27 NPT	N.2R
3632142	**A16NEL2**	2	1.000	1.375	.688	12	1/4-18 NPT	N.2R
3632120	**A16NEL3**	3	1.000	1.375	.688	12	1/4-18 NPT	N.3R
3632124	**A20NEL3**	3	1.250	1.750	.875	14	1/4-18 NPT	N.3R
3632128	**A24NEL3**	3	1.500	2.000	1.000	14	1/4-18 NPT	N.3R
3632141	**A28NEL4**	4	1.750	2.500	1.250	14	1/4-18 NPT	N.4R
3632149	**A32NEL4**	4	2.000	2.750	1.375	16	1/4-18 NPT	N.4R

NOTE: F dimension measured over sharp point of insert.
SSC = To correspond with the SSC on the insert.

Integral I.D. Threading Boring Bars • A-NE-1



Necked steel shank with through coolant.



Right Hand Tool

order number	catalog number	SSC	D	D min	D2	L1	L2	F	A	CS	gage insert
right hand											
3632121	**A06NER1**	1	.375	.440	.312	6	1	.258	.125	—	N.1L
3632119	**A08NER1**	1	.500	.440	.310	8	1	.258	.094	1/16-27 NPT	N.1L

NOTE: F dimension measured over sharp point of insert.
SSC = To correspond with the SSC on the insert.

Laydown Threading

External and Internal Threading

The Laydown Threading System offers an extensive range of inserts and toolholders, the ideal for all of threading requirements.

- Four insert sizes available to cover a wide range of thread-making operations.
- Ideal for high-helix/multi-start threads and single-point threading in small-diameter bores.
- Maximized tool life and low-profile design for unhindered chip flow and superior performance.
- Precision ground inserts to provide accurate thread forms and indexing.
- TN6025™ premium PVD TiAlN-coated grade outperforms conventional PVD grades.
- Partial- and full-profile insert options available for all common thread forms.



LAYDOWN THREADING

RELIABLE

With the WIDIA™ Laydown Threading System, you experience reliable countersunk screw locking for unhindered chip flow and precise insert positioning accuracy.

PRODUCTIVE

Laydown insert technology, with its wide range of available tools and inserts, guarantees increased tool life, minimized built-up edges, and precise cuts of most common materials.

EXTERNAL AND INTERNAL THREADING

INSERTS

FIRST CHOICE	INSERT STYLE	SPEED SELECTION — M/MIN	MATERIALS
TN6025	 Precision ground	40–200 (130–650)	P
		40–135 (130–450)	M
		60–145 (200–475)	K
		50–360 (160–1150)	N
		10–100 (35–330)	S

APPLICATIONS



THREADING



I.D. INTERNAL THREADING

INDUSTRY

GENERAL ENGINEERING

TRANSPORTATION



Insert Selection Guide

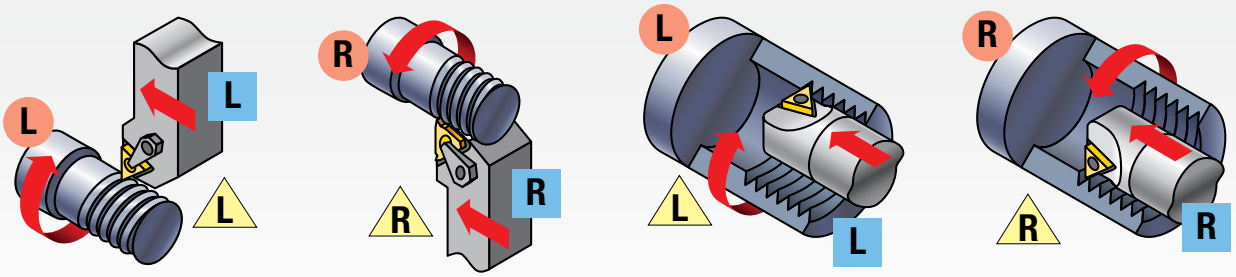
Step 1 • Select Threading Method and Hand of Tooling

Required Information:
- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.



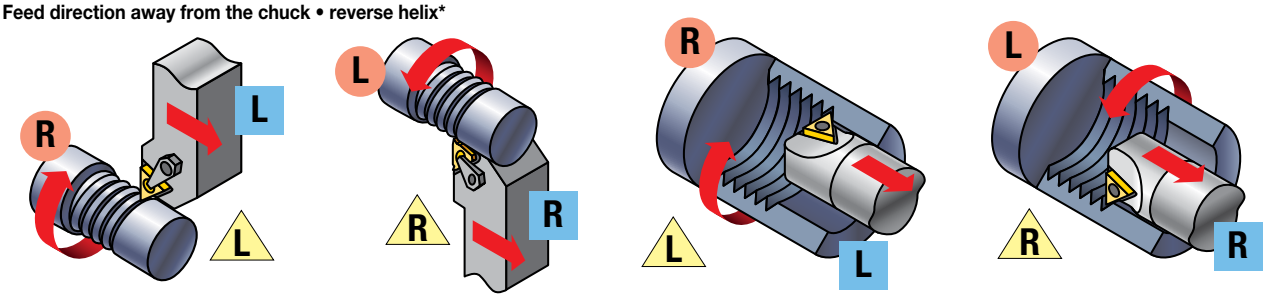
hand of thread | hand of toolholder | hand of insert

Feed direction toward the chuck • standard helix • RECOMMENDED



external left-hand thread | external right-hand thread | internal left-hand thread | internal right-hand thread

Feed direction away from the chuck • reverse helix*



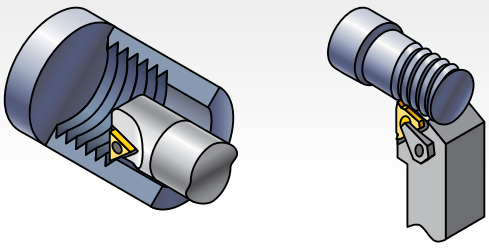
external right-hand thread | external left-hand thread | internal right-hand thread | internal left-hand thread

**Negative shim required*

Step 2 • Select Holder from Catalog Page

Required Information:
- External/internal operation.
- Minimum bore diameter (for internal operations).
- Hand of tool.
- Insert size (gage insert).

Select the appropriate holder for the insert size and hand:



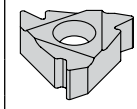
The insert size must match the gage insert size of your toolholder selection:

catalog number	gage insert	minimum bore diameter	shim
S0812LSER2	2IRA60	.650"	–
S2020LSER3	3IR...	1.45"	SM-YI3

Insert Selection Guide

Step 3 • Choose Insert for Application

- Select cresting inserts for fully controlled thread form including diameter.
- Cresting inserts eliminate the need for deburring and are optimized for the best tool life at that pitch.
- Non-cresting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Note insert size for toolholder selection.



insert size	catalog number	TN6025
11	2IRA60	•
16	3IRAG60	•

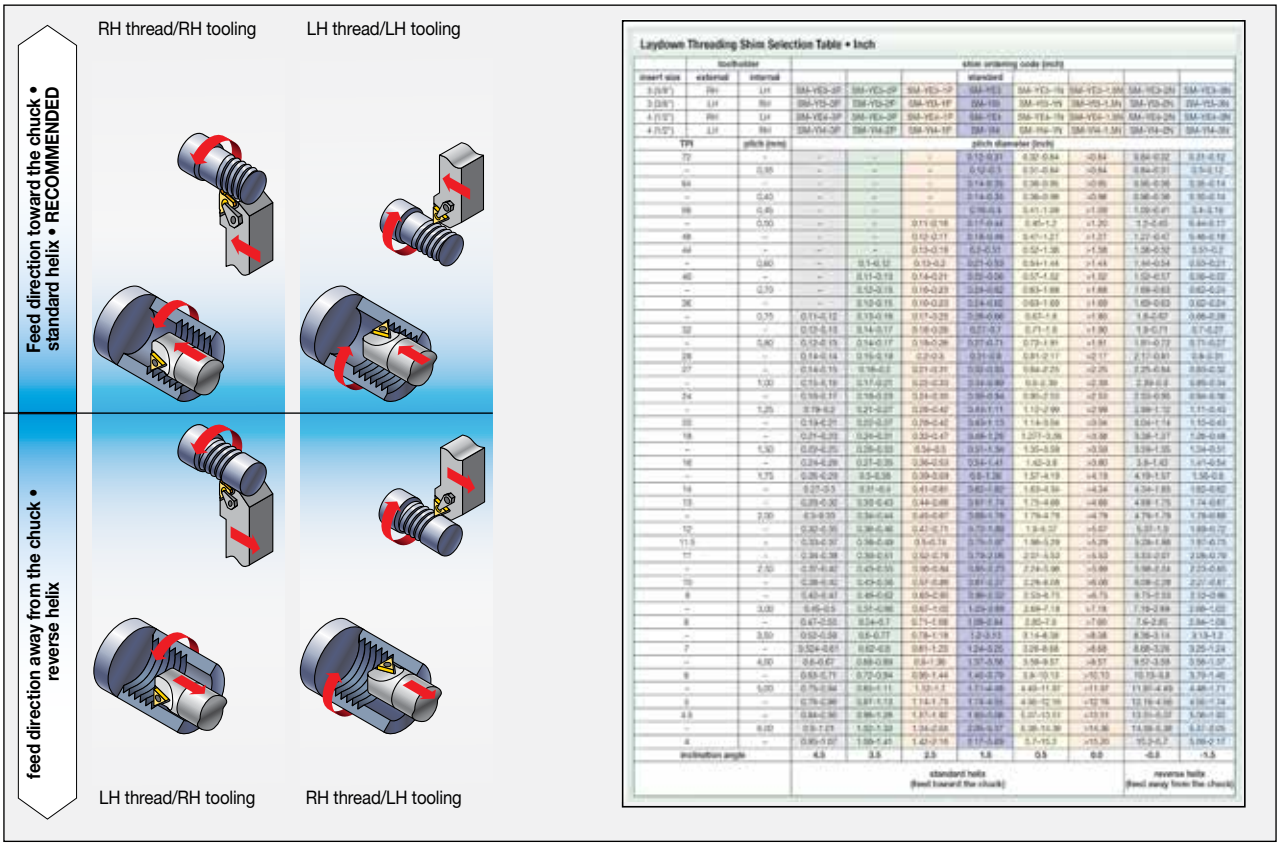
See threading insert overview on page E444.

Step 4 • Select Appropriate Shim

Required Information:

- Thread form (TPI or pitch).
- Pitch diameter.
- Helix method (hand of tool, feed direction, hand of thread).
- Number of starts.

Select the proper shim: SMYE... for external RH or internal LH
SMYI... for internal RH or external LH



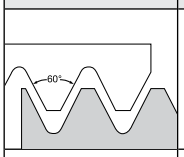
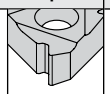
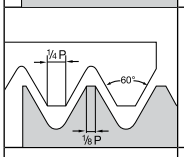
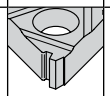
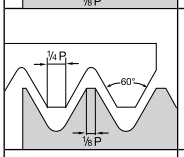
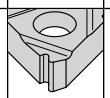
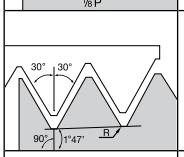
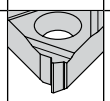
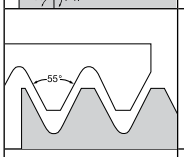
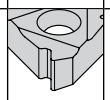
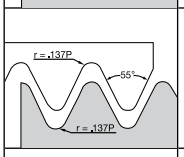
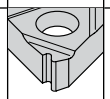
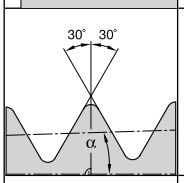
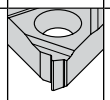
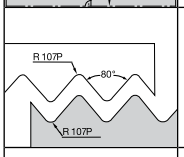
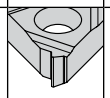
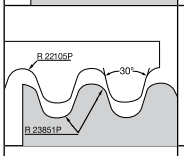
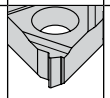
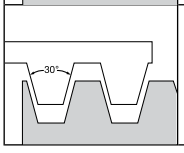
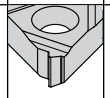
If recommended shim is different from shim supplied with toolholder, order shim separately.
NOTE: Optimize your threading operation by using the proper infeed angle and the recommended infeed values. See the Technical Section on pages E506–E507. Also see detailed shim selection information on pages E519–E520.

Step 5 • Select Grade and Speed

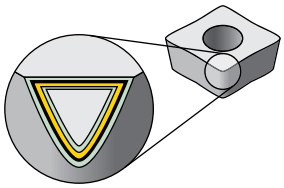
Recommendations for Grade and Speed Selection — m/min (SFM)

workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
insert style	 precision ground				
first choice	TN6025	TN6025	TN6025	TN6025	TN6025
	40–200 (130–650)	40–135 (130–450)	60–145 (200–475)	50–360 (160–1150)	10–100 (35–330)

Insert Overview

style			thread profile	standard	tolerance class	cresting	application	page(s)
	flat top							
	60		Partial profile 60°	–	–	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**E477–E478**
	ISO		Metric ISO	ISO R262, DIN 13	6g/6H	Y	Widely used metric 60° V-form for all industries.	**E479–E482**
	UN		American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60° V-form for all industries.	**E483–E484**
	NPT		NPT	ANSI/ASME B1.20.1S1983	Standard NPT	N	National Pipe Thread standard 60° thread form for pipe fittings.	**E485**
	55		Partial profile 55°	–	–	N	General use for 55° thread forms such as Whitworth, BSW, and BSP where non-cresting inserts are desired to cut a variety of pitches.	**E486–E487**
	W		Whitworth, BSW, BSF, BSP	BS 84:1956, ISO 228/1:1982, DIN 259	Medium Class A	Y	Widely used 55° form for gas and water connections.	**E488–E489**
	API-RD		API round	API STD. 5B:1979	Standard API RD	Y	60° V-form with large radius for casing, tubing, and line pipe in the oil and gas industry, including 8 and 10 round forms.	**custom solution**
	PG		PG	DIN 404B0		Y	80° steel conduit thread.	**custom solution**
	RD		Round	DIN 405	7e/7H	Y	Round thread form for tube fittings in the chemical and food industries.	**E489–E490**
	TR		Trapez	DIN 103	7e/7H	N	30° truncated metric thread form for motion applications.	**E491–E492**

Grades and Grade Descriptions

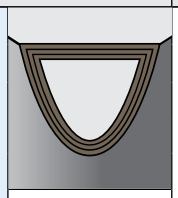


Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

- Reduce cycle times — high speed capability.
- Longer tool life — new multilayer coating provides better wear resistance.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade	Coating	Grade Description		05	10	15	20	25	30	35	40	45
TN6025	 HC-P25	PVD-TiAlN nano-multilayer coated carbide. General-purpose machining for steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at low to medium cutting speeds when higher toughness is required.	P									
			M									
			K									
			N									
			S									

Laydown Threading Thread Form Guide

- All Laydown Threading inserts are precision ground to provide accurate thread forms and indexing.
- Both cresting and non-cresting partial profile inserts are specifically designed for either external or internal threading operations.
- Cresting inserts provide a fully controlled thread form, including major, minor, root, and crest for a given pitch. The need for deburring is eliminated and the inserts are optimized for the best tool life at that pitch.
- Non-cresting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Right-hand Laydown Threading toolholders use right-hand inserts. Left-hand Laydown Threading toolholders use left-hand inserts.
- Right-hand Laydown Threading boring bars use right-hand inserts. Left-hand Laydown Threading boring bars use left-hand inserts.

Catalog Numbering System

3	E	R	A	ISO	
Insert Size	Insert Type	Hand of Insert	Thread Pitch	Thread Profile	Number of Teeth

E — External thread

I — Internal thread

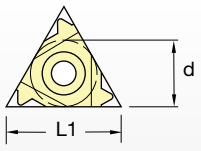
R — Right-hand thread

L — Left-hand thread

Single tooth profile — No symbol

Multi-tooth profile — Number of teeth (cutting edge and symbol)

Multi-tooth profile with two teeth — 2M



symbol	d	L1
2	0.250	11
3	0.375	16
4	0.500	22
5	0.625	27

Partial profile inserts

symbol	mm
A	0,5–1,5
AG	0,5–3,0
G	1,7–3,0
N	3,5–5,0
Q	5,5–6,0

Full profile inserts

symbol	mm
Actual TPI	0,5–0,4

55	Partial Profile 55°
60	Partial Profile 60°
ISO	ISO Metric 60°
TR	Trapez DIN 103°
UN	ISO Inch/American UN 60°
W	Whitworth 55°
NPT	American National Pipe Thread 60°
RD	Round
PG	Steel Conduit
APIRD	API Round

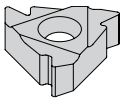
Recommended Cutting Speeds • Metric

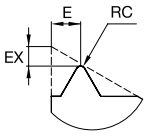
Material Group		Cutting Speed — vc m/min		
		TN6025		
		min	Start	max
P	0/1	130	**140**	150
	2	110	**145**	175
	3	110	**145**	175
	4	75	**95**	115
	5	100	**125**	145
	6	40	**55**	65
M	1	60	**75**	90
	2	40	**50**	55
	3	40	**50**	60
K	1	60	**80**	90
	2	60	**75**	85
	3	60	**75**	90
N	1	600	**750**	900
	2	535	**685**	835
	3	230	**300**	370
	4	135	**180**	225
	5	70	**90**	110
	6	445	**565**	690
	7	550	**700**	850
S	1	25	**35**	40
	2	15	**20**	20
	3	40	**60**	70
	4	20	**30**	35

Recommended Cutting Speeds • Inch

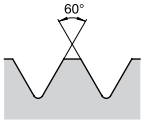
Material Group		Cutting Speed — vc SFM		
		TN6025		
		min	Start	max
P	0/1	425	**455**	490
	2	360	**465**	575
	3	360	**465**	575
	4	235	**300**	365
	5	325	**400**	475
	6	130	**180**	210
M	1	195	**245**	295
	2	130	**160**	180
	3	130	**165**	195
K	1	195	**255**	295
	2	195	**240**	280
	3	195	**245**	295
N	1	1965	**2460**	2950
	2	1750	**2240**	2730
	3	750	**980**	1210
	4	445	**590**	730
	5	230	**295**	360
	6	1450	**1855**	2260
	7	1805	**2295**	2785
S	1	75	**110**	130
	2	40	**55**	65
	3	135	**195**	235
	4	65	**95**	115

