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.

Table of Contents

Rotating Tools

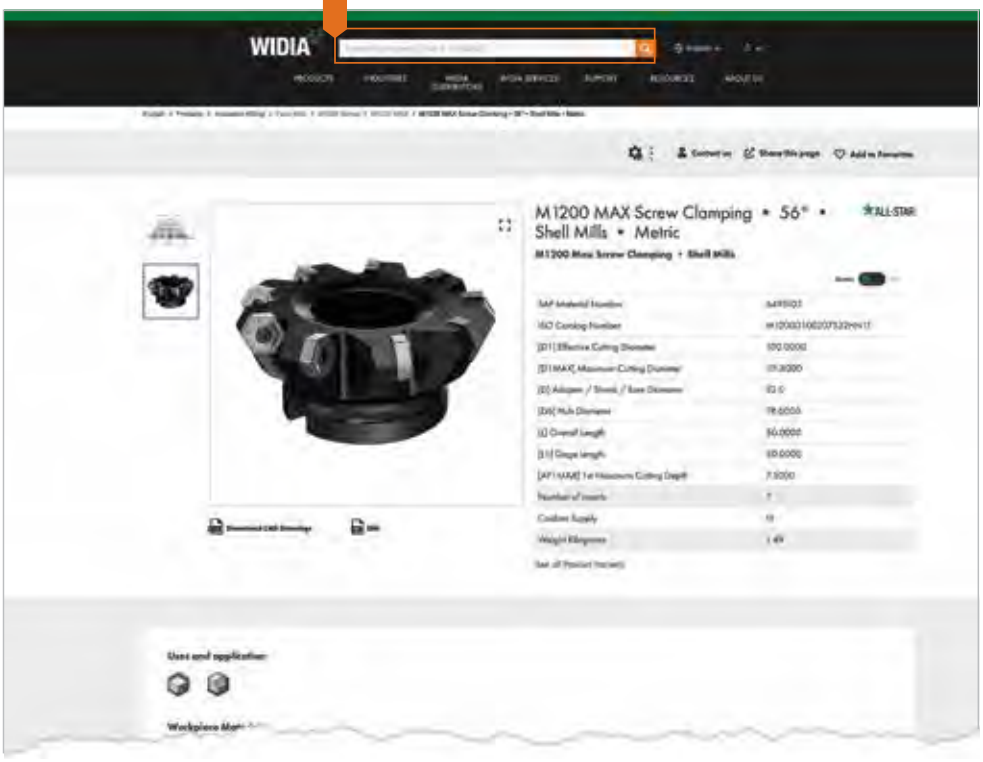
Stationary Tools

Spare Parts & Accessories Information

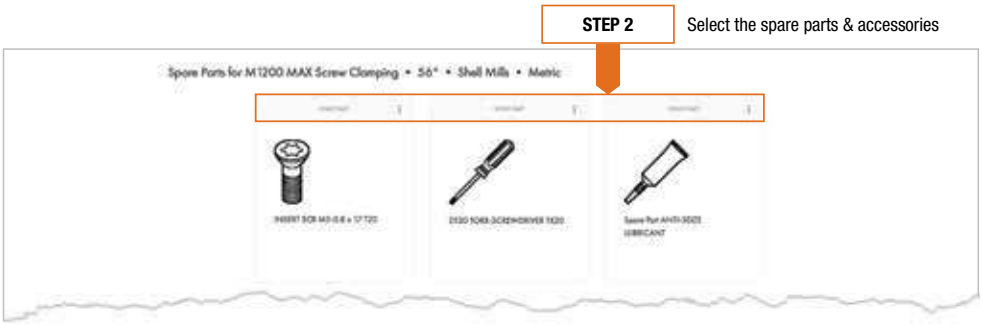
Lost a screw? Have to replace worn-out clamping wedges?
Need to find and re-order those spare parts?

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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www.linkedin.com/company/widiatools/

www.instagram.com/widiatools/

www.facebook.com/widiatools

widia.com

WIDIA™

TO SEE ALL PRODUCT LINES, VISIT OUR DIGITAL RESOURCES

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

widia.com

www.youtube.com/c/widiatools

www.linkedin.com/company/widiatools/

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

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.