Threading Inserts • ER/L-60









Partial Profile 60°
External

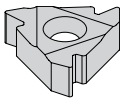
● first choice
○ alternate choice

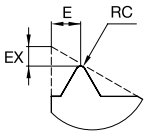
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand											
3ERA60	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,50	16-48	–	2018214
2ERA60	0,05	.002	0,9	.035	0,8	.032	2	0,50-1,50	16-48	–	2007404
3ERAG60	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	8-48	–	2018246
3ERG60	0,28	.011	1,2	.047	1,7	.067	3	1,75-3,0	8-14	–	2018222
4ERN60	0,53	.021	1,7	.067	2,5	.098	4	3,5-5,0	5-7	–	2018252
left hand											
3ELAG60	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	8-48	–	2071904

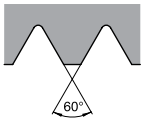
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • IR/L-60









Partial Profile 60° Internal

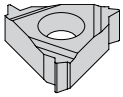
● first choice
○ alternate choice

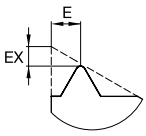
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand											
2IRA60	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,50	16-48	–	2018262
3IRA60	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,50	16-48	–	2018272
3IRAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50-3,0	8-48	–	2018284
3IRG60	0,15	.006	1,2	.047	1,7	.067	3	1,75-3,0	8-14	–	2018278
5IRQ60	0,30	.012	1,8	.071	2,7	.106	5	5,5-6,0	4-4.5	–	2018295
4IRN60	0,31	.012	1,7	.067	2,5	.098	4	3,5-5,0	5-7	–	2018290
left hand											
2ILA60	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,50	16-48	–	2021656
3ILAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50-3,0	8-48	–	2008275
4ILN60	0,31	.012	1,7	.067	2,5	.098	4	3,5-5,0	5-7	–	2100489

NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • ER/L-ISO







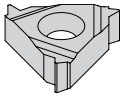
● first choice
○ alternate choice

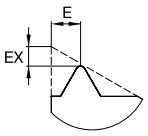
P		●
M		●
K		○
N		○
S		●
H		○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand									
3ER05ISO	0,6	.024	0,4	.016	3	0,50	–	–	2018377
3ER07ISO	0,6	.024	0,6	.024	3	0,70	–	–	2018389
3ER075ISO	0,6	.024	0,6	.024	3	0,75	–	–	2018395
3ER08ISO	0,6	.024	0,6	.024	3	0,80	–	–	2018403
3ER10ISO	0,7	.027	0,7	.027	3	1,00	–	–	2018411
3ER125ISO	0,8	.031	0,9	.035	3	1,25	–	–	2018421
3ER15ISO	0,8	.031	1,0	.039	3	1,50	–	–	2018429
3ER175ISO	0,9	.035	1,2	.047	3	1,75	–	–	2018445
3ER20ISO	1,0	.039	1,3	.051	3	2,00	–	–	2018460
3ER25ISO	1,1	.043	1,5	.059	3	2,50	–	–	2018472
3ER30ISO	1,2	.047	1,6	.063	3	3,00	–	–	2008256

Threading Inserts • ER/L-ISO

(continued)







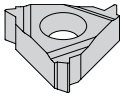
● first choice
○ alternate choice

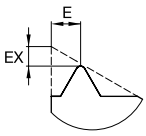
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
4ER35ISO	1,6	.063	2,3	.090	4	3,50	–	–	2018495
4ER40ISO	1,6	.063	2,3	.090	4	4,00	–	–	2018501
4ER45ISO	1,7	.067	2,4	.094	4	4,50	–	–	2018508
4ER50ISO	1,7	.067	2,5	.098	4	5,00	–	–	2018517
5ER55ISO	2,7	.106	1,9	.075	5	5,50	–	–	2018522
5ER60ISO	2,9	.114	2,0	.079	5	6,00	–	–	2018528
left hand									
3EL10ISO	0,7	.027	0,7	.027	3	1,00	–	–	2008187
3EL035ISO	0,8	.031	0,4	.016	3	0,35	–	–	3122015
3EL15ISO	0,8	.031	1,0	.039	3	1,50	–	–	2018435
3EL20ISO	1,3	.051	1,0	.039	3	2,00	–	–	2018466

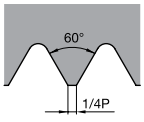
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • IR/L-ISO









ISO Metric-Internal

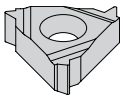
● first choice
○ alternate choice

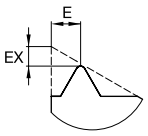
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand									
3IR05ISO	0,6	.024	0,6	.024	3	0,50	–	–	2018582
3IR075ISO	0,6	.024	0,6	.024	3	0,75	–	–	2018596
3IR10ISO	0,6	.024	0,7	.028	3	1,00	–	–	2018612
3IR125ISO	0,8	.032	0,9	.035	3	1,25	–	–	2018626
2IR15ISO	0,8	.032	1,0	.039	2	1,50	–	–	2018550
3IR15ISO	0,8	.032	1,0	.039	3	1,50	–	–	2018636
3IR175ISO	0,9	.035	1,2	.047	3	1,75	–	–	2018652
3IR20ISO	1,0	.039	1,3	.051	3	2,00	–	–	2018663
3IR25ISO	1,1	.043	1,5	.059	3	2,50	–	–	2018674
3IR30ISO	1,1	.043	1,5	.059	3	3,00	–	–	2018684
4IR35ISO	1,6	.063	2,3	.091	4	3,50	–	–	2018695

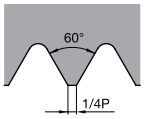
Threading Inserts • IR/L-ISO

(continued)









ISO Metric-Internal

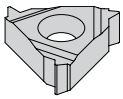
● first choice
○ alternate choice

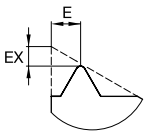
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
4IR40ISO	1,6	.063	2,3	.091	4	4,00	–	–	2018702
4IR50ISO	1,6	.063	2,3	.091	4	5,00	–	–	2018714
5IR55ISO	1,6	.063	2,3	.091	5	5,50	–	–	2021597
4IR45ISO	1,6	.063	2,4	.095	4	4,50	–	–	2018708
5IR60ISO	1,8	.071	2,5	.098	5	6,00	–	–	2018720
left hand									
3IL075ISO	0,6	.024	0,6	.024	3	0,75	–	–	2018598
3IL15ISO	0,8	.032	1,0	.039	3	1,50	–	–	2018642
3IL30ISO	1,1	.043	1,5	.059	3	3,00	–	–	2018688

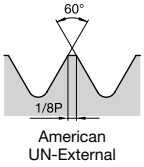
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • ER/L-UN









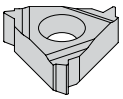
● first choice
○ alternate choice

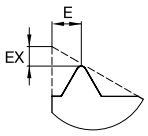
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand									
3ER32UN	0,6	.024	0,6	.024	3	–	32	–	2018752
3ER28UN	0,6	.024	0,7	.028	3	–	28	–	2018756
3ER24UN	0,7	.028	0,8	.032	3	–	24	–	2018766
3ER20UN	0,8	.032	0,9	.035	3	–	20	–	2018772
3ER18UN	0,8	.032	1,0	.039	3	–	18	–	2018778
3ER16UN	0,9	.035	1,1	.043	3	–	16	–	2018782
3ER14UN	1,0	.039	1,2	.047	3	–	14	–	2018790
3ER12UN	1,1	.043	1,4	.055	3	–	12	–	2018802
3ER11UN	1,1	.043	1,5	.059	3	–	11	–	2018808
3ER10UN	1,1	.043	1,5	.059	3	–	10	–	2018814
3ER8UN	1,2	.047	1,6	.063	3	–	8	–	2018824
3ER13UN	1,3	.051	1,0	.039	3	–	13	–	2018796

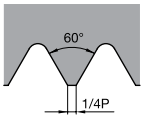
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • IR/L-UN









American
UN-Internal

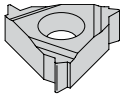
● first choice
○ alternate choice

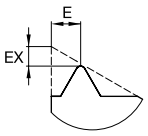
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand									
3IR20UN	0,8	.032	0,9	.035	3	–	20	–	2018938
3IR18UN	0,8	.032	1,0	.039	3	–	18	–	2018944
2IR18UN	0,8	.031	1,0	.039	2	–	18	–	2018882
3IR16UN	0,9	.035	1,1	.043	3	–	16	–	2018950
2IR16UN	0,9	.035	1,1	.043	2	–	16	–	2018886
3IR12UN	1,1	.043	1,4	.055	3	–	12	–	2018966
3IR8UN	1,1	.043	1,5	.059	3	–	8	–	2018990
left hand									
3IL12UN	1,1	.043	1,4	.055	3	–	12	–	2102749

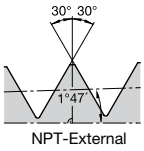
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • ER/L-NPT









NPT-External

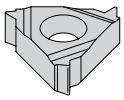
● first choice
○ alternate choice

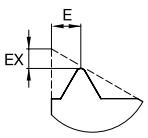
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand									
3ER18NPT	0,8	.032	1,0	.039	3	—	18	.7500	2019278
3ER14NPT	0,9	.035	1,2	.047	3	—	14	.7500	2019288
3ER115NPT	1,1	.043	1,5	.059	3	—	11.5	.7500	2019298
3ER8NPT	1,3	.051	1,8	.071	3	—	8	.7500	2019305

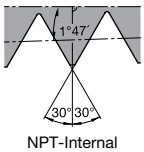
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • IR/L-NPT









NPT-Internal

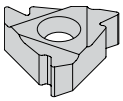
● first choice
○ alternate choice

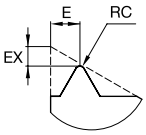
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand									
3IR14NPT	0,9	.035	1,2	.047	3	—	14	.7500	2019329
3IR115NPT	1,1	.043	1,5	.059	3	—	11.5	.7500	2019335

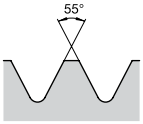
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • ER/L-55









Partial Profile 55°
External

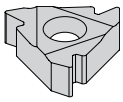
● first choice
○ alternate choice

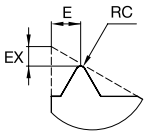
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand											
3ERAG55	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	8-48	–	2018314
3ERG55	0,20	.008	1,2	.047	1,7	.067	3	1,75-3,0	8-14	–	2018308
4ERN55	0,43	.017	1,7	.067	2,5	.098	4	3,5-5,0	5-7	–	2018320
left hand											
3ELG55	0,20	.008	1,2	.047	1,7	.067	3	1,75-3,0	8-14	–	2008190

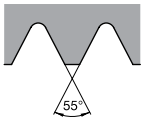
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • IR/L-55









Partial Profile 55°
Internal

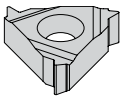
● first choice
○ alternate choice

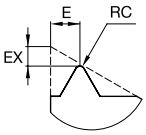
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand											
2IRA55	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,50	16-48	–	2018328
3IRA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,50	16-48	–	2018334
3IRAG55	0,07	.003	1,2	.047	1,7	.067	3	0,50-3,0	8-48	–	2018346
3IRG55	0,21	.008	1,2	.047	1,7	.067	3	1,75-3,0	8-14	–	2018340
4IRN55	0,43	.017	1,7	.067	2,5	.098	4	3,5-5,0	5-7	–	2018354
left hand											
3ILA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,50	16-48	–	3122449

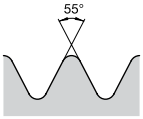
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • ER/L-W









Whitworth BSW,
BSF, BSP-External

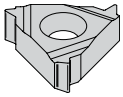
● first choice
○ alternate choice

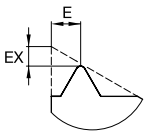
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand											
3ER32W	0,08	.003	0,6	.024	0,6	.024	3	–	32	–	2019023
3ER28W	–	–	0,6	.024	0,7	.028	3	–	28	–	2019029
3ER19W	–	–	0,8	.032	1,0	.039	3	–	19	–	2019055
3ER14W	–	–	1,0	.039	1,2	.047	3	–	14	–	2019071
3ER10W	–	–	1,1	.043	1,5	.059	3	–	10	–	2019089
3ER11W	–	–	1,1	.043	1,5	.059	3	–	11	–	2019083
3ER8W	–	–	1,2	.047	1,5	.059	3	–	8	–	2019101

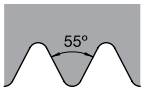
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • IR/L-W









Whitworth BSW, BSF, BSP-Internal

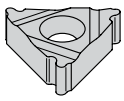
● first choice
○ alternate choice

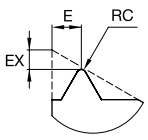
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand									
2IR14W	0,9	.035	1,1	.043	2	–	14	–	2019136
3IR14W	1,0	.039	1,2	.047	3	–	14	–	2019189
3IR11W	1,1	.043	1,5	.059	3	–	11	–	2019205

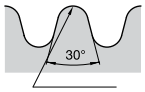
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • ER/L-RD









Round External

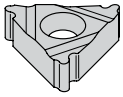
● first choice
○ alternate choice

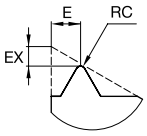
P	●
M	●
K	○
N	○
S	●
H	○

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand											
3ER8RD	0,76	.030	1,4	.055	1,3	.051	3	–	8	–	2019347

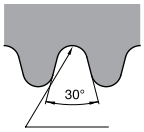
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • IR/L-RD









Round-Internal
R = 0,221P

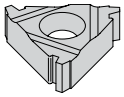
● first choice
○ alternate choice

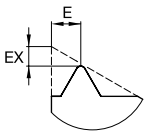
P	●
M	●
K	○
N	○
S	●
H	○

	RC		EX		E						
catalog number	mm	in	mm	in	mm	in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand											
3IR8RD	0,70	.028	1,4	.055	1,4	.055	3	—	8	—	2019381
4IR4RD	1,40	.055	2,3	.091	2,2	.087	4	—	4	—	2019400

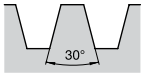
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • ER/L-TR









Trapez-External

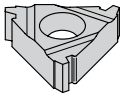
● first choice
○ alternate choice

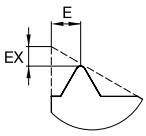
	P	M	K	N	S	H
	●	●	○	○	●	○

catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand									
3ER2TR	1,1	.043	1,3	.051	3	2,00	–	–	2019453
3ER3TR	1,3	.051	1,5	.059	3	3,00	–	–	2019461
4ER4TR	1,7	.067	1,9	.075	4	4,00	–	–	2019469
4ER5TR	2,1	.083	2,5	.098	4	5,00	–	–	2019479
5ER6TR	2,3	.091	2,7	.106	5	6,00	–	–	2019487
left hand									
3EL3TR	1,3	.051	1,5	.059	3	3,00	–	–	2019463

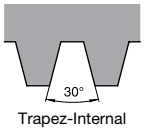
NOTE: SSC = To correspond with the SSC on the toolholder.

Threading Inserts • IR/L-TR









● first choice
○ alternate choice

P	●
M	●
K	○
N	○
S	●
H	○

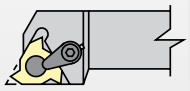
catalog number	EX mm	EX in	E mm	E in	SSC	thread pitch mm	TPI	TPF	TN6025
right hand									
3IR3TR	1,3	.051	1,5	.059	3	3,00	–	–	2019511
4IR4TR	1,7	.067	1,9	.075	4	4,00	–	–	2019520
4IR5TR	2,1	.083	2,5	.098	4	5,00	–	–	2019528
5IR6TR	2,3	.091	2,7	.106	5	6,00	–	–	2019534

NOTE: SSC = To correspond with the SSC on the toolholder.

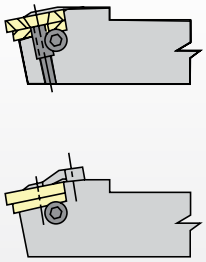
Laydown Threading Toolholder • Catalog Numbering System

L	S	AS	R		16	3	
Insert Style	Insert Holding Method	Tool Style	Hand of Tool	Drop Head	Shank Size	Insert Size	Qualified Surface and Length

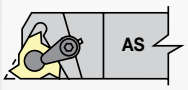
L –
Laydown triangle



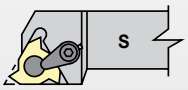
S –
Insert screw or clamp only



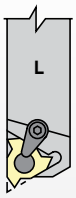
Straight shank



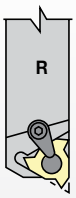
Offset shank

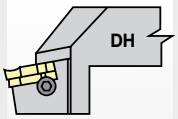


Left hand



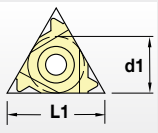
Right hand





Inch:
This shows a two-digit number that indicates the holder cross section. For shanks 5/8" square and over, the number will represent the number of sixteenths of width and height. For shanks under 5/8" square, the number of sixteenths of cross section will be preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width, and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.

Size equals number of 1/8" increments of iC.



inch insert size	metric insert size	d1 inch	L1 mm
2	11	1/4	11,0
3	16	3/8	16,5
4	22	1/2	22,0
5	27	5/8	27,0

C –
qualified back and end, 5" long

D –
qualified back and end, 6" long

E –
qualified back and end, 7" long

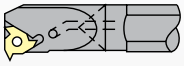
T –
qualified back and end, 3.25" long

Q –
qualified metric holder

Laydown Threading Boring Bar • Catalog Numbering System

S	10	12	L	S	E	R	3
Bar Type	Primary Necked Shank Bar Diameter	Secondary (mounting) Bar Diameter	Insert Style	Insert Holding Method	Bar Style	Hand of Tool	Insert Size

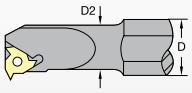
E — Carbide with coolant



S — Steel shank without coolant

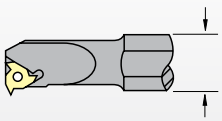


Indicates the primary bar diameter in 1/16" increments.

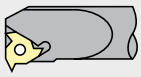


NOTE: Boring bars with primary bar diameters larger than 5/8" are supplied with clamp and insert screw. Secure the insert with either the clamp or insert screw. **Do not use both.**

Indicates the secondary bar diameter in 1/16" increments.

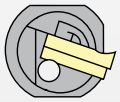


L — Laydown triangle

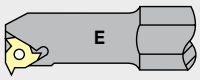


S — Insert screw or clamp only

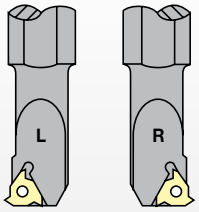




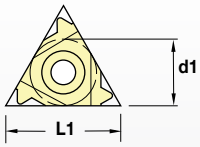
End cutting edge mount



Left hand / Right hand

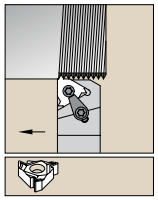


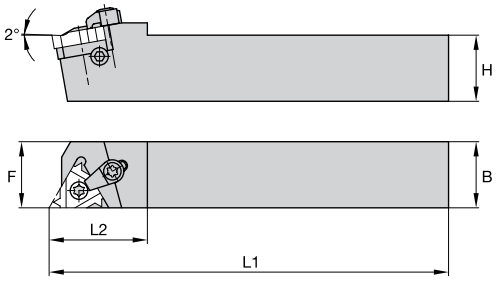
Size equals number of 1/8" increments of iC.



inch insert size	metric insert size	d1 inch	L1 mm
2	11	1/4	11,0
3	16	3/8	16,5
4	22	1/2	22,0

Integral Toolholders • LSAS



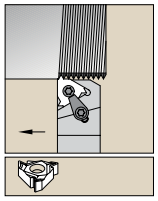


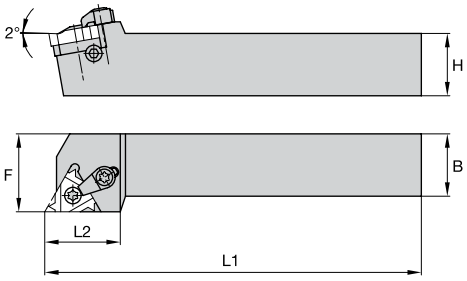
Right Hand Tool

order number	catalog number	SSC	H	B	F	L1	L2	gage insert
right hand								
2968567	**LSASR83**	3	.500	.500	.500	3.25	.87	LT16ER
2968584	**LSASR123**	3	.750	.750	.750	5.00	1.20	LT16ER
2968585	**LSASR163**	3	1.000	1.000	1.000	6.00	1.20	LT16ER
2968586	**LSASR164**	4	1.000	1.000	1.000	6.00	1.42	LT22ER
left hand								
2968570	**LSASL163**	3	1.000	1.000	1.000	6.00	1.20	LT16EL

NOTE: SSC = To correspond with the SSC on the insert.

Integral Toolholders • LSS





Right Hand Tool

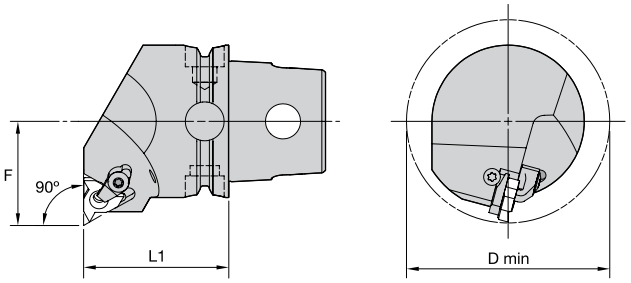
order number	catalog number	SSC	H	B	F	L1	L2	gage insert
right hand								
2968591	**LSSR123D**	3	.750	.750	1.000	6.00	1.00	LT16ER
2968592	**LSSR163D**	3	1.000	1.000	1.250	6.00	1.00	LT16ER
2968593	**LSSR164D**	4	1.000	1.000	1.250	6.00	1.20	LT22ER

NOTE: SSC = To correspond with the SSC on the insert.

Cutting Units • KM40TS • LSE-N 90° • Internal Only • Metric



KM QUICK CHANGE



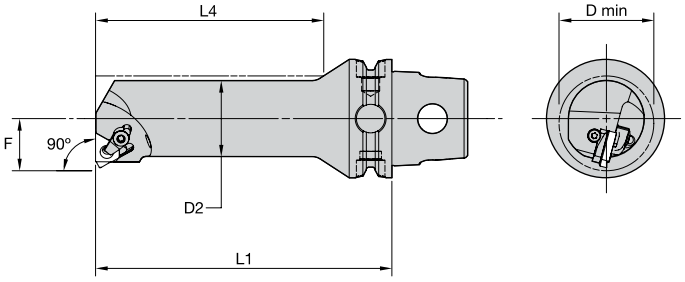
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	kg	lbs
right hand										
3950832	**KM40TSLSER16N**	40	1.575	27	1.063	54	2.126	LT16NR	0,35	.78
3950854	**KM40TSLSER22N**	40	1.575	27	1.063	54	2.126	LT22NR	0,35	.77
left hand										
3950831	**KM40TSLSEL16N**	40	1.575	27	1.063	54	2.126	LT16NL	0,35	.78

NOTE: Cutting units are supplied with insert screw and clamp assembly.
However, tools are designed to use either the insert screw or the clamp assembly, not both.

Cutting Units • KM40TS • LSE 90° • Metric



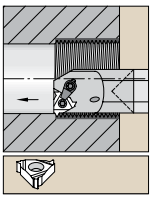
KM QUICK CHANGE



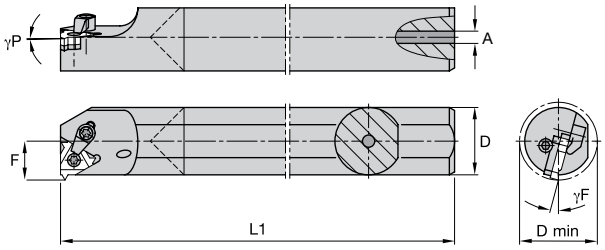
order number	catalog number	D2 mm	D2 in	D min mm	D min in	F mm	F in	L4 mm	L4 in	L1 mm	L1 in	gage insert	kg	lbs
right hand														
3955464	**KM40TSS10DLSER11**	10	.394	13	.51	7	.276	35	1.38	60	2.362	LT11NR	0,22	.49
3955466	**KM40TSS12ELSER11**	12	.472	16	.63	9	.354	42	1.66	70	2.756	LT11NR	0,25	.56
3955468	**KM40TSS16FLSER16**	16	.630	20	.79	11	.433	56	2.21	80	3.150	LT16NR	0,28	.61
3955470	**KM40TSS20GLSER16**	20	.787	25	.98	13	.512	70	2.76	90	3.543	LT16NR	0,34	.75
3955472	**KM40TSS25HLSER16**	25	.984	32	1.26	17	.669	75	2.95	100	3.937	LT16NR	0,50	1.11
3955474	**KM40TSS32JLSER16**	32	1.260	40	1.57	22	.866	96	3.78	110	4.331	LT16NR	0,72	1.58
3955476	**KM40TSS32JLSER22**	32	1.260	40	1.57	22	.866	96	3.78	110	4.331	LT22NR	0,71	1.56
left hand														
3955463	**KM40TSS10DLSEL11**	10	.394	13	.51	7	.276	35	1.38	60	2.362	LT11NL	0,22	.49
3955465	**KM40TSS12ELSEL11**	12	.472	16	.63	9	.354	42	1.65	70	2.756	LT11NL	0,25	.55
3955469	**KM40TSS20GLSEL16**	20	.787	25	.98	13	.512	70	2.76	90	3.543	LT16NL	0,34	.75
3955471	**KM40TSS25HLSEL16**	25	.984	32	1.26	17	.669	75	2.95	100	3.937	LT16NL	0,50	1.11
3955473	**KM40TSS32JLSEL16**	32	1.260	40	1.57	22	.866	96	3.78	110	4.331	LT16NL	0,72	1.58
3955475	**KM40TSS32JLSEL22**	32	1.260	40	1.57	22	.866	96	3.78	110	4.331	LT22NL	0,71	1.56

NOTE: Items listed without a shim are designed for a 1,5° inclination angle.
Cutting units are supplied with insert screw and clamp assembly. However, tools are designed to use either the insert screw or the clamp assembly, not both.

Integral I.D. Threading Boring Bars • E-LSE



Carbide shank with through coolant.

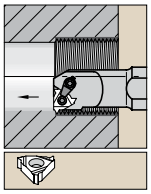


Right Hand Tool

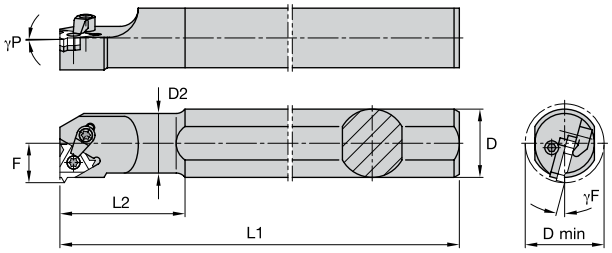
order number	catalog number	SSC	D	D min	F	L1	A	γF°	γP°	gage insert
right hand										
2892518	**E06LSER2**	2	.375	.500	.280	6.00	.13	-15.0	-1.50	LT11NR
left hand										
2892519	**E06LSEL2**	2	.375	.500	.280	6.00	.13	-15.0	-1.50	LT11NL
2892555	**E12LSEL3**	3	.750	.900	.510	10.00	.22	-15.0	-1.50	LT16NL

NOTE: Items listed without a shim are designed for a 1.5° inclination angle.
SSC = To correspond with the SSC on the insert.

Integral I.D. Threading Boring Bars • S-LSE



Steel shank without coolant.



Right Hand Tool

order number	catalog number	SSC	D	D min	D2	F	L1	L2	γF°	γP°	gage insert
right hand											
2968597	**S0612LSER2**	2	.750	.500	.375	.280	7.00	1.00	-15.0	-1.50	LT11NR
2968601	**S1012LSER3**	3	.750	.800	.625	.460	7.00	1.50	-15.0	-1.50	LT16NR
2968763	**S1212LSER3**	3	.750	.900	—	.510	7.00	1.57	-15.0	-1.50	LT16NR
2968765	**S1620LSER3**	3	1.250	1.200	1.000	.650	10.00	2.50	-15.0	-1.50	LT16NR

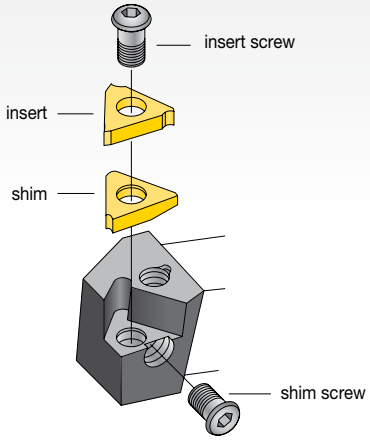
NOTE: Items listed without a shim are designed for a 1.5° inclination angle.
SSC = To correspond with the SSC on the insert.

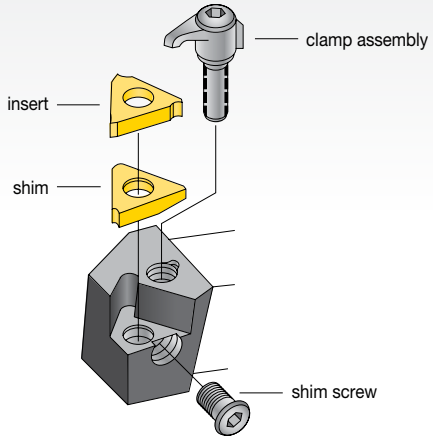
Hardware

Laydown Threading Toolholders

In all cases, the proper shim selection is important.

WIDIA™ toolholders are supplied with a shim for a 1.5° lead angle. Change the shim if your thread is more than 1° different.
For more details on proper shim selections, see pages E519–E520.





insert size and screw		insert screw	shim	shim screw and washer	clamp assembly
3ER		S-SA3T	SM-YIE3	S-SY3T	CK-C3
3EL		S-SA3T	SM-YI3	S-SY3T	CK-C3
4ER		S-SA4T	SM-YIE4	S-SY4T	CK-C4
4EL		S-SA4T	SM-YI4	S-SY4T	CK-C4
Laydown Threading boring bars					
2IR		S-SN2T	–	–	–
2IL		S-SN2T	–	–	–
3IR		S-SA3T	SM-YI3	S-SY3T	CK-C3
3IL		S-SA3T	SM-YIE3	S-SY3T	CK-C3
4IR		S-SA4T	SM-YI4	S-SY4T	CK-C4
4IL		S-SA4T	SM-YIE4	S-SY4T	CK-C4

SM	—	Y	E	3	—	2N
Shim		Y-shim for Laydown standard inserts	**E** — External **I** — Internal	**iC** — 1/8"		Shim Angle

2P	2° positive
1P	1° positive
–	0°
1N	1° negative
2N	2° negative
3N	3° negative

Screw Thread Definitions

resultant angle		3.5°	2.5°	1.5°	0.5°	-0.5°	-1.5°
insert size (iC)	toolholder	shim ordering code					
3/8"	ex. RH/in. LH ex. LH/in. RH	SM-YE3-2P SM-YI3-2P	SM-YE3-1P SM-YI3-1P	SM-YE3 SM-YI3	SM-YE3-1N SM-YI3-1N	SM-YE3-2N SM-YI3-2N	SM-YE3-3N SM-YI3-3N
1/2"	ex. RH/in. LH ex. LH/in. RH	SM-YE4-2P SM-YI4-2P	SM-YE4-1P SM-YI4-1P	SM-YE4 SM-YI4	SM-YE4-1N SM-YI4-1N	SM-YE4-2N SM-YI4-2N	SM-YE4-3N SM-YI4-3N

Slanted Shim Kit

Because you might occasionally need different shims than those supplied with our standard toolholders, we strongly recommend that shim kits be readily available in every tool shop.

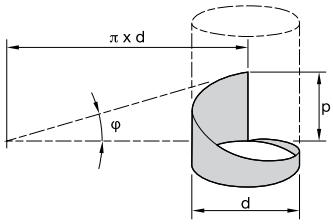
insert size	shim size (D)	ordering code	contains slanted shims
3x	3/8"	ABY3	SM-YE3-2P, 1P, 1N, 2N, 3N SM-YI3-2P, 1P, 1N, 2N, 3N
4x	1/2"	ABY4	SM-YE4-2P, 1P, 1N, 2N, 3N SM-YI4-2P, 1P, 1N, 2N, 3N

The Helix Angle

Example:
d = 1.892" (48,06mm)
p = .125" (3,175mm)

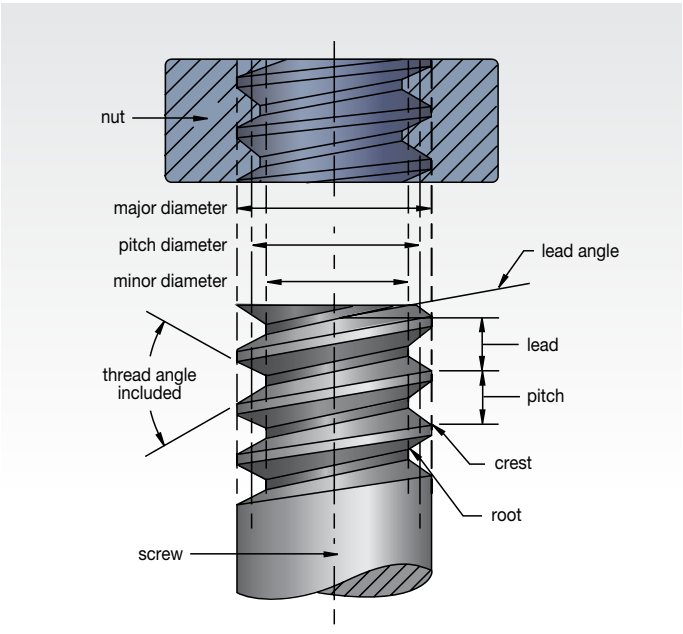
ϕ = Helix angle
p = pitch
d = pitch diameter

$$\phi = \arctan\left(\frac{p * starts}{\pi * \varnothing}\right) = 1.13°$$



Screw Thread Definitions

1. Major diameter — The largest diameter of a straight screw thread. This applies to both internal and external threads.
2. Pitch diameter — On a straight thread, it is the diameter which passes through the thread profiles at such points which make the thread width of the groove equal to one-half of the basic pitch. On a "perfect thread," this occurs at the point where the widths of the thread and groove are equal.
3. Thread angle (included) — The included angle between the individual flanks of the thread form.
4. Minor diameter — The smallest diameter of a straight screw thread. This applies to both internal and external threads.
5. Lead angle — On a straight thread, the lead angle is the angle created by the helix of the thread at the pitch diameter with a plane perpendicular to the axis.
6. Lead — The distance a screw thread advances axially in one revolution. On a single start, the pitch and lead are identical. The lead is equal to the pitch times the number of starts.
7. Pitch — The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to the thread axis.
8. Crest — The outermost surface of the thread form which joins the flanks.
9. Root — The innermost surface of the thread form which joins the flanks.

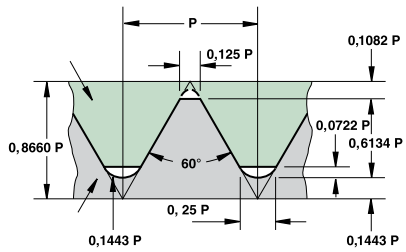


NOTE: Threads per inch (TPI) not shown:
The number of threads per inch measured axially.
The terms pitch and TPI are often used interchangeably. TPI = 1/pitch

Common Thread Forms

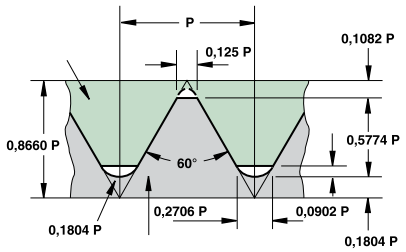
NOTE: Taper shown exaggerated.

ISO M (Metric) and UN (Unified National)



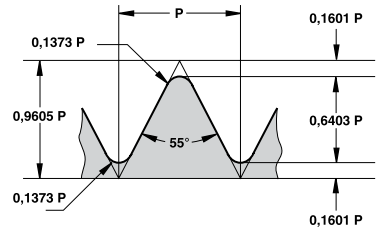
Use: All branches of mechanical industry.

UNJ (controlled root radius)



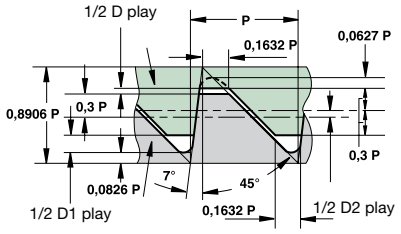
Use: Aircraft and space industry.