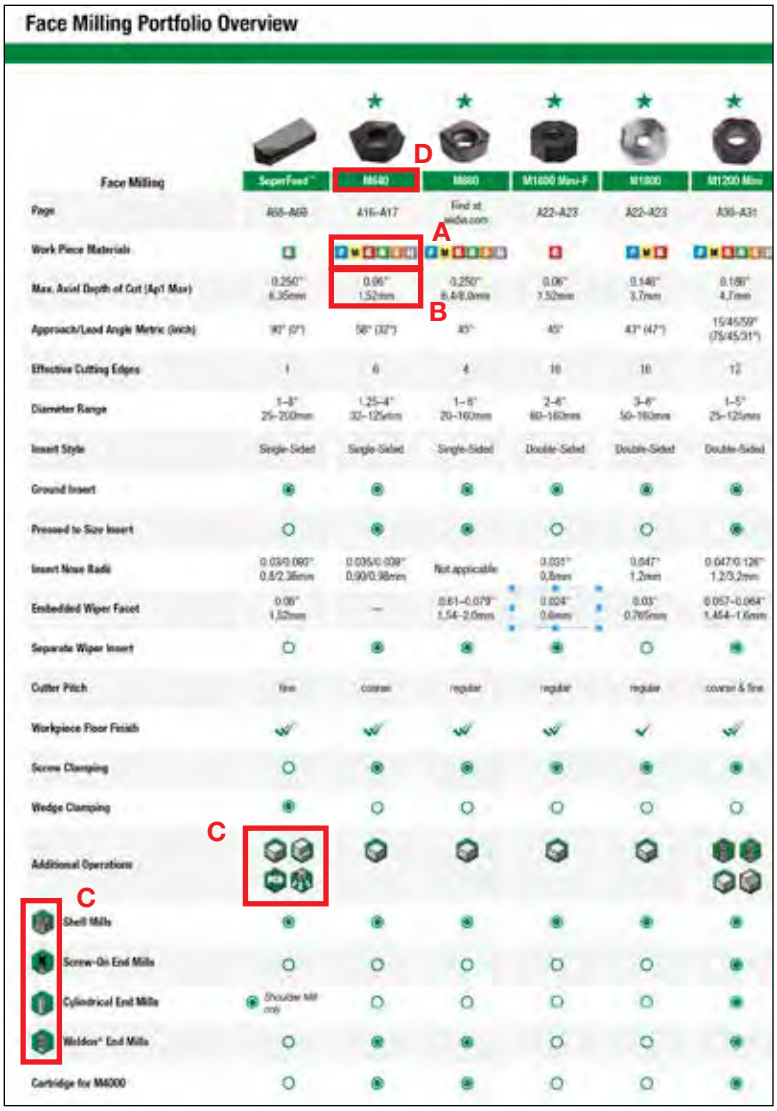
2. Select tool based on maximum depth of cut and diameter required:

   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.

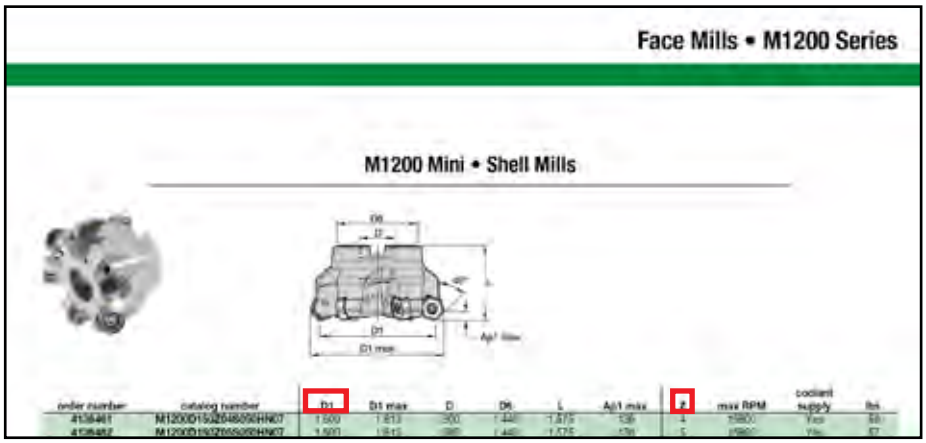
Determining Cutting Data

Selecting Tool Body, Insert, and Cutting Data

4. Choose the tool body:

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

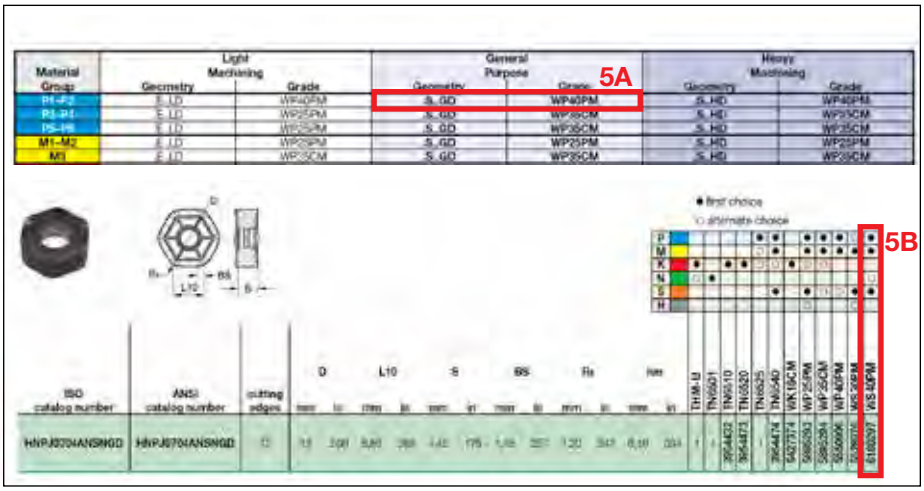
NOTE: Make sure you select the correct shank style for your toolholder. For toolholders, visit widia.com.



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.

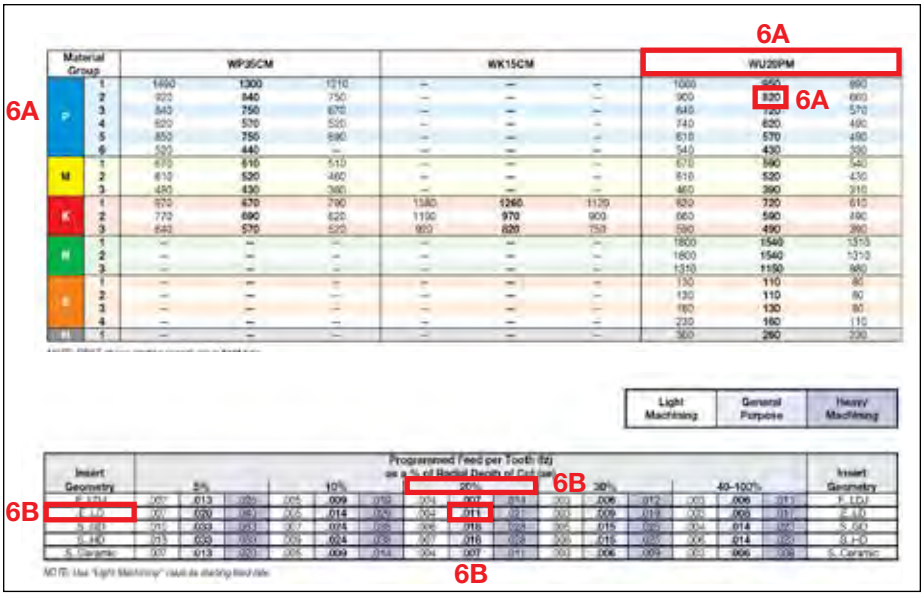


6. Determine cutting data — with the WIDIA Recommended Speeds and Feeds tables:

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.