Whitworth (BSW)



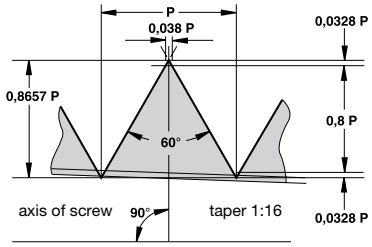
Use: Fittings and pipe couplings for gas, water, and sewer lines (replaced by ISO).

American Buttress



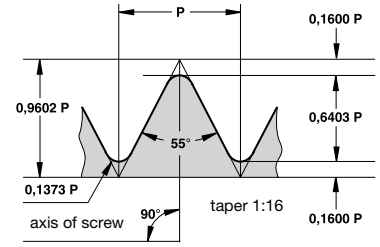
Use: Fittings and pipe couplings.

NPT (American National Pipe Thread)



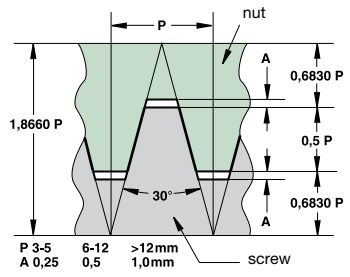
Use: Fittings and pipe couplings.

BSPT (British Standard Pipe Thread)



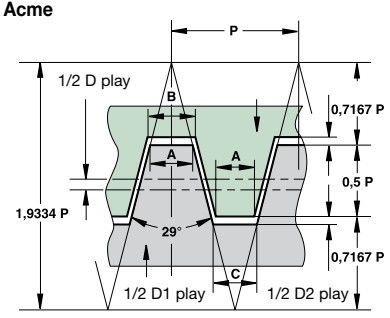
Use: Pipe thread for steam, gas, and water lines.

TR DIN 103



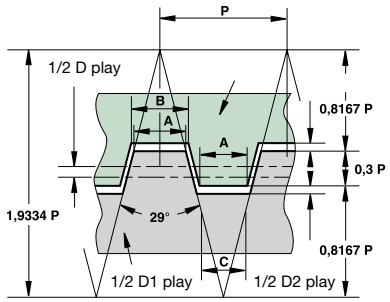
Use: Mechanical industry for motion transmission screws.

Acme



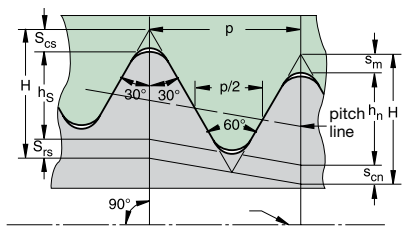
A = 0,0307 P
B = 0,3707 P—x D play
C = 0,3707 P—(D1 play—D2 play)
Use: Acme-General is used in mechanical industry for motion transmission screws.

Acme, truncated (Stub)



A = 0,4224 P
B = 0,4224 P—x D play
C = 0,4224 P—(D1 play—D2 play)
Use: Where normal Acme is too deep.

API Casing and Tubing Round Thread Form



taper = 3/4" per foot (62,5mm per meter) on diameter

NOTE: Taper shown exaggerated.

Grade Selection Chart

Suggested Grades and Speeds for Threading Various Workpiece Materials

workpiece group	workpiece material	recommended surface speed — SFM		
		uncoated	PVD coated	
		THM	TN6010	TN6025
free-machining carbon steel	10L18, 10L45, 1213, 12L13, 12L14, 1140, 1141, 11L44, 1151, 10L50	—	300–650	150–650
plain carbon steel	10063, 1008, 1010, 1015, 1018, 1020, 1025, 1026, 1108, 1117	—	250–650	150–575
alloy steels/tool steels 150–325 HB (up to 35 HRC)	1042, 1045, 1070, 1080, 1085, 1090, 1095, 1541, 1561, 1572, 5140, 8620, W1, O1, S1, P20, H13, D2, A6, H13, L6	—	250–650	125–550
alloy steels/tool steels 330–450 HB (36–47 HRC)		—	200–525	—
martensitic/ferritic stainless/precipitation hardening	416, 420F, 440F, 405, 409, 429, 430, 434, 436, 442, PH	—	150–525	100–400
austenitic stainless steel	201, 202, 301, 302, 303, 304, 304, 305, 321, 347, 348, 310, 314, 316, 316L, 330	200–350	200–650	150–450
gray cast iron 135–270 HB	class 20, 30, 35, 45	200–300	200–775	150–400
gray cast iron 275–450 HB	class 50, 55, 60	150–250	150–575	50–250
alloy/ductile iron	A536, J434C, 60-40-18, 80-55-06, 100-70-03	150–250	150–650	100–525
free-machining aluminum alloys	2024-T4, 2014-T6, 6061-T6 2011-T3, 3003-H18, A2, Alcan, Alcoa® 510, Duralumin	400–800	400–1200	—
high-silicon aluminum alloys	A380, A390, A380-1, A390-1, A380-2	—	—	—
copper/zinc/brass		250–600	250–1000	150–775
non-metallics	Graphite, Nylon, Plastics, Rubbers, Phenolics, Carbon	400–1500	400–1300	150–1000
high-temperature alloys 125–269 HB (up to 27 HRC)	Nickel 200, MONEL®, R405, MONEL K500, INCONEL® 600, INCONEL 625/901x750/718, Waspaloy®, Hastelloy® C	80–120	80–400	40–250
high-temperature alloys 260–450 HB (26–47 HRC)	Rene 95, Waspaloy A286, INCOLOY® 800, Haynes® 188, Stellite™ F, Haynes 25	80–100	100–250	20–200
titanium alloys	Ti-6Al-4V, TI-5Al-2.5Sn	110–180	110–325	—

NOTE: When workpiece hardness levels are at the top of a range, starting SFM should be at the lower end. Regularly inspect insert clamps for worn flats.

Edge preparation:
Uncoated — sharp
PVD coated — light hone except positive top rake, top rake-sharp

Failure and Solution Guide

problem	cause	possible solution
thread with torn finish 	• Burs. • Torn finish. • Steps. • Improper shim. • Improper infeed.	• Use modified flank infeed. • Use full profile insert. • Increase coolant concentration. • Increases SFM. • Check machine “Z” travel axis. • Check insert form. • Check for correct shim in LT system. • Calculate flank clearance.
chatter 	• Poor rigidity. • Insert movement. • Improper infeed. • Off centerline.	• Use modified flank infeed. • Minimize tool overhang. • Check for workpiece deflection. • Check insert and clamp. • Verify that tool cutting position is at workpiece centerline. • Adjust number of passes. Fewer passes reduce chatter.
built-up edge 	• Speed too low. • Insufficient coolant. • Chip load.	• Increase SFM. • Increase coolant concentration and/or flow. • Adjust infeed angle. • Increase depth of cut per pass.
deformation 	• Wrong grade. • Speed too high. • Improper infeed angle. • Insufficient coolant.	• Use modified flank infeed. • Use a more wear-resistant grade (e.g., TN6010™). • Reduce SFM. • Increase coolant flow.
chipping 	• Improper infeed. • Chip load. • Wrong grade. • Incorrect speed. • Poor rigidity.	• Use modified flank infeed. • Increase or decrease number of passes. • Eliminate spring passes. • Use tougher grade (e.g., TN6025™). • Increase SFM if chipping on trailing edge. • Decrease SFM if chipping on leading edge. • Minimize tool overhang. • Check for insert movement/check clamp. Torque screw or clamp to correct value. • Check for possible part deflection. • Calculate flank clearance. • Ensure correct shim.
broken nose 	• Heavy chip load. • Small nose radius. • Wrong grade. • Improper infeed.	• Use modified flank infeed. • Decrease chip load. • Use large nose radius if possible. • Use tougher grade (e.g., TN6025).
flank wear 	• Improper shim. • Wrong grade. • Insufficient coolant. • Off centerline. • Insufficient flank clearance . • Improper infeed angle.	• Ensure correct shim. • Use a more wear-resistant grade (e.g., TN6025). • Increase coolant flow. • Check the centerline height of the tool. (The smaller the diameter, the more critical the need for centerline accuracy.) • Calculate flank clearance and change shim to increase clearance on worn flank. • If wear is on trailing flank, increase infeed angle clearance.

Failure and Solution Guide

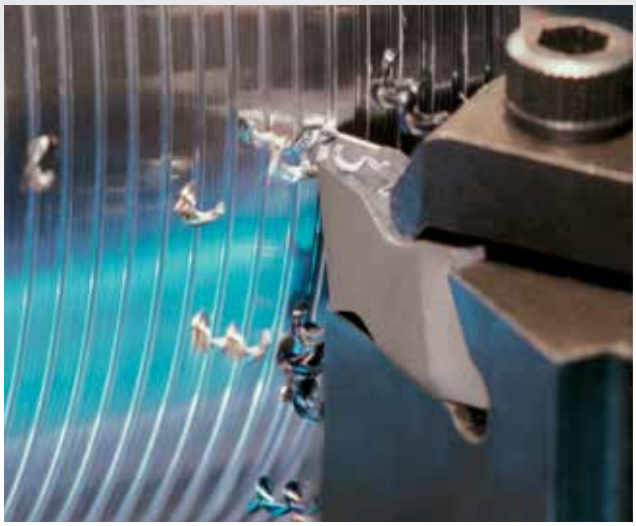
problem	possible solution																	
	increase SFM	reduce SFM	increase chip load	decrease chip load where failure occurs	use tougher carbide grade	use harder carbide grade	apply coolant	use coated carbide	use topping insert	change infeed angle	check for insert movement and reseat	reduce tool overhang	reselect shim	apply chipbreaker style	reduce DOC	adjust center height	begin cutting threads .472" before workpiece	change infeed method
chatter	•			•							•	•				•		•
bur on crest	•								•									•
short tool life		•	•	•		•		•										•
chipped leading edge			•	•	•													
chipped trailing edge					•					•								
broken nose (first pass)	•														•	•		
broken nose (after first pass)				•	•					•			•					•
built-up on cutting edge	•		•				•	•										•
premature topping													•					
splitting threads																	•	
poor chip evacuation														•				•

General Machining Guidelines

WIDIA™ insert technology brings chip control to your threading operations with the TopThread™ platform. The proprietary WIDIA recessed chip groove, when used according to our recommendations, controls the chip in most applications. Our positive rake design lowers cutting pressures, which in turn lowers damaging heat generation thus providing better tool life. Long, stringy chips no longer mar the workpiece surface finish. The danger to operators when removing long chips from the workpiece and chuck is eliminated. All of these benefits combine to improve the productivity of your threading operations.

The Last Pass

Some CNC controls require the last pass to be at a 0° infeed angle because the chip will not break on the last pass. On most carbon and alloy steels, the last pass can remain at .005" (0,127mm) depth of cut and produce an acceptable finish. For some materials, a .001" (0,025mm) to .003" (0,076mm) (spring) pass may be used to improve surface finish, however, chipbreaking action may be compromised.

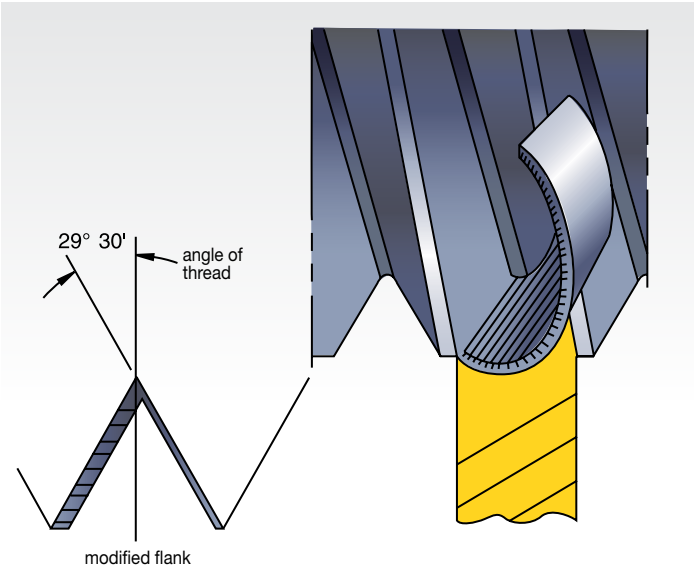


Machine Programming

Modern CNC controls allow the programmer to easily adjust infeed angle, the number of passes, and depth of cut for each pass. The chip control threading insert performs best at an infeed angle of 29° 30', although 15° to 30° is acceptable. Also, it is important to maintain a minimum of .005" (0,127mm) depth of cut on every pass. In most applications, use of CNC canned cycles produce only marginally successful results. Custom written programs are better and are recommended.

Infeed Angle

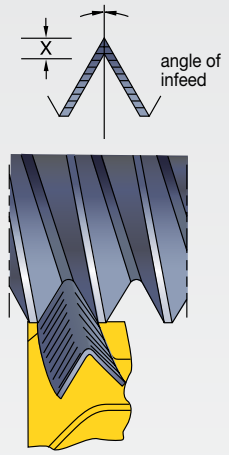
In order to effectively and consistently break the chip, it is important to use an infeed angle between 28° and 29° 30'. Do not apply chip control inserts at infeed angles less than 15°.



General Machining Guidelines

Radial

modified flank



Advantage —

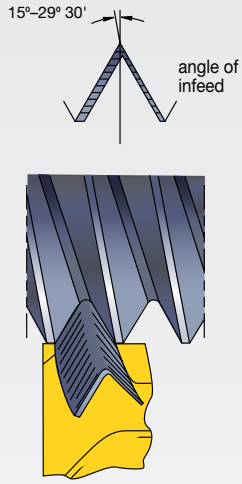
- Cutting on both sides of the thread form places all of the cutting edge in the cut and protects edge from chipping.
- Even wear on the insert.

Disadvantage —

- Tool develops a channel chip that may be difficult to handle.
- Tip chipping occurs when cutting high-tensile materials.
- Bur condition is increased.
- Entire cutting edge is engaged at finish of thread, causing increased tendency to chatter.

Modified flank

modified flank



Advantage —

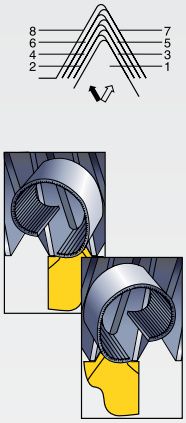
- Tool cuts both sides of thread form, so it is protected from chipping similar to 0° infeed. Channel-type chip develops, but uneven chip thickness helps remove the chip similar to flank infeed.
- This is the preferred method, especially when used with a chip control insert.
- Combined radial and/or alternating flank infeed.
- Results in good tool life, with wear evenly distributed over both flanks.

Disadvantage —

- Similar disadvantages as with 0° infeed, although reduced somewhat in magnitude as cutting forces are better equalized and chip flow is much less of a problem.

Alternating flank

alternating flank



Advantage —

- *Increased tool life because both edges are used equally.*

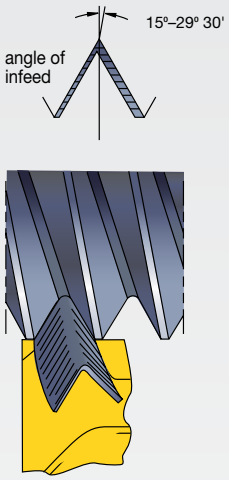
NOTE: Some machine tools may require special programming techniques to achieve this method of infeed.

Disadvantage —

- Difficult to cut on conventional machinery.

Reversed modified flank

modified flank



Advantage —

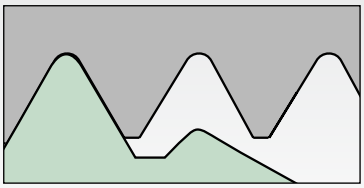
- Tool cuts both sides of thread form, so it is protected from chipping similar to 0° infeed. Channel-type chip develops, but uneven chip thickness helps remove the chip similar to flank infeed.
- This is the preferred method, especially when used with a chip control insert.
- Combined radial and/or alternating flank infeed.
- Results in good tool life, with wear evenly distributed over both flanks.
- As chip flow is the reversed feed direction, it is an excellent choice for internal threading.

Disadvantage —

- Programming needs to be done line by line.

Threading

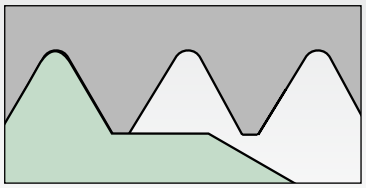
Partial Profile



Tooth profile with universal profile shape:

- Reduced inventory.
- For various pitches in a limited range.
- Major/minor diameters must be accurately pre-turned.

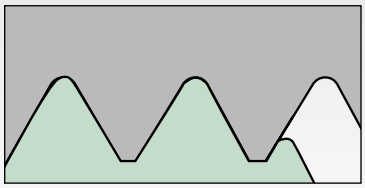
Full Profile



Tooth profile with full profile shape including tooth height:

- For bur-free, precise threads in the specified pitch.
- General application.
- Machining allowance for outside/core diameter around .004–.006".

Multi-Tooth Profile



Multi-tooth full profile generally with 2–3 teeth:

- Highly productive threading with fewer passes and longer tool life.
- Requires a rigid setup and long thread pass through.

Formulas

Inch Formula

to find	given	formula
SFM	D (inch) RPM	$SFM = \frac{\pi \times D}{12"} \times RPM$
RPM	D (inch) SFM	$RPM = \frac{SFM \times 12"}{D \times \pi}$

Metric Formula

to find	given	formula
m/min	D (mm) RPM	$m/min = \frac{\pi \times D}{1000} \times RPM$
RPM	D (mm) m/min	$RPM = \frac{m/min \times 1000}{D \times \pi}$

Legend

IPM	=	inch per minute
SFM	=	surface feet per minute
m/min	=	meters per minute
RPM	=	revolutions per minute
D	=	part diameter
π	=	3.1416

Maximum Cutting Speeds

On older machines cutting speed is often limited by the maximum travel speed (IPM or mm/min) of the tool allowed by the machine. Check your maximum speed with the following formulas:

inch formula: maximum cutting speed (SFM) =
part diameter (inch) x 3.14 x TPI x $\frac{\text{max IPM}}{12"}$

metric formula: maximum cutting speed (m/min) =
part diameter (mm) x 3.14 x (1/pitch) x $\frac{\text{max mm/min}}{1000\text{mm}}$

Flank Clearance

γ = arctan (sin (β/2) * tan(α))
g = side (flank) clearance
β = included angle of thread form
α = radial inclination angle

Thread	Angle	External	Internal
UN & ISO	60	5.3	8
BSW	55	4.8	7.3
TR	30	2.6	4
ACME	29	2.6	3.9
AMBUT	7	.6	.9
AMBUT	45	4	6

Threading

Recommendation for Threading Infeed Passes

TPI	48–32	28–24	20–16	14–12	11.5–9	8–6	5–4	3–2
metric pitch (mm)	0,50–0,75	0,80–1	1,25–1,5	1,75–2	2,5–3	3,5–4	4,5–6	8
Thread Type	**recommended number of passes**							
Common V-thread forms ISO, UN, UNJ, NPT, Whitworth, BSPT, API Rotary Shoulder	4–5	5–6	6–8	8–10	9–12	12–15	14–16	15–25
Acme, Trapez, Round, API Round	–	–	5–6	7–8	10–11	12–13	13–15	18–20
Stub Acme, API Buttress	–	–	5	5–6	7–8	8–10	10–12	14–16
American Buttress	–	–	7–8	9–10	11–12	13–15	17–19	22–24

Maintain minimum .002" (0,05mm) infeed on last passes to avoid work hardening and excessive abrasion of the threading tool.