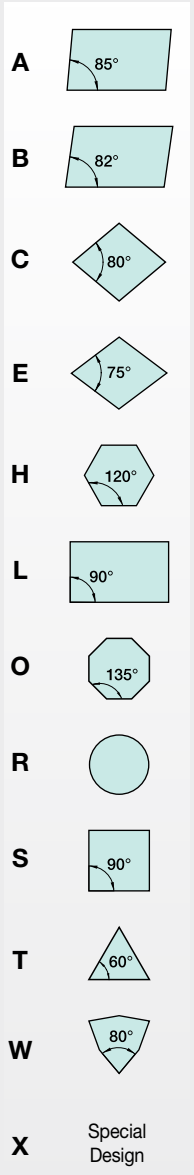
Starting values are given in bold.



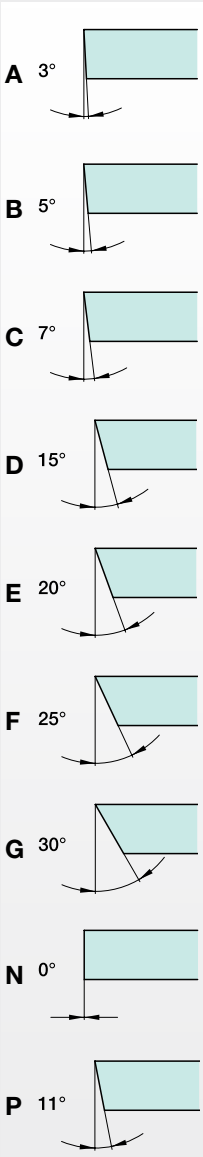
Inserts • Catalog Numbering System

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

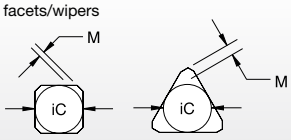


P
Tolerance Class

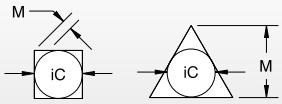
J
Geometry and Clamping Type

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				

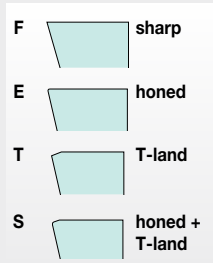
*See table above for tolerances according to insert size and class.
**WIDIA standard only.

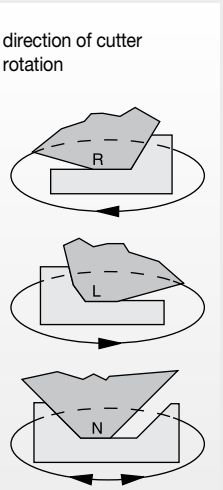
Inserts • Catalog Numbering System

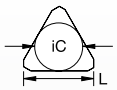
(continued)

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

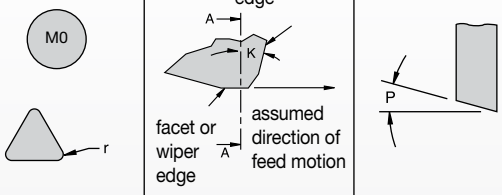






inscribed circle "iC" versus cutting edge length "L"
For shapes A, L, and X, see position #1; use length of leading cutting edge.

	"L" for shapes						
iC	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

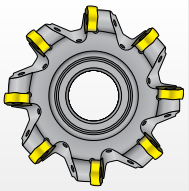
wiper edge clearance P	
A	3º
B	5º
C	7º
D	15º
E	20º
F	25º
G	30º
N	0º
P	11º

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

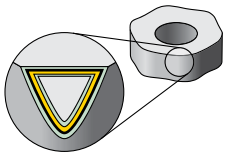
Insert Clearance Angle

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

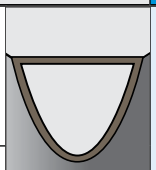
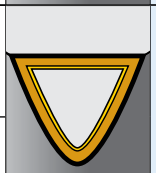
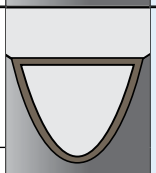
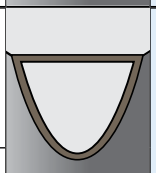
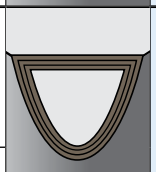
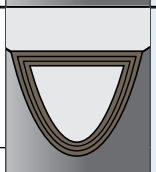


Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

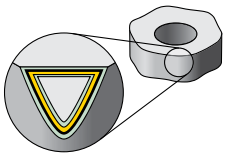
Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

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

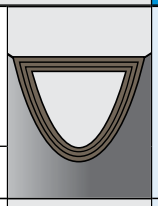
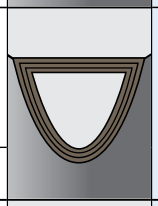
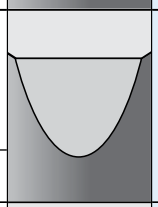
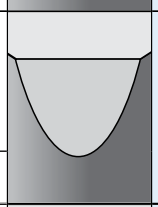
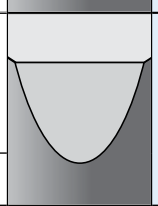
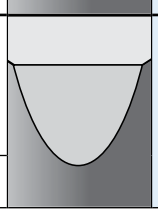


Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

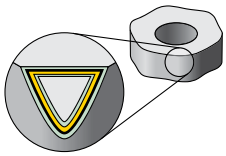
Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

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



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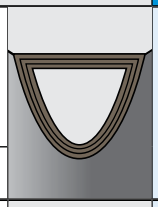
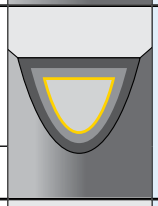
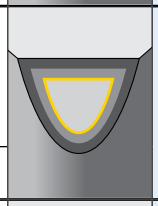
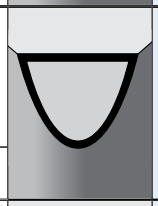
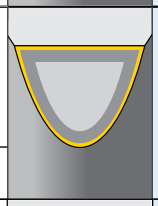
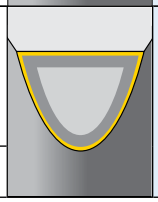
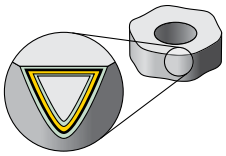
Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

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

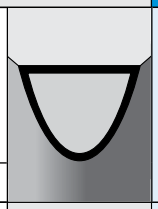
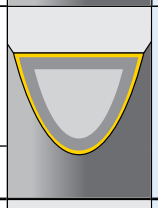
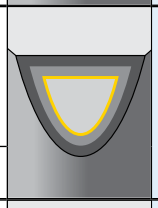
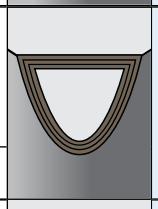
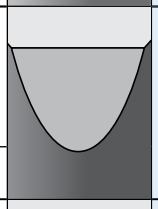
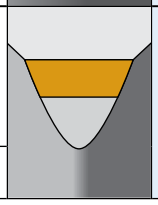


Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

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.

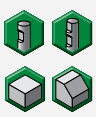
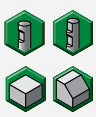
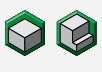
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

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

Grade		P	M	K	N	S	H	dry	with coolant
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	—
	✓✓	✓	✓	✓	✓	✓✓	✓	✓✓
	◉	◉	○	◉	○	○	◉	—
	○	○	◉	○	◉	○	○	—
								
	◉	◉	◉	◉	◉	◉	◉	◉
	○	○	○	○	○	○	○	○
	○	○	○	○	○	○	○	○
	◉	○	○	○	○	○	○	○
	◉	○	○	○	○	○	○	—

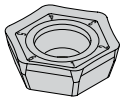
✓ Good ✓✓ Perfect ◉ Yes ○ No ★ All-Star Program

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

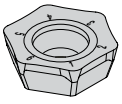
Positive and stable geometry for medium machining. The positive stabilized cutting edge improves the milling action.

-3W

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

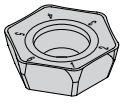
INSERT

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

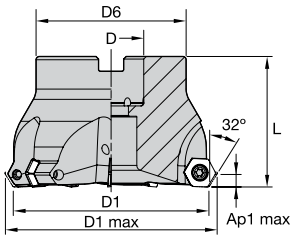
FACE MILLING

SLEEK FINISH

LOW CUTTING FORCES

Highly positive rake angle for extremely low cutting forces.