Constant Volume Infeed Values for Threading Operations

In most applications, use of CNC canned cycles produces only marginally successful results. For example, an 8-pitch external thread has a depth of .0789" (2mm).

$$\Delta ap_x = \frac{ap}{\sqrt{nap-1}} * \sqrt{\phi}$$

Formula for constant chip load infeed

Δap	=	radial infeed
x	=	actual pass (from 1 to the nap)
nap	=	number of passes
ϕ	=	1st pass, 0.3
		2nd pass, 1
		3rd pass and up, x-1

Using Radial Infeed

Bending stress on the cutting edge caused by V-shaped chips from long-chipping steel workpiece materials.

High cutting forces with small cutting thicknesses require sharp edges with high strength.

Using Flank Infeed

Lower bending stress and stabilized cutting edges produce more favorable chip shapes and larger cutting thicknesses.

Carbides with high hardness, good wear resistance, and temperature stability are advantageous.

Guidelines for Infeeds — How to Determine the Number and the Size of Passes

The number of passes “s” per thread is decisive for successful threading and crest turning. The following tables give standard values for the application condition when machining steel. The proper number of passes must be determined empirically.

If insert breakage occurs, the number of passes must be increased. With increased wear, we recommend decreasing the number of passes. The chip thickness should not be less than .0019" (0,05mm). The allowance at the diameter should not exceed .0078" (0,2mm).

Threading Infeed Tables

Metric ISO, External Thread Cutting

thread pitch P (mm)	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,50	3,00	3,50	4,00	4,50	5,00
T Ap (in)	.012	.018	.024	.030	.036	.042	.048	.060	.072	.085	.097	.109	.121
N Ap	4	4	5	6	6	8	8	10	12	14	15	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0038	0.0057	0.0066	0.0073	0.0088	0.0087	0.0099	0.0110	0.0119	0.0129	0.0142	0.0160	0.0171
2	0.0031	0.0047	0.0054	0.0061	0.0073	0.0072	0.0082	0.0090	0.0098	0.0107	0.0117	0.0132	0.0141
3	0.0029	0.0043	0.0050	0.0056	0.0067	0.0066	0.0075	0.0083	0.0090	0.0098	0.0107	0.0121	0.0129
4	0.0022	0.0033	0.0038	0.0043	0.0051	0.0050	0.0058	0.0064	0.0069	0.0075	0.0082	0.0093	0.0099
5			0.0032	0.0036	0.0043	0.0043	0.0049	0.0054	0.0058	0.0063	0.0069	0.0078	0.0084
6				0.0032	0.0038	0.0037	0.0043	0.0047	0.0051	0.0056	0.0061	0.0069	0.0074
7						0.0034	0.0039	0.0043	0.0046	0.0050	0.0055	0.0062	0.0067
8						0.0031	0.0036	0.0039	0.0043	0.0046	0.0051	0.0057	0.0061
9								0.0037	0.0040	0.0043	0.0047	0.0053	0.0057
10								0.0034	0.0037	0.0040	0.0044	0.0050	0.0054
11									0.0035	0.0038	0.0042	0.0047	0.0051
12									0.0034	0.0036	0.0040	0.0045	0.0048
13										0.0035	0.0038	0.0043	0.0046
14										0.0033	0.0037	0.0041	0.0044
15											0.0035	0.0040	0.0043
16													0.0041
T Ap (in)	0.012	0.018	0.024	0.030	0.036	0.042	0.048	0.060	0.072	0.085	0.097	0.109	0.121

NOTE: Always allow .003–.005" extra stock for full profile inserts.

Metric ISO, Internal Thread Cutting

thread pitch P (mm)	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00
T Ap	0.011	0.016	0.021	0.027	0.032	0.037	0.043	0.053	0.064	0.075	0.085	0.096	0.107
N Ap	4	4	5	6	6	8	8	10	11	12	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0035	0.0051	0.0058	0.0066	0.0078	0.0077	0.0089	0.0097	0.0111	0.0124	0.0129	0.0141	0.0151
2	0.0029	0.0042	0.0047	0.0055	0.0065	0.0063	0.0074	0.0080	0.0092	0.0102	0.0107	0.0116	0.0125
3	0.0026	0.0038	0.0043	0.0050	0.0059	0.0058	0.0067	0.0073	0.0084	0.0094	0.0098	0.0106	0.0114
4	0.0020	0.0029	0.0033	0.0038	0.0045	0.0044	0.0052	0.0056	0.0064	0.0072	0.0075	0.0082	0.0088
5			0.0028	0.0032	0.0038	0.0037	0.0044	0.0047	0.0054	0.0061	0.0063	0.0069	0.0074
6				0.0029	0.0034	0.0033	0.0038	0.0042	0.0048	0.0053	0.0056	0.0061	0.0065
7						0.0030	0.0035	0.0038	0.0043	0.0048	0.0050	0.0055	0.0059
8						0.0027	0.0032	0.0035	0.0040	0.0044	0.0046	0.0050	0.0054
9								0.0032	0.0037	0.0041	0.0043	0.0047	0.0050
10								0.0030	0.0035	0.0039	0.0040	0.0044	0.0047
11									0.0033	0.0037	0.0038	0.0042	0.0045
12										0.0035	0.0036	0.0040	0.0043
13											0.0035	0.0038	0.0041
14											0.0033	0.0036	0.0039
15												0.0035	0.0038
16													0.0036
T Ap	0.011	0.016	0.021	0.027	0.032	0.037	0.043	0.053	0.064	0.075	0.085	0.096	0.107

NOTE: Always allow .003–.005" extra stock for full profile inserts.

Threading Infeed Tables

UN Thread, External Thread Cutting

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
T Ap (in)	0.026	0.031	0.034	0.038	0.036	0.042	0.048	0.060	0.072	0.085	0.097	0.109	0.121
N Ap	5	6	6	7	9	9	10	11	12	13	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0071	0.0076	0.0083	0.0085	0.0070	0.0081	0.0088	0.0104	0.0119	0.0134	0.0147	0.0160	0.0171
2	0.0059	0.0063	0.0069	0.0070	0.0058	0.0067	0.0072	0.0086	0.0098	0.0111	0.0122	0.0132	0.0141
3	0.0054	0.0057	0.0063	0.0064	0.0053	0.0062	0.0066	0.0079	0.0090	0.0102	0.0111	0.0121	0.0129
4	0.0041	0.0044	0.0048	0.0049	0.0040	0.0047	0.0051	0.0060	0.0069	0.0078	0.0086	0.0093	0.0099
5	0.0035	0.0037	0.0041	0.0042	0.0034	0.0040	0.0043	0.0051	0.0058	0.0066	0.0072	0.0078	0.0084
6		0.0033	0.0036	0.0037	0.0030	0.0035	0.0038	0.0045	0.0051	0.0058	0.0064	0.0069	0.0074
7				0.0033	0.0027	0.0032	0.0034	0.0040	0.0046	0.0052	0.0057	0.0062	0.0067
8					0.0025	0.0029	0.0031	0.0037	0.0043	0.0048	0.0053	0.0057	0.0061
9					0.0023	0.0027	0.0029	0.0035	0.0040	0.0045	0.0049	0.0053	0.0057
10							0.0027	0.0033	0.0037	0.0042	0.0046	0.0050	0.0054
11								0.0031	0.0035	0.0040	0.0044	0.0047	0.0051
12									0.0034	0.0038	0.0042	0.0045	0.0048
13										0.0036	0.0040	0.0043	0.0046
14											0.0038	0.0041	0.0044
15												0.0040	0.0043
16													0.0041
T Ap (in)	0.026	0.031	0.034	0.038	0.036	0.042	0.048	0.060	0.072	0.085	0.097	0.109	0.121

NOTE: Always allow .003–.005" extra stock for full profile inserts.

UN Thread, Internal Thread Cutting

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
T Ap	.023	.027	.030	.034	.039	.045	.049	.054	.060	.068	.077	.090	.108
N Ap	5	6	6	7	8	9	9	10	11	12	13	14	15
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0063	0.0066	0.0073	0.0076	0.0081	0.0087	0.0095	0.0099	0.0104	0.0112	0.0122	0.0137	0.0158
2	0.0052	0.0055	0.0061	0.0063	0.0067	0.0072	0.0078	0.0081	0.0086	0.0093	0.0101	0.0113	0.0131
3	0.0048	0.0050	0.0056	0.0057	0.0061	0.0066	0.0072	0.0075	0.0079	0.0085	0.0092	0.0103	0.0120
4	0.0037	0.0038	0.0043	0.0044	0.0047	0.0051	0.0055	0.0057	0.0060	0.0065	0.0071	0.0079	0.0092
5	0.0031	0.0032	0.0036	0.0037	0.0039	0.0043	0.0046	0.0048	0.0051	0.0055	0.0060	0.0067	0.0077
6		0.0029	0.0032	0.0033	0.0035	0.0038	0.0041	0.0042	0.0045	0.0048	0.0052	0.0059	0.0068
7				0.0030	0.0031	0.0034	0.0037	0.0038	0.0040	0.0044	0.0047	0.0053	0.0062
8					0.0029	0.0031	0.0034	0.0035	0.0037	0.0040	0.0044	0.0049	0.0057
9						0.0029	0.0032	0.0033	0.0035	0.0037	0.0041	0.0046	0.0053
10								0.0031	0.0033	0.0035	0.0038	0.0043	0.0050
11									0.0031	0.0033	0.0036	0.0041	0.0047
12										0.0032	0.0034	0.0039	0.0045
13											0.0033	0.0037	0.0043
14											0.0031	0.0035	0.0041
15													0.0039
16													
T Ap	0.023	0.027	0.030	0.034	0.039	0.045	0.049	0.054	0.060	0.068	0.080	0.090	0.108

NOTE: Always allow .003–.005" extra stock for full profile inserts.

Threading Infeed Tables

NPT Thread, External, and Internal Machining

TPI	27	18	14	11.5	8
T Ap	0.030	0.044	0.056	0.068	0.098
N Ap	6	8	10	12	14
	values for flank infeed (X/Z)				
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0073	0.0091	0.0102	0.0112	0.0149
2	0.0061	0.0075	0.0084	0.0093	0.0123
3	0.0056	0.0069	0.0077	0.0085	0.0113
4	0.0043	0.0053	0.0059	0.0065	0.0086
5	0.0036	0.0045	0.0050	0.0055	0.0073
6	0.0032	0.0039	0.0044	0.0048	0.0064
7		0.0035	0.0040	0.0044	0.0058
8		0.0033	0.0037	0.0040	0.0053
9			0.0034	0.0037	0.0050
10			0.0032	0.0035	0.0047
11				0.0033	0.0044
12				0.0032	0.0042
13					0.0040
14					0.0038
15					
16					
T Ap	0.030	0.044	0.056	0.068	0.098

NOTE: Always allow .003–.005" extra stock for full profile inserts.

BSPT Thread, External, and Internal Machining

TPI	28	19	14	11
T Ap	0.023	0.034	0.046	0.057
N Ap	5	8	10	12
	values for flank infeed (X/Z)			
order of passes	X/Z	X/Z	X/Z	X/Z
1	0.0063	0.0070	0.0084	0.0094
2	0.0052	0.0058	0.0069	0.0078
3	0.0048	0.0053	0.0064	0.0071
4	0.0037	0.0041	0.0049	0.0055
5	0.0031	0.0034	0.0041	0.0046
6		0.0030	0.0036	0.0041
7		0.0027	0.0033	0.0037
8		0.0025	0.0030	0.0034
9			0.0028	0.0031
10			0.0026	0.0029
11				0.0028
12				0.0027
13				
14				
15				
16				
T Ap	0.023	0.034	0.046	0.057

Trapezoid Thread to DIN 103, External, and Internal Machining

pitch	1.50	2.00	3.00	4.00	5.00
T Ap	0.040	0.049	0.069	0.089	0.108
N Ap	6	8	10	12	14
	values for flank infeed (X/Z)				
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0098	0.0101	0.0126	0.0147	0.0164
2	0.0081	0.0084	0.0104	0.0121	0.0135
3	0.0074	0.0077	0.0095	0.0111	0.0124
4	0.0057	0.0059	0.0073	0.0085	0.0095
5	0.0048	0.0050	0.0062	0.0072	0.0080
6	0.0042	0.0044	0.0054	0.0063	0.0071
7		0.0040	0.0049	0.0057	0.0064
8		0.0036	0.0045	0.0053	0.0059
9			0.0042	0.0049	0.0055
10			0.0039	0.0046	0.0051
11				0.0044	0.0049
12				0.0041	0.0046
13					0.0044
14					0.0042
15					
16					
T Ap	0.040	0.049	0.069	0.089	0.108

NOTE: Always allow .003–.005" extra stock for full profile inserts.

Round Thread to DIN 405, External, and Internal Machining

pitch	10	8	6
T Ap	0.052	0.064	0.085
N Ap	8	10	12
	values for flank infeed (X/Z)		
order of passes	X/Z	X/Z	X/Z
1	0.0108	0.0117	0.0140
2	0.0089	0.0096	0.0116
3	0.0081	0.0088	0.0106
4	0.0062	0.0068	0.0081
5	0.0053	0.0057	0.0069
6	0.0046	0.0050	0.0061
7	0.0042	0.0046	0.0055
8	0.0039	0.0042	0.0050
9		0.0039	0.0047
10		0.0037	0.0044
11			0.0042
12			0.0040
13			
14			
15			
16			
T Ap	0.052	0.064	0.085

NOTE: Always allow .003–.005" extra stock for full profile inserts.

Threading Infeed Tables

Whitworth, External, and Internal Thread Cutting

TPI	28	20	19	16	14	12	11	10	9	8	7	6	5
T Ap	0.023	0.032	0.032	0.034	0.040	0.053	0.058	0.064	0.071	0.080	0.091	0.107	0.128
N Ap	5	6	6	8	8	9	9	10	11	12	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0063	0.0078	0.0078	0.0070	0.0083	0.0103	0.0112	0.0117	0.0123	0.0132	0.0138	0.0157	0.0181
2	0.0052	0.0065	0.0065	0.0058	0.0068	0.0085	0.0093	0.0096	0.0102	0.0109	0.0114	0.0129	0.0149
3	0.0048	0.0059	0.0059	0.0053	0.0063	0.0078	0.0085	0.0088	0.0093	0.0100	0.0105	0.0118	0.0137
4	0.0037	0.0045	0.0045	0.0041	0.0048	0.0060	0.0065	0.0068	0.0071	0.0077	0.0080	0.0091	0.0105
5	0.0031	0.0038	0.0038	0.0034	0.0041	0.0050	0.0055	0.0057	0.0060	0.0065	0.0068	0.0077	0.0089
6		0.0034	0.0034	0.0030	0.0036	0.0044	0.0048	0.0050	0.0053	0.0057	0.0060	0.0068	0.0078
7				0.0027	0.0032	0.0040	0.0044	0.0046	0.0048	0.0051	0.0054	0.0061	0.0071
8				0.0025	0.0030	0.0037	0.0040	0.0042	0.0044	0.0047	0.0050	0.0056	0.0065
9						0.0034	0.0037	0.0039	0.0041	0.0044	0.0046	0.0052	0.0060
10								0.0037	0.0039	0.0041	0.0043	0.0049	0.0057
11									0.0036	0.0039	0.0041	0.0046	0.0054
12										0.0037	0.0039	0.0044	0.0051
13											0.0037	0.0042	0.0049
14											0.0036	0.0040	0.0047
15												0.0039	0.0045
16													0.0043
T Ap	0.023	0.032	0.032	0.034	0.040	0.053	0.058	0.064	0.071	0.080	0.091	0.107	0.128

NOTE: Always allow .003–.005" extra stock for full profile inserts.

Multi-Tooth Threads, Internal

	ISO metric						ISO UN					Whit-	NPT		
type	3M	2M	3M	2M	3M	2M	2M	3M	2M	3M	2M	2M	2M	3M	2M
pitch (mm)	1.0	1.5	1.5	2.0	2.0	3.0	—	—	—	—	—	—	—	—	—
TPI	—	—	—	—	—	—	16	16	12	12	8	11	11.5	11.5	8
total depth	.024	.033	.033	.460	.460	.070	.037	.037	.490	.490	.740	.620	.690	.690	.100
1	.013	.015	.020	.020	.028	.022	.017	.022	.022	.030	.023	.029	.023	.032	.035
2	.011	.010	.013	.015	.018	.019	.012	.015	.016	.019	.020	.019	.020	.022	.025
3	—	.008	—	.011	—	.017	.008	—	.011	—	.017	.014	.014	.015	.022
4	—	—	—	—	—	.012	—	—	—	—	.014	—	.012	—	.018

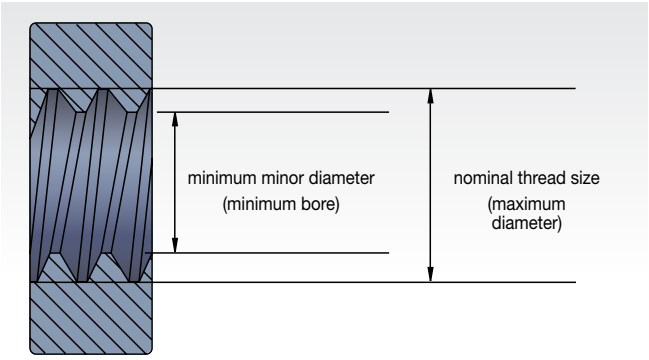
Recommendations for Steel Workpieces (<300 BHN)

			total depth — on radius		
catalog number	insert size	TPI profile	1st pass	2nd pass	3rd pass
NTC-8R/L8EM	8	8 UN	.048	.064	.079
NTC-8R/L8IM	8	8 UN	.047	.061	.074
NTC-8R/L10EM	8	10 UN	.036	.050	.063
NTC-8R/L10IM	8	10 UN	.035	.048	.060
NTC-8R/L12EM	8	12 UN	.030	.041	.052
NTC-8R/L12IM	8	12 UN	.030	.037	.047
NTC-8R/L14EM	8	14 UN	.027	.037	.044
NTC-8R/L14IM	8	14 UN	.024	.031	.041
NTC-8R/L16EM 8	8	16 UN	.023	.032	.038
NTC-8R/L16IM	8	16 UN	.020	.027	.037
NTC-8R/L18EM	8	18 UN	.019	.026	.034
NTC-8R/L18IM	8	18 UN	.019	.024	.033
NDC-68RDR/L-75M	8	8 round	.058	.065	.073
NDC-61RDR/L-75M	8	10 round	.044	.051	.057
NDC-88RDRD/L-75M	8	8 round	.051	.069	.073
NDC-88VR/L-75M	8	8 NPT	.040	.068	.096
NDC-8115VR/L-75M	8	11.5 NPT	.038	.054	.067
NDN-814VR/L-75M	8	14 NPT	.038	.054	.054

NOTE: Always allow .003–.005" extra stock for full profile inserts.