M640 • Shell Mills

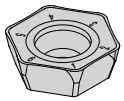


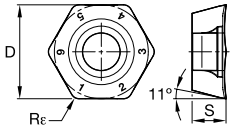
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2961910	**M640D200Z05S075HP06**	2.000	2.251	.750	1.700	1.500	.192	5	11500	Yes	.69
2961912	**M640D300Z07S100HP06**	3.000	3.251	1.000	2.300	2.000	.192	7	7900	Yes	2.25

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M640 • HPGT-LDAL



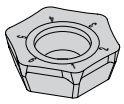


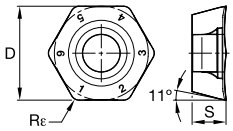
● first choice
○ alternate choice

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



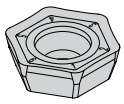


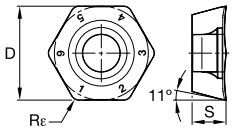
● first choice
○ alternate choice

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



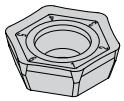


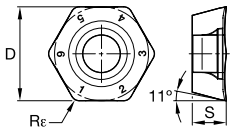
● first choice
○ alternate choice

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



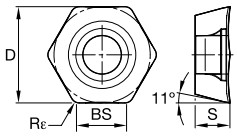


● first choice
○ alternate choice

	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

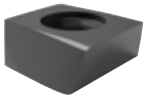
WU10PM

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

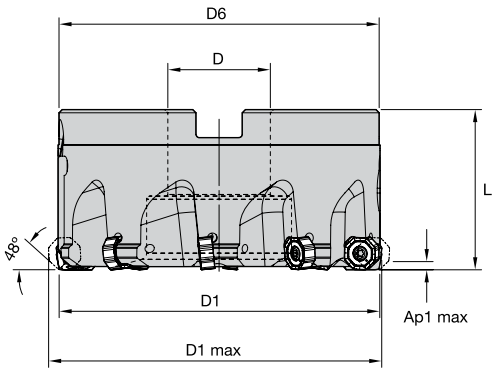
GENERAL ENGINEERING

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

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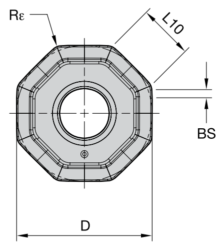
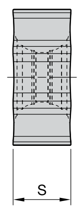
MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M1600 Mini-F • ONGX-MM



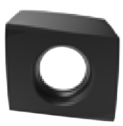


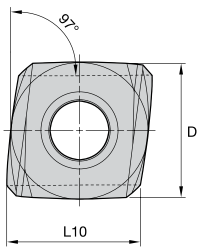
● first choice
○ alternate choice

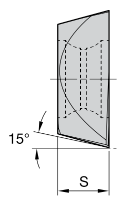
	THM-F	WK15CM	WU10PM	WU20PM
P				●
M				●
K	●	●	●	○
N	●			○
S				○
H			●	○

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-F	WK15CM	WU10PM	WU20PM
ONGX04T308ANSNMM	ONGX04T308ANSNMM	16	10	.394	4,10	.162	3,97	.156	0,60	.024	0,80	.031	0,04	.002	ı	6095310	ı	ı
ONGX04T308ANSNMM	ONGX04T308ANSNMM	16	10	.394	4,10	.162	3,97	.156	0,60	.024	0,80	.031	0,04	.001	ı	ı	6243772	ı
ONGX04T308ANSNMM	ONGX04T308ANSNMM	16	10	.394	4,10	.162	3,97	.156	0,60	.024	0,80	.031	0,05	.002	ı	ı	ı	6291724

M1600 Mini-F • Wiper Inserts • XDHX-W2C







● first choice
○ alternate choice

	THM-F	WK15CM	WU10PM	WU20PM
P				●
M				●
K	●	●	●	○
N	●			○
S				○
H			●	○

ISO catalog number	ANSI catalog number	cutting edges	D mm	D in	L10	S mm	S in	Rε	hm mm	hm in	THM-F	WK15CM	WU10PM	WU20PM
XDHX1004RW2C	XDHX1004RW2C	2	13	.500	8,72	4,76	.188	0,00	0,02	.001	6739214	ı	ı	ı
XDHX1004RW2C	XDHX1004RW2C	2	13	.500	–	4,76	.188	–	0,02	.001	ı	ı	6877620	ı

M1600 Mini-F • 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	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]

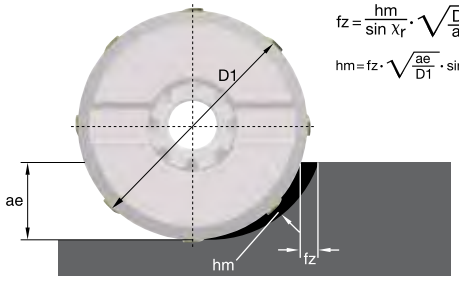
Light Machining	General Purpose	Heavy Machining

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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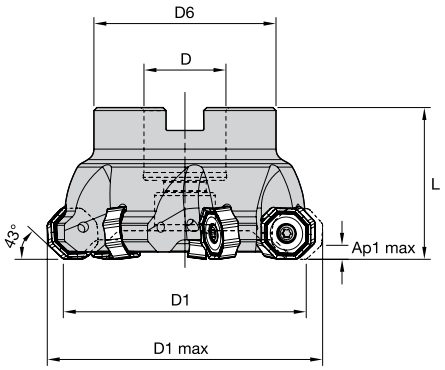
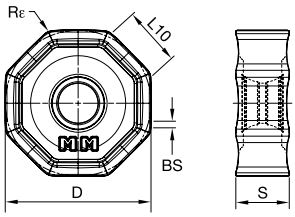
M1600 • 47° • Shell Mills • Inch



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

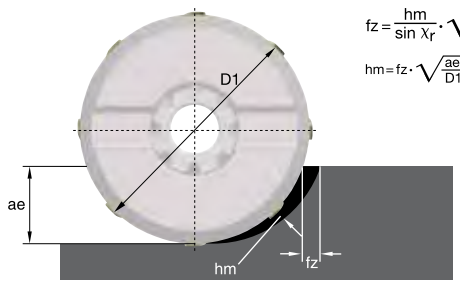
*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

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

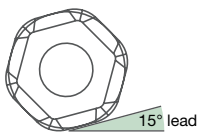
The M1200 Max is a 12-edged face mill for customers who need to run at a higher DOC (up to 0.295" [7,5mm]) in steel, stainless steel, gray cast iron, and nodular iron.

M1200 MAX WEDGE CLAMPING • FOR CAST IRON COMPONENTS

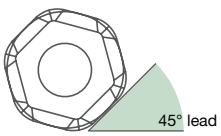
The M1200 Max wedge clamping is a 12-edged face mill for medium roughing - semi-finishing while running higher DOC (up to 0.295" [7,5mm]) in gray cast iron and nodular iron components.

ONE INSERT STYLE FITS INTO ALL DIFFERENT CUTTER BODY VERSIONS

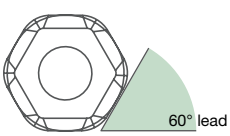
M1200 & M1200 MINI HF
High-Feed 15°



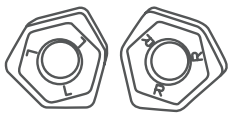
M1200 & M1200 MINI
45°



M1200 & M1200 MINI HD
60°



WIPER
(XNGJ)