TopThread™

The following charts list the largest thread pitch that can be applied on internal applications using TopThread threading inserts for 60° V-threading and Acme threading.



Inch-Sized 60° V-Threading Limits

internal threading limitations NT-1, NT-2 V-threading inserts

TPI	nominal thread size		minimum minor diameter (inch)	
	NT-1	NT-2	NT-1	NT-2
6	1-7/8	—	1.695	—
7	1-3/4	—	1.595	—
8	1-5/8	—	1.490	—
9	1-9/16	—	1.442	—
10	1-1/2	15/16	1.392	.830
11	1-7/16	15/16	1.339	.830
11-1/2	1-3/8	15/16	1.281	.830
12	1-3/8	9/16	1.285	.472
13	1-5/16	9/16	1.229	.472
14	1-1/4	9/16	1.173	.472
16	1-1/4	9/16	1.182	.472
18	1-1/8	9/16	1.065	.472
20	1-1/8	1/2	1.071	.440
24*	1-1/16	1/2	1.017	.440

**Twenty-four threads per inch and finer can be cut with an NT-2 insert provided the minor diameter is 1.000" or larger (.440" or larger with NT-1).*

internal threading limitations NT-3 and-4 V-threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
4**	3	2.729
4-1/2**	2-7/8	2.634
5	2-3/4	2.534
6	2-1/2	2.320
7	2-1/4	2.095
8	2	1.865
9	1-15/16	1.817
10	1-7/8	1.767
11	1-13/16	1.714
11-1/12	1-3/4	1.656
12	1-3/4	1.660
13	1-5/8	1.542
14	1-9/16	1.485
16*	1-7/16	1.370

**Sixteen threads per inch and finer can be cut provided minor diameter is 1.370" or larger.*
***NT-4 insert only.*

Metric-sized 60° V-Threading Limits

internal threading limitations NT-1, NT-2 60° V-threading inserts

TPI	nominal thread size		minimum thread diameter (inch)	
	NT-1	NT-2	NT-1	NT-2
4,00	M48 x 4.00	–	43,67	–
3,00	M42 x 3.00	–	38,75	–
2,50	M39 x 2.50	M24 x 2,50	36,29	21,29
2,00	M33 x 2.00	M15 x 2,00	30,84	12,84
1,75	M32 x 1.75	M15 x 1,75	30,11	13,11
1,50	M32 x 1.50	M15 x 1,50	30,38	13,38
1,25	M29 x 1.29	M14 x 1,25	27,65	12,65
1,00*	M27 x 1.00	M14 x 1,00	25,92	12,92
0,75	M22 x 0.75	M12 x 0,75	21,19	11,19

**Thread pitch of 1mm and less can be cut with an NT-2 insert provided the core thread diameter is 25mm or larger (11mm or larger with NT-1).*

internal threading limitations NT-3 and NT-4 60° V-threading inserts

TPI	nominal thread size	minimum thread diameter (inch)
6,00**	M76 x 6.00	69,50
5,50**	M73 x 5.50	67,05
5,00	M70 x 5.00	64,59
4,00	M64 x 4.00	59,67
3,00	M52 x 3.00	48,75
2,50	M48 x 2.50	45,29
2,00	M42 x 2.00	39,84
1,75	M40 x 1.75	38,11
1,50*	M38 x 1.50	36,38

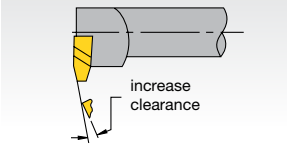
**Thread pitch of 1,5mm and less can be cut provided core thread diameter is 35mm or larger.*
***NT-4-insert only.*

Acme Threading Limits

internal threading limitations NA and NAS-2, -3, -4, and -6 Acme threading inserts

TPI	nominal thread size	minimum thread diameter (inch)	
	NT-1	NT-1	NT-2
2**	5	4.500	114.3
2-1/2**	4-1/2	4.100	104.1
3**	4	3.665	93.1
4	3-1/2	3.250	82.6
5	3	2.800	71.1
6	2-1/2	2.333	59.3
8	2-1/4	2.125	54.0
10	2	1.900	48.3
12	1-3/4	1.667	42.4
14	1-5/8	1.554	39.5
16*	1-1/2	1.438	36.5

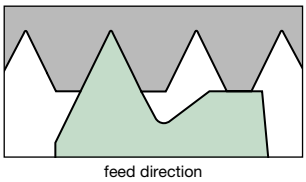
**Sixteen threads per inch and finer can be cut provided minor diameter is 36,5mm (1.438") or larger.*
***NA-6 insert only.*



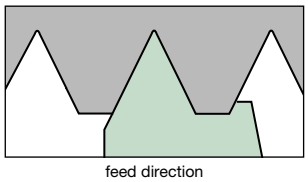
Additional secondary clearance can be ground on leading edge of insert to provide sufficient helical clearance for machining coarser threads and multiple start threads. Modified standard inserts may be furnished for machining threads outside of the limits shown.

TopThread™

60° V-Thread Crest Turning Application Data



NTC crest turning insert for 12 threads per inch and finer (P ≤ 2mm)



NTC crest turning insert for 11 threads per inch and coarser (P ≥ 3mm)

NOTE: NTC inserts automatically control root to crest dimensions. Therefore, in setting up threading operations with NTC inserts, check the O.D. or I.D. at the thread crest for correct dimensions.

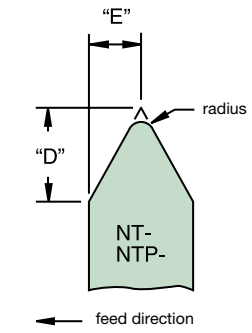
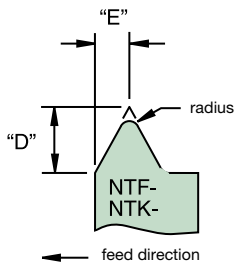
60° V-Thread Crest Turning Application Data

insert catalog number	nose radius on insert (inch)	thread radius per MIL-S-8879A (inch)
NJ-3014R/L12	.0125/.0135	.0125/.0150
NJK-3008R/L20	.0075/.0085	.0075/.0090

"J" thread note for catalog

The controlled root radius thread form (SAE8879C) is defined for the external thread only. To machine the corresponding internal thread, choose any insert that will cut a unified class 2B thread, then bore the minor diameter to size. Refer to SAE8879C and MIL-S-8879C and SAEAS8879D for the correct "J" thread minor diameter values.

60° V-Thread Application Data

insert description	insert	D** (inch)	E** (inch)	recommended TPI*		recommended TP*	
				external	internal	external	internal
	NT-1	.075	.044	–	24–12	–	1,00–2,00
	NT-2	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NT-2-K	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NTF-2	.062	.040	44–14	24–12	0,60–1,75	1,00–2,00
	NTK-2	.062	.040	44–14	24–12	0,60–1,75	1,00–2,00
	NTP-2	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NT-3	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-K	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-C	.148	.097	11–6	6 (only)	2,50–4,00	4,00 (only)
	NT-3-CK	.148	.097	11–6	6 (only)	2,50–4,00	4,00 (only)
	NTF-3	.083	.054	44–10	24–9	0,60–2,50	1,00–2,50
	NTK-3	.083	.054	44–10	24–9	0,60–2,50	1,00–2,50
	NTP-3	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-4	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25
	NT-4-K	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25
	NTP-4	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25

**Based on maximum insert radius size and class 2A and 2B thread specifications.*

TopThread™

API Thread Forms • Insert Applications Chart for API Rotary Shouldered Connections

thread form	WIDIA™ insert		tool joint application	minimum box size*
	cresting	non-cresting		
V-.038R 2" TPF 4 TPI	NDC-4038R/L2 4-E/IR4API382	ND-3038R/L	2-3/8 API internal flush 2-7/8 API internal flush 3-1/2 API internal flush 4 API internal flush 4-1/2 API internal flush 5-1/2 API internal flush 6-5/8 API internal flush 4 API full hole API #23, API #26, API #31, API #35, API #38, API #40, API #44, API #46, API #50	API #31 2-7/8 IF
V-.038R 3" TPF 4 TPI	NDC-4038R/L3 4-E/IR4API383	ND-3038R/L	API #56 API #61 API #70 API #77	API #56
V-.050 2" TPF 4 TPI	NDC-4050R/L2 4-E/IRAPI502	ND-4050R/L	5-1/2 API full hole 6-5/8 API regular 6-5/8 API full hole	5-1/2 API full hole
V-.050 3" TPF 4 TPI	NDC-4050R/L3 4-E/IR4API503	ND-4050R/L	5-1/2 API regular 7-5/8 API regular 8-5/8 API regular	5-1/2 API regular
V-.040 3" TPF 5 TPI	NDC-3040R/L3 NDC-4040R/L3 4-E/IR5API403	ND-3040R/L ND-4040R/L	2-3/8 API regular 2-7/8 API regular 3-1/2 API regular 4-1/2 API regular	3-1/2 API regular

**Minimum box size that can be threaded with a standard TopThread insert due to minimum bore equipment.*

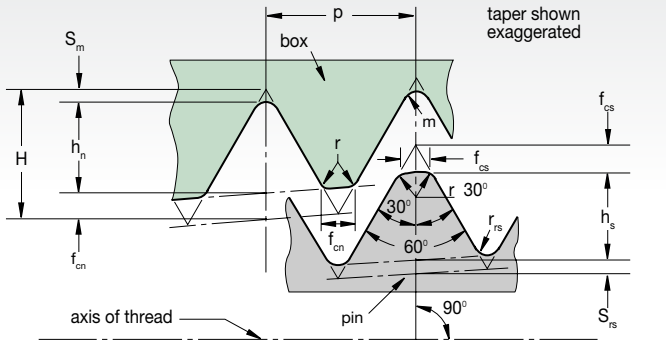
API Thread Forms

Product Thread Dimensions • Rotary Shouldered Connections (Inch)

threadform	taper inch per ft.	thread height, not truncated H	thread height, truncated $h_n=h_s$	root truncation $S_m=S_{rs}$ $f_m=f_{rs}$	crest truncation $f_{cn}=f_{cs}$	width of flat		root radius $r_m=r_{rs}$	radius at thread corners r	pitch p
						crest $f_{cn}=f_{cs}$	crest $f_m=f_{rs}$			
V-.038R	2	.216005	.121844	.038000	.056161	.065	—	.038	.015	.250
V-.038R	3	.215379	.121381	.038000	.055998	.065	—	.038	.015	
V-.040	3	.172303	.117842	.020000	.034461	.040	—	.020	.015	.250
V-.050	3	.215379	.147303	.025000	.043076	.050	—	.025	.015	
V-.050	2	.216005	.147804	.025000	.043201	.050	—	.025	.015	.250

NOTE: All dimensions in inches.

V-.040 and V-.050 Product Thread Form

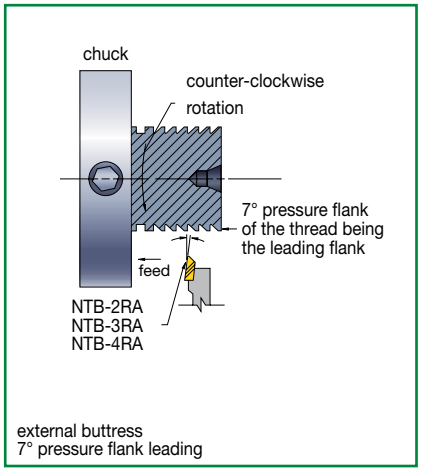


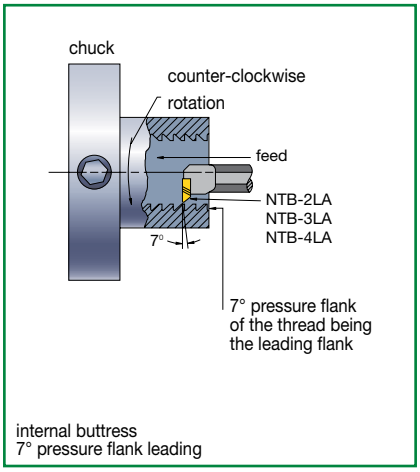
Casing and Tubing Round Thread (Height Dimensions)

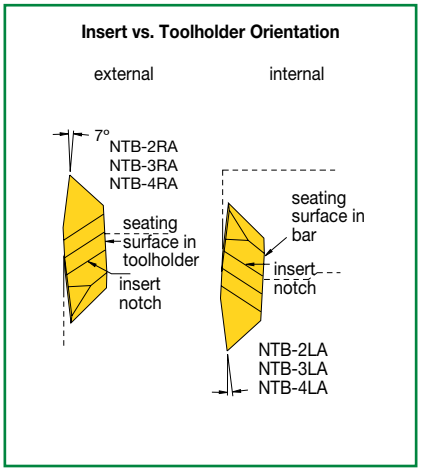
thread element		10 TPI p= .1000	8 TPI p= .1250
H	= .866p	.08660	.10825
$H_s = h_n$	= .626p - .007	.05560	.07125
$S_{rs} = S_m$	= .120p + .002	.01400	.01700
$S_{cs} = S_{cn}$	= .120p + .005	.01700	.02000

TopThread™

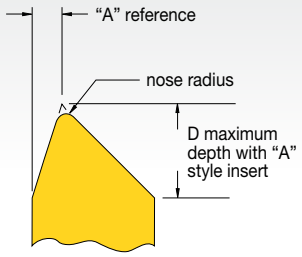
American Buttress (7° Pressure Flank Leading) NTB-A Inserts • Push Type







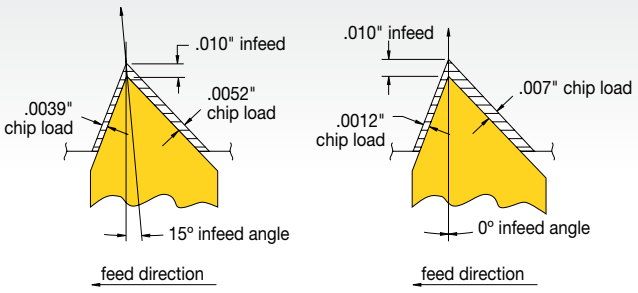
Reference Dimensions



insert	D (inch)	"A" ref. (inch)	nose radius (inch)	pitch based on maximum radius
NTB-2A	.133	.024	.002–.004	16–20 TPI
NTB-3A	.171	.031	.005–.008	8–16 TPI
NTB-4A	.218	.049	.008–.012	4–6 TPI

NOTE: For balanced chip load, 15° infeed angle is suggested.

Infeed Angle vs. Chip Load: 7° Pressure Flank Leading



NTB-A insert

Internal Threading Limitations

internal threading limitations
NTB-2A Buttress threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
8	1-3/4	1.600
10	1-5/8	1.505
12	1-1/2	1.400
16	1-1/4	1.175
20	1-1/16	1.002

internal threading limitations
NTB-3 and NTB-4A Buttress threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
4*	2-1/2	2.200
5	2-1/4	2.010
6	2	1.800
8	1-3/4	1.600
10	1-5/8	1.505
12**	1-1/2	1.400

**NTB-4A insert only.*
***Can cut 16 or 20 threads per inch provided minor diameter is 1.375" or larger.*

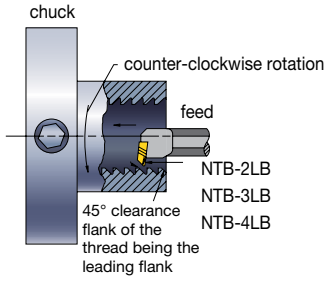
Threads per Inch vs. Maximum Root Radius Chart (Inch)

TPI	20	16	12	10	8	6	5	4	3	2-1/2	2	1-1/2	1-1/4	1
maximum root radius	.0036	.0045	.0059	.0071	.0089	.0119	.0143	.0179	.0238	.0268	.0375	.0476	.0572	.0714

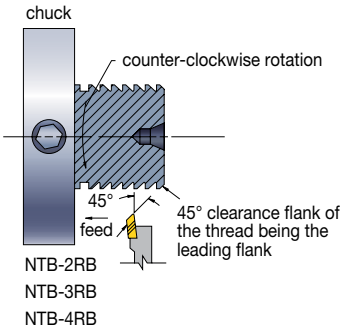
NOTE: Special buttress forms are available upon request.

TopThread™

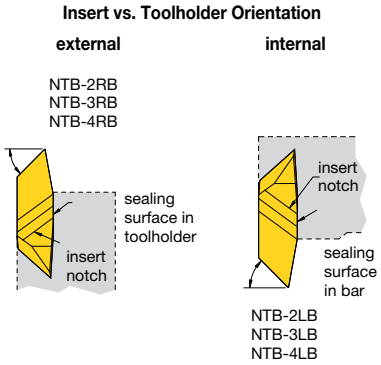
American Buttress (45° Clearance Flank Leading): NTB-B Inserts • Pull Type



Internal Buttress 45° clearance flank leading

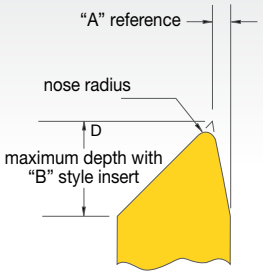


External Buttress 45° clearance flank leading

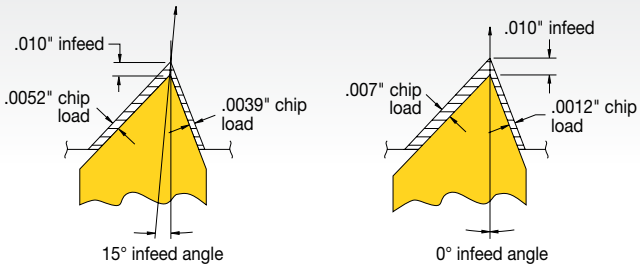


45° clearance flank leading

Reference Dimensions



Infeed Angle vs. Chip Load: 45° Clearance Flank Leading



NTB-B insert

insert	D (inch)	"A" reference (inch)	nose radius (inch)	pitch based on maximum radius
NTB-3B	.171	.031	.005–.004	8–16 TPI

NOTE: For balanced chip load, a reverse 15° infeed angle is suggested.

Internal Threading Limitations

internal threading limitations
NTB-2B Buttress threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
8	1-3/4	1.600
10	1-5/8	1.505
12	1-1/2	1.400
16	1-1/4	1.175
20	1-1/16	1.002

internal threading limitations
NTB-3 and NTB-4B Buttress threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
4*	2-7/8	2.575
5	2-3/4	2.510
6	2-3/8	2.175
8	2-1/8	1.975
10	1-7/8	1.755
12	1-5/8	1.525
16	1-1/2	1.407
20	1-7/16	1.378

**NTB-4B insert only.*

External Laydown Threading

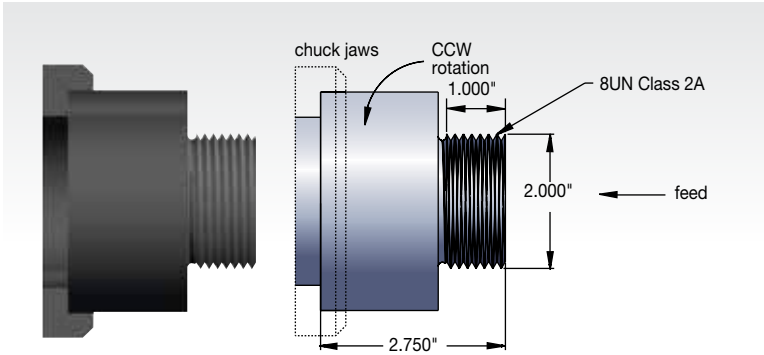
Required Information

From Part Drawing:

material:	316SS, 200 HB
thread form:	8UN
tolerance:	class 2A
operation:	external threading
pitch diameter:	2.00" x 1.00" deep

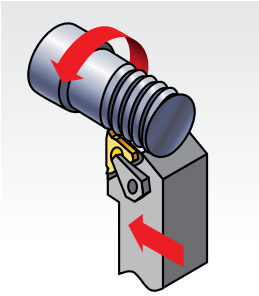
From Machine Setup Data:

tooling:	.750" x .750"
spindle rotation:	counter-clockwise
feed:	toward chuck



Steps for a Successful Threading Operation

Step 1 • Determine Threading Method



Need to Know:

- Operation (external).
- Spindle rotation (CCW). Counter-clockwise rotation.
- Feed direction (toward chuck).
- Right-hand toolholder.
- Right-hand insert (ER).
- Standard helix method.

Step 2 • Select Insert



Need to Know:

- Thread form (8 UN Class 2A).
- Hand of insert (right hand — ER).

Choose the High-Performance Solution

catalog number	insert size	TN6025
3ER8UN	3"	•

High-Performance Selection

NOTE: Use insert with largest iC available.

insert: 3ER8UN
grade: TN6025
speed: 500 SFM

Step 3 • Select the Grade and Speed

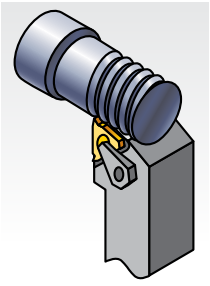
Need to Know:

- Workpiece material (316SS-200HB).
- Operation (external).

Options: Grade and Speed Selection Guidelines

threading operation	stainless steel
external	general purpose and high performance
	TN6025
	150–450 SFM

Step 4 • Select Toolholder



Need to Know:

- External or internal operation (external).
- Pitch diameter to determine minimum bore diameter (N/A).
- Type of tooling — toolholder, boring bar (toolholder).
- Hand of tool (right hand).
- Insert size (3/8").

Options:

catalog number	insert size	shim
LSASR-123	3"	SM-YE3

First choice: LSASR-123 holder

Step 5 • Select Shim

Need to Know:

- Thread form — TPI or pitch (8 TPI).
- Pitch diameter (2").
- Helix method (standard). See Laydown Threading (LT) shim selection chart.

Select SM-YE3 shim

NOTE: The SM-YE3 shim is supplied with the selected toolholder.

Internal Laydown Threading

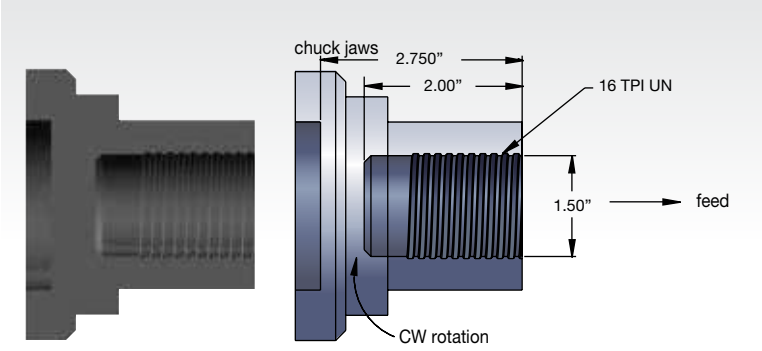
Required Information

From Part Drawing:

material:	4140 steel
thread form:	16 TPI UN
tolerance:	class 2B
operation:	internal threading
pitch diameter:	1.5" x 2" deep

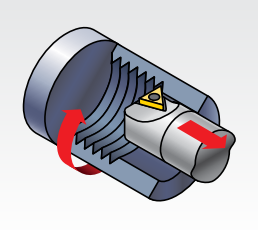
From Machine Setup Data:

tooling:	.075" boring bar
spindle rotation:	clockwise
feed:	away from chuck



Steps for a Successful Threading Operation

Step 1 • Determine Threading Method



Need to Know:

- Operation (internal).
- Spindle rotation (CW). Clockwise rotation.
- Feed direction (away from chuck).
- Left-hand toolholder.
- Left-hand insert (NL).
- Reverse helix method.

Step 2 • Select Insert



Need to Know:

- Thread form (16UN Class 2B).
- Hand of insert (left hand — NL).

Choose the High-Performance Solution

catalog number	insert size	TN6025
2ILA60	2"	•
3ILA60	3"	•

High-Performance Selection

NOTE: Use insert with largest possible iC to go into the bore.
insert: 3ILA60
grade: TN6025
speed: 450 SFM

Step 3 • Select the Grade and Speed

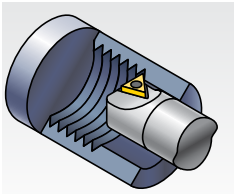
Need to Know:

- Workpiece material (4010 steel).
- Operation (internal).

Options: Grade and Speed Selection Guidelines

threading operation	steel
internal	general purpose and high performance
	TN6025
	100–550 SFM

Step 4 • Select Toolholder



Need to Know:

- External or internal operation (internal).
- Pitch diameter to determine minimum bore diameter for internal operations (1.5").
- Type of tooling — toolholder, boring bar (boring bar).
- Hand of tool (left hand).
- Insert size (3/8").

Options:

catalog number	insert size	minimum bore diameter	shim
S1212-LSEL3	3"	.90	SM-YE3
S0812-LSEL2	2"	.65	—

First choice: S1212-LSEL3 bar

Step 5 • Select Shim

Need to Know:

- Thread form — TPI or pitch (16 TPI).
- Pitch diameter (1.5").
- Helix method (reverse). See Laydown Threading (LT) shim selection chart.

Select SM-YE3-2N shim

NOTE: For this application, the standard shim supplied should be replaced with the recommended shim, SM-YE3-2N.

Laydown Threading

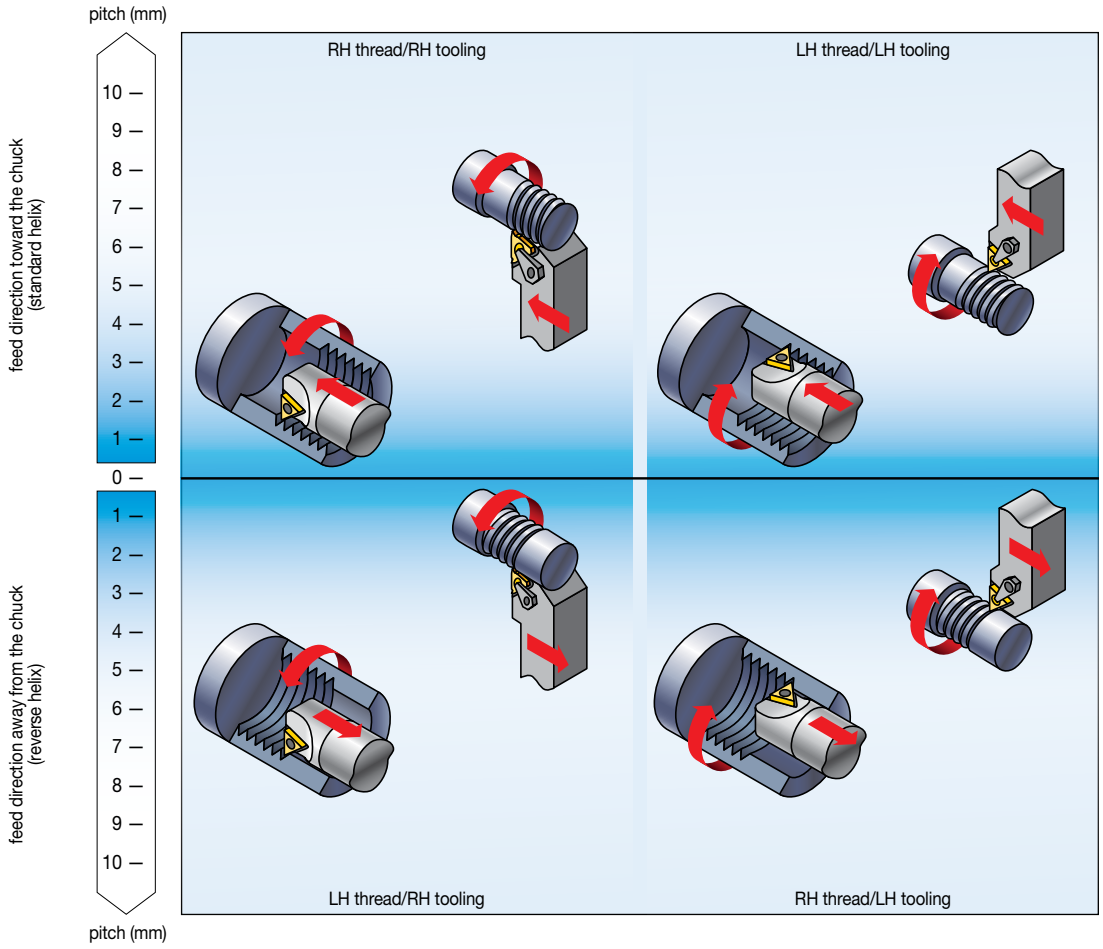
Laydown Threading Shim Selection Guidelines

It is essential to select the correct shim to ensure thread quality and maximum tool life.
These parameters are needed:

- Pitch
- Pitch diameter
- Number of starts
- Feed direction

NOTE: When considering method of thread cutting, the part's shape and stability and the flow of chips are determining factors in your decision.

Laydown Selection Chart



NOTE: For multi-start threads, use the lead value instead of the pitch.

Diagram of Thread Lead Angles

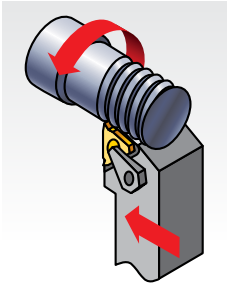
To calculate the lead angle of a given thread, use this formula:

$$\beta = \text{Arctan} \frac{P \bullet S}{\pi D_e}$$

ß = thread lead angle
D_e = effective pitch diameter of thread wear
P = 1/TPI
TPI = threads per inch
S = number of starts
single-start, lead = pitch
multiple-start, lead = pitch (x) number of starts

All toolholders are designed with an inclination angle = 1.5°. When turning standard threads with a lead angle of 1–2°, this guarantees adequate clearance at the flanks of the insert's thread tooth. The thread lead angle and the required inclination angle of the insert are given by ß.

Cutting edge height is constant at every shim and insert combination. All toolholders are supplied with 1-1/2° lead angle.



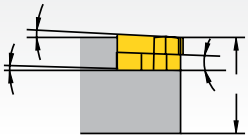
Laydown Threading

Laydown Threading Shim Selection Table • Inch

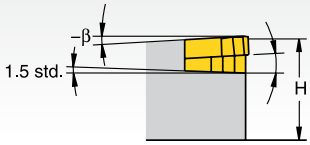
toolholder			shim ordering code (inch)							
insert size	external	internal				standard				
3 (3/8")	RH	LH	SM–YE3–3P	SM–YE3–2P	SM–YE3–1P	SM–YE3	SM–YE3–1N	SM–YE3–1.5N	SM–YE3–2N	SM–YE3–3N
3 (3/8")	LH	RH	SM–YI3–3P	SM–YI3–2P	SM–YI3–1P	SM–YI3	SM–YI3–1N	SM–YI3–1.5N	SM–YI3–2N	SM–YI3–3N
4 (1/2")	RH	LH	SM–YE4–3P	SM–YE4–2P	SM–YE4–1P	SM–YE4	SM–YE4–1N	SM–YE4–1.5N	SM–YE4–2N	SM–YE4–3N
4 (1/2")	LH	RH	SM–YI4–3P	SM–YI4–2P	SM–YI4–1P	SM–YI4	SM–YI4–1N	SM–YI4–1.5N	SM–YI4–2N	SM–YI4–3N
TPI		pitch (mm)	pitch diameter (inch)							
72		–	–	–	–	0.12–0.31	0.32–0.84	>0.84	0.84–0.32	0.31–0.12
–		0,35	–	–	–	0.12–0.3	0.31–0.84	>0.84	0.84–0.31	0.3–0.12
64		–	–	–	–	0.14–0.35	0.36–0.95	>0.95	0.95–0.36	0.35–0.14
–		0,40	–	–	–	0.14–0.35	0.36–0.96	>0.96	0.96–0.36	0.35–0.14
56		0,45	–	–	–	0.16–0.4	0.41–1.09	>1.09	1.09–0.41	0.4–0.16
–		0,50	–	–	0.11–0.16	0.17–0.44	0.45–1.2	>1.20	1.2–0.45	0.44–0.17
48		–	–	–	0.12–0.17	0.18–0.46	0.47–1.27	>1.27	1.27–0.47	0.46–0.18
44		–	–	–	0.13–0.19	0.2–0.51	0.52–1.38	>1.38	1.38–0.52	0.51–0.2
–		0,60	–	0.1–0.12	0.13–0.2	0.21–0.53	0.54–1.44	>1.44	1.44–0.54	0.53–0.21
40		–	–	0.11–0.13	0.14–0.21	0.22–0.56	0.57–1.52	>1.52	1.52–0.57	0.56–0.22
–		0,70	–	0.12–0.15	0.16–0.23	0.24–0.62	0.63–1.68	>1.68	1.68–0.63	0.62–0.24
36		–	–	0.12–0.15	0.16–0.23	0.24–0.62	0.63–1.69	>1.69	1.69–0.63	0.62–0.24
–		0,75	0.11–0.12	0.13–0.16	0.17–0.25	0.26–0.66	0.67–1.8	>1.80	1.8–0.67	0.66–0.26
32		–	0.12–0.13	0.14–0.17	0.18–0.26	0.27–0.7	0.71–1.9	>1.90	1.9–0.71	0.7–0.27
–		0,80	0.12–0.13	0.14–0.17	0.18–0.26	0.27–0.71	0.72–1.91	>1.91	1.91–0.72	0.71–0.27
28		–	0.14–0.14	0.15–0.19	0.2–0.3	0.31–0.8	0.81–2.17	>2.17	2.17–0.81	0.8–0.31
27		–	0.14–0.15	0.16–0.2	0.21–0.31	0.32–0.83	0.84–2.25	>2.25	2.25–0.84	0.83–0.32
–		1,00	0.15–0.16	0.17–0.21	0.22–0.33	0.34–0.89	0.9–2.39	>2.39	2.39–0.9	0.89–0.34
24		–	0.16–0.17	0.18–0.23	0.24–0.35	0.36–0.94	0.95–2.53	>2.53	2.53–0.95	0.94–0.36
–		1,25	0.19–0.2	0.21–0.27	0.28–0.42	0.43–1.11	1.12–2.99	>2.99	2.99–1.12	1.11–0.43
20		–	0.19–0.21	0.22–0.27	0.28–0.42	0.43–1.13	1.14–3.04	>3.04	3.04–1.14	1.13–0.43
18		–	0.21–0.23	0.24–0.31	0.32–0.47	0.48–1.26	1.277–3.38	>3.38	3.38–1.27	1.26–0.48
–		1,50	0.22–0.25	0.26–0.33	0.34–0.5	0.51–1.34	1.35–3.59	>3.59	3.59–1.35	1.34–0.51
16		–	0.24–0.26	0.27–0.35	0.36–0.53	0.54–1.41	1.42–3.8	>3.80	3.8–1.42	1.41–0.54
–		1,75	0.26–0.29	0.3–0.38	0.39–0.59	0.6–1.56	1.57–4.19	>4.19	4.19–1.57	1.56–0.6
14		–	0.27–0.3	0.31–0.4	0.41–0.61	0.62–1.62	1.63–4.34	>4.34	4.34–1.63	1.62–0.62
13		–	0.29–0.32	0.33–0.43	0.44–0.66	0.67–1.74	1.75–4.68	>4.68	4.68–1.75	1.74–0.67
–		2,00	0.3–0.33	0.34–0.44	0.45–0.67	0.68–1.78	1.79–4.79	>4.79	4.79–1.79	1.78–0.68
12		–	0.32–0.35	0.36–0.46	0.47–0.71	0.72–1.89	1.9–5.07	>5.07	5.07–1.9	1.89–0.72
11.5		–	0.33–0.37	0.38–0.49	0.5–0.74	0.75–1.97	1.98–5.29	>5.29	5.29–1.98	1.97–0.75
11		–	0.34–0.38	0.39–0.51	0.52–0.78	0.79–2.06	2.07–5.53	>5.53	5.53–2.07	2.06–0.79
–		2,50	0.37–0.42	0.43–0.55	0.56–0.84	0.85–2.23	2.24–5.98	>5.98	5.98–2.24	2.23–0.85
10		–	0.38–0.42	0.43–0.56	0.57–0.86	0.87–2.27	2.28–6.08	>6.08	6.08–2.28	2.27–0.87
9		–	0.42–0.47	0.48–0.62	0.63–0.95	0.96–2.52	2.53–6.75	>6.75	6.75–2.53	2.52–0.96
–		3,00	0.45–0.5	0.51–0.66	0.67–1.02	1.03–2.68	2.69–7.18	>7.18	7.18–2.69	2.68–1.03
8		–	0.47–0.53	0.54–0.7	0.71–1.08	1.09–2.84	2.85–7.6	>7.60	7.6–2.85	2.84–1.09
–		3,50	0.52–0.59	0.6–0.77	0.78–1.19	1.2–3.13	3.14–8.38	>8.38	8.38–3.14	3.13–1.2
7		–	0.524–0.61	0.62–0.8	0.81–1.23	1.24–3.25	3.26–8.68	>8.68	8.68–3.26	3.25–1.24
–		4,00	0.6–0.67	0.68–0.89	0.9–1.36	1.37–3.58	3.59–9.57	>9.57	9.57–3.59	3.58–1.37
6		–	0.63–0.71	0.72–0.94	0.95–1.44	1.45–3.79	3.8–10.13	>10.13	10.13–3.8	3.79–1.45
–		5,00	0.75–0.84	0.85–1.11	1.12–1.7	1.71–4.48	4.49–11.97	>11.97	11.97–4.49	4.48–1.71
5		–	0.76–0.86	0.87–1.13	1.14–1.73	1.74–4.55	4.56–12.16	>12.16	12.16–4.56	4.55–1.74
4.5		–	0.84–0.95	0.96–1.26	1.27–1.92	1.93–5.06	5.07–13.51	>13.51	13.51–5.07	5.06–1.93
–		6,00	0.9–1.01	1.02–1.33	1.34–2.04	2.05–5.37	5.38–14.36	>14.36	14.36–5.38	5.37–2.05
4		–	0.95–1.07	1.08–1.41	1.42–2.16	2.17–5.69	5.7–15.2	>15.20	15.2–5.7	5.69–2.17
inclination angle			4.5	3.5	2.5	1.5	0.5	0.0	-0.5	-1.5
			standard helix (feed toward the chuck)						reverse helix (feed away from the chuck)	

1. Select TPI or pitch from the left-hand columns.
2. Follow row to specified pitch diameter and the correct feed direction.
3. Follow the column to the top for the required shim based on the toolholder and insert size.

standard helix method:
Used when RH thread is cut with RH tool or LH thread with LH tool.



reverse helix method:
Used when RH thread is cut with LH tool or when LH thread is cut with RH tool.





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Turning Icons

 Shank: KM-TS™ (ISO 26622)	 ISO: 26622	 Through Coolant: 100 bar	 Through Coolant: 100 bar	 Turning
 Cut-off	 I.D. Turning	 I.D. Chamfering	 I.D. Grooving	 I.D. Face Grooving
 I.D. Internal Threading	 Profiling	 Facing	 Face Grooving	 Back Boring
 Threading	 Grooving			

Indexable Milling Icons

 Countersinking	 Face Milling	 Helical Milling	 Plunge Milling	 Ramping Blank
 Slotting: Ball Nose	 Slotting: Side Milling	 Slotting: Side Milling with AE/AP Dimensions	 Slotting: Square End	 Slotting: T
 Side Milling/Shoulder Milling: Ball Nose	 Side Milling/Shoulder Milling: Square End	 Side Milling: Square End with AE/AP Dimensions	 Chamfer Milling	 Side Milling: Roughing
 3D Profiling	 PCD Tool	 Pocketing	 Plain Shank	 Shell Mill Shank
 Weldon® Shank	 Weldon Shank: 2 Flat	 Screw-On Shank	 Shank	 Through Coolant: Radial: Indexable Milling

Solid End Milling Icons

 Plunge Milling	 Ramping Blank	 Slotting: Ball Nose	 Slotting: Ball Nose with AP Dimension	 Slotting: Square End
 Slotting: Square End with AP Dimension	 Trochoidal Milling	 Trochoidal Milling: Ball Nose	 Side Milling/Shoulder Milling: Ball Nose	 Side Milling/Shoulder Milling: Ball Nose with AE/AP Dimension
 Side Milling/Shoulder Milling: Square End	 Side Milling/Shoulder Milling: Square End with AE/AP Dimension	 Chamfer Milling	 Chamfer Milling: Chamfer Milling with AE/AP Dimension	 3D Profiling
 PCD Tool	 HSS-PM Material	 HSS-M42	 Corner Style: Ball Nose	 Corner Style: Corner Chamfer
 Corner Style: Corner Radius	 Corner Style: Square End	 Corner Style: Torus	 Helix Angle: 0°	 Helix Angle: 15°
 Helix Angle: 20°	 Helix Angle: 25°	 Helix Angle: 30°	 Helix Angle: 35°	 Helix Angle: 37°
 Helix Angle: 38°	 Helix Angle: 40°	 Helix Angle: 45°	 Helix Angle: 45°	 Helix Angle: 60°
 Helix Angle: 43°	 DIN 6528	 DIN 844	 DIN 1835B	 DIN 6527
Through Coolant: Radial: Drilling	Through Coolant: Axial: Solid End Mill	Tool Dimensions: Flute Configuration: X (Variable)	Tool Dimensions: Flute Configuration: 1	Tool Dimensions: Flute Configuration: 2
Tool Dimensions: Flute Configuration: 3	Tool Dimensions: Flute Configuration: 4	Tool Dimensions: Flute Configuration: 5	Tool Dimensions: Flute Configuration: 6	Tool Dimensions: Flute Configuration: 7
Manufacturer's Specs: JIS				

Holemaking Icons

 Countersinking/ Stroke Chamfering	 Drilling	 Chain Drilling	 Drilling: Cross Hole	 Drilling: Half Cylinder
 Drilling: Corner Drilling 45°	 Drilling: Inclined Entry	 Drilling: Inclined Exit	 Drilling: Exit Offset	 Drilling: Stacked Plates
 Drilling: Convex	 Drilled Hole	 Reaming: Through Hole	 Reaming: Blind Hole	 Reaming: Through Cross
 Reaming: Blind and Cross Holes	 Drilling Depth: 3x	 Drilling Depth: 5x	 Drilling Depth: 8x	 Drilling Depth: 12x
 Shank: Cylindrical Plain ≤h6	 Shank: Cylindrical Whistle Notch 2°	 Flat Shank	 Shank: Cylindrical with flat	 KM™ Shank
 Helix Angle 0°	 Helix Angle 30°	 DIN Number 212	 DIN Number 6535	 DIN Number 6537
 Through Coolant: Radial: Drilling	 Through Coolant: Radial: Drilling	 Through Coolant: Radial: Indexable Drilling	 Flood Coolant: Reaming	 Through Coolant: MQL (Minimum Quantity Lubricant): Drilling
 Axial: Drilling	 Through Coolant: Axial Reaming	 Tool Dimensions: 2-Flute/2-Margin/ Coolant	 Tool Dimensions: 2-Flute/4-Margin/ Coolant	

Tapping Icons

Tapping: Blind Hole	Threading: Through Hole	Threading: Blind Hole	HSS-E: High-Speed Steel with Cobalt Alloy for Materials with Higher Hardness	HSS-E-PM: High-Speed Steel with Cobalt Alloy for Materials with Higher Hardness (PM = Power Metal Steel)
HM: (Carbide)	Square Shank	Chamfer Form C (2–3)	Chamfer Form D (3.5–5)	Chamfer Form E (1.5–2)
Plug Chamfer (3–5)	Tapping Helix: Angle: 0°	Tapping Helix: Angle: 10°	Tapping Helix: Angle: L8°	Tapping Helix: Angle: 15°
Tapping Helix: Angle: L15°	Tapping Helix: Angle: 25°	Tapping Helix: Angle: 30°	Tapping Helix: Angle: 42°	Tapping Helix: Angle: 45°
DIN Number 371	DIN Number 374	DIN Number 2174	DIN Number 376	Tapping: Through Coolant
Flood Coolant: Tapping	Through Coolant: Axial: Tapping	ISO 2	Manufacturer's Specs: JIS	Class of Fit: 2B
Class of Fit: 3B	Class of Fit: 6H	Class of Fit: 6HX	Class of Fit: 6G	ANSI
Unified Course Thread: J Profile	Unified Fine Thread: J Profile	Unified Fine Thread	Unified Course Thread	ISO Metric Coarse Thread
ISO Metric Fine Thread				

DIN — German Institute for Standardization
ISO — International Standardization Organization

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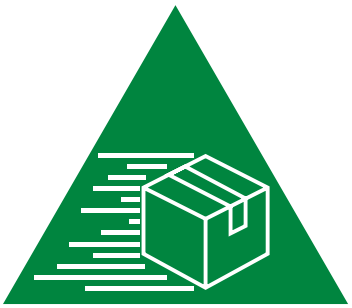
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Material Cross Reference • ANSI

P	Steel	N	Non-Ferrous	H	Hardened Materials
M	Stainless Steel	S	High-Temp Alloys	C	CFRP Materials
K	Cast Iron				

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	–	A36, 1008, 1010, 1018 through 1029; 1108, 1117
P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	10L18, 1200 Series, 1213, 12L14
P2	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	1035, 1045, 10L45, 1050, 10L50, 1080, 1137, 1144, 11L44, 1525, 1545, 1572
P3	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
P4	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
P5	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
M1	Austenitic Stainless Steel	–	<600	130–200	–	200 Series, 301, 302, 304, 304L, 309
M2	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	310, 316, 316L, 321, 347, 384 ASTM Cast XM-1, XM-5, XM-7, XM-21
M3	Duplex Stainless Steel	–	<800	135–275	<30	323, 329, F55, 2205, S329000
K1	Gray Cast Iron	–	125–500	120–290	<32	class 20, 25, 30, 35, 40, 45, 50, 55, 60, G1800, G3000, G3500, G4000
K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	60-40-18, 65-45-12, 80-55-06; SAE J434: D4018, D4512, D5506; ASTM A47: Grade 32510, 35018; SAE J158: Grade M3210, M4504, M5003, M5503, M7002; ASTMA842: Grade 250, 300, 350, 400, 450
K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	ASTM A536:100-70-03, 120-90-02, SAE J434: D7003, SAE J158: Grade M8501AST A897: 125-80-10, 150-100-7, 175-125-4, 200-150-1, 230-185
N1	Wrought Aluminum	–	–	–	–	2025, 5050, 7050, 1000, 2017
N2	Low-Silicon Aluminum Alloys and Magnesium Alloys	Si <12,2%	–	–	–	2024, 6061, 7075
N3	High-Silicon Aluminum Alloys and Magnesium Alloys	Si >12,2%	–	–	–	–
N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	C81500
N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass	–	–	–	–	–
N6	Carbon, Graphite Composites, CFRP	–	–	–	–	Graphite, CFK, CFRP
N7	Metal Matrix Composites (MMC)	–	–	–	–	C63000
S1	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	A-286, INCOLOY® 800 Series, A608, A567, Discaloy, INVAR®, N-155, 16-25-6, 19-9 DL; Cast: ASTM A-297, A-351, A-567, A-608
S2	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 25 (L605), Haynes 188, J-1570, Stellite™, AiResist 213; Cast: AiResist 13, Haynes 21, MAR-M302, MAR-M509, NASA Co-W-Re, WI-52
S3	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	Astroloy™, Hastelloy® B/C/ C-276 /X, INCONEL® 600 and 700 Series, IN102, INCOLOY 900 Series, Rene 41, Waspalloy, MONEL®, K-500, MAR-M20, NIMONIC®, UDIMET®
S4	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Pure: Ti 98.8, Ti 98.9,Ti 99.9; Alloyed: Ti 5Al-2.5Sn, Ti6Al-4V, Ti6Al-2Sn-4Zr-2Mo, Ti-3Al-8V-6Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al
H1	Hardened Materials	–	–	–	44–48	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H2	Hardened Materials	–	–	–	48–55	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H3	Hardened Materials	–	–	–	56–60	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H4	Hardened Materials	–	–	–	>60	Tool Steel H10, H11, H13, D2, D3, 4340, P20
C1	CFRP, CFRP/CFRP	–	–	–	–	–
C2	CFRP/Non-Ferrous	–	–	–	–	–
C3	CFRP/High-Temp	–	–	–	–	–
C4	CFRP/Stainless Steel	–	–	–	–	–
C5	CFRP/Non-Ferrous/High-Temp	–	–	–	–	–

P	Steel	N	Non-Ferrous	H	Hardened Materials
M	Stainless Steel	S	High-Temp Alloys	C	CFRP Materials
K	Cast Iron				

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	–	–
P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	C15, Ck22, ST37-2, S235JR, 9SMnPb28, GS38
P2	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	ST52, S355JR, C35, GS60, Cf53
P3	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	16MnCr5, Ck45, 21CrMoV5-7, 38SMn28
P4	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
P5	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	X102CrMo17, G-X120Cr29
M1	Austenitic Stainless Steel	–	<600	130–200	–	X5CrNi 18 10, X2CrNiMo 17 13 2, G-X25CrNiSi18 9, X15CrNiSi 20 12
M2	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	X2CrNiMo 13 4, X5NiCr 32 21, X5CrNiNb 18 10, G-X15CrNi 25-20
M3	Duplex Stainless Steel	–	<800	135–275	<30	X8CrNiMo27 5, X2CrNiMoN22 5 3, X20CrNiSi25 4, G-X40CrNiSi27 4
K1	Gray Cast Iron	–	125–500	120–290	<32	GG15, GG25, GG30, GG40, GTW40
K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	GGG40, GTS35
K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	GGG60, GTW55, GTS65
N1	Wrought Aluminum	–	–	–	–	AlMg1, Al99.5, AlCuMg1, AlCuBiPb, AlMgSi1, ALMgSiPb
N2	Low-Silicon Aluminum Alloys and Magnesium Alloys	Si <12,2%	–	–	–	GAlSiCu4, GDAlSi10Mg
N3	High-Silicon Aluminum Alloys and Magnesium Alloys	Si >12,2%	–	–	–	G-ALSi12, G-AlSi17Cu4, G-AlSi21CuNiMg
N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	CuZn40, Ms60, G-CuSn5ZnPb, CuZn37, CuSi3Mn
N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass	–	–	–	–	LEXAN®, Hostalen™, Polystyrol®, MAKROLON®
N6	Carbon, Graphite Composites, CFRP	–	–	–	–	CFK, GFK
N7	Metal Matrix Composites (MMC)	–	–	–	–	–
S1	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	X1NiCrMoCu32 28 7, X12NiCrSi36 16, X5NiCrAlTi31 20, X40CoCrNi20 20
S2	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 188, Stellite™ 6,21,31
S3	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	INCONEL® 690, INCONEL 625, Hastelloy®, NIMONIC® 75
S4	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Ti1, TiAl5Sn2, TiAl6V4, TiAl4Mo4Sn2
H1	Hardened Materials	–	–	–	44–48	GX260NiCr42, GX330NiCr42, GX300CrNiSi952, GX300CrMo153, Hardox® 400
H2	Hardened Materials	–	–	–	48–55	–
H3	Hardened Materials	–	–	–	56–60	–
H4	Hardened Materials	–	–	–	>60	–
C1	CFRP, CFRP/CFRP	–	–	–	–	–
C2	CFRP/Non-Ferrous	–	–	–	–	–
C3	CFRP/High-Temp	–	–	–	–	–
C4	CFRP/Stainless Steel	–	–	–	–	–
C5	CFRP/Non-Ferrous/High-Temp	–	–	–	–	–

Notes

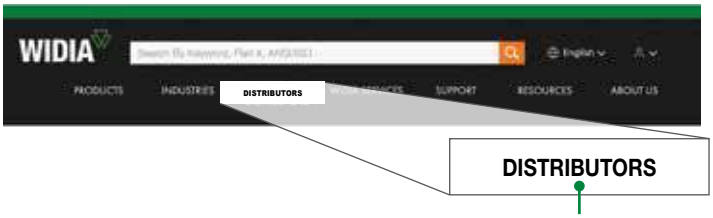
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IMPORTANT SAFETY INSTRUCTIONS: READ BEFORE USING THE TOOLS IN THIS CATALOG

METALCUTTING SAFETY

Projectile and Fragmentation Hazards

Modern metalcutting operations involve high spindle and cutter speeds and high temperatures and cutting forces. Hot metal chips may fly off the workpiece during metalcutting. Although cutting tools are designed and manufactured to withstand high cutting forces and temperatures, they can sometimes fragment, particularly if they are subjected to over-stress, severe impact, or other abuse.

To avoid injury:

- Always wear appropriate personal protective equipment, including safety goggles, when operating metalcutting machines or working nearby.
- Always make sure all machine guards are in place.

Breathing and Skin Contact Hazards

Grinding carbide or other advanced cutting tool materials produces dust or mist containing metallic particles. Breathing this dust or mist — especially over an extended period — can cause temporary or permanent lung disease or make existing medical conditions worse. Contact with this dust or mist can irritate eyes, skin, and mucous membranes and may make existing skin conditions worse.

To avoid injury:

- Always wear breathing protection and safety goggles when grinding.
- Provide ventilation control and collect and properly dispose of dust, mist, or sludge from grinding.
- Avoid skin contact with dust or mist.

For more information, read the applicable Material Safety Data Sheet provided by WIDIA and consult General Industry Safety and Health Regulations, Part 1910, Title 29 of the Code of Federal Regulations.

These safety instructions are general guidelines. Many variables affect machining operations. It is impossible to cover every specific situation. The technical information included in this catalog and recommendations on machining practices may not apply to your particular operation.

For more information, consult the WIDIA Metalcutting Safety booklet, available free from WIDIA at +1 724 539 5747 or fax +1 724 539 5439. For specific product safety and environmental questions, contact our Corporate Environmental Health and Safety Office at +1 724 539 5066 or fax +1 724 539 5372.

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