3RH + 3LH

12-EDGED FACE MILL

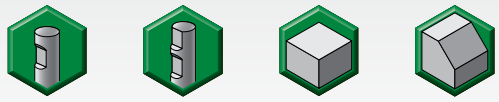
PRODUCT

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

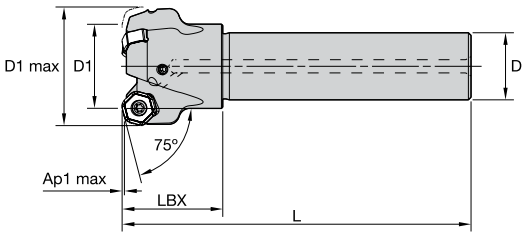
TRANSPORTATION

AEROSPACE

ENERGY

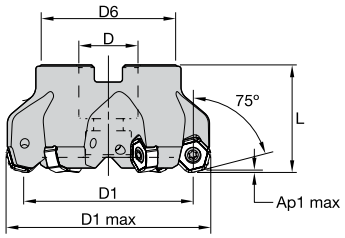
GENERAL ENGINEERING

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

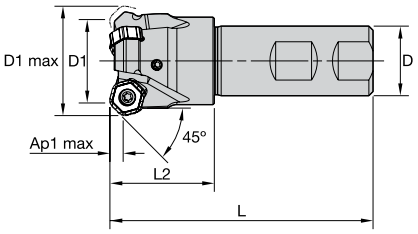
M1200 Mini High Feed • Shell Mills



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

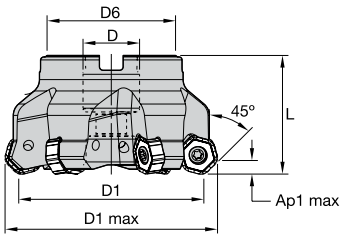
NOTE: Socket-head cap screw with coolant groove must be ordered separately.

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

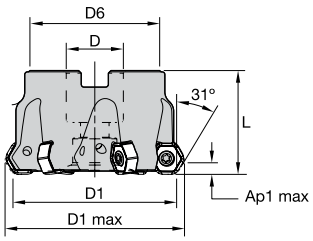
M1200 Mini • Shell Mills



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



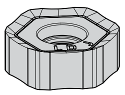
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136418	M1200HD200Z05S075HN07	2.000	2.266	.750	1.750	1.575	.186	5	12500	Yes	.91
4136421	M1200HD300Z05S100HN07	3.000	3.266	1.000	2.188	1.750	.186	5	8300	Yes	1.95
4136433	M1200HD400Z06S150HN07	4.000	4.266	1.500	3.661	1.750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

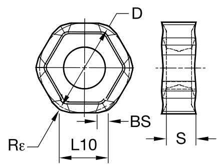
NOTE: Socket-head cap screw with coolant groove must be ordered separately.

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M1200 Mini • HNGJ-LDJ • HN0704



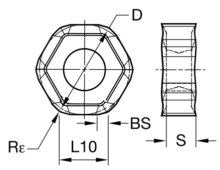


● first choice
○ alternate choice

		THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	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	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNGJ0704ANFNLDJ	HNGJ0704ANFNLDJ	12	13	.500	6,84	.269	4,48	.176	1,51	.060	1,20	.047	0,08	.003	3954332	3954414	–	–	–	–	–	–	–	–	–	–

M1200 Mini • HNGJ-LD • HN0704

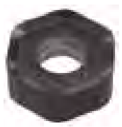


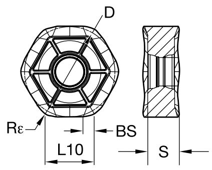
● first choice
○ alternate choice

		THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	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	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNGJ070432ANENLD	HNGJ070432ANENLD	12	13	.500	6,00	.236	4,48	.176	–	–	3,21	.126	0,08	.003	–	–	–	–	–	–	–	–	–	–	–	6180300
HNGJ0704ANENLD	HNGJ0704ANENLD	12	13	.500	6,84	.269	4,48	.176	1,60	.064	1,20	.047	0,08	.003	–	–	3954419	3954420	3954421	3954422	–	5895291	5895292	5550905	5528975	6180295

M1200 Mini • HNPJ-GD • HN0704



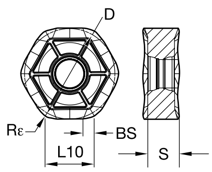


● first choice
○ alternate choice

	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	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	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNPJ0704ANSNGD	HNPJ0704ANSNGD	12	13	.500	6,80	.269	4,45	.175	1,45	.057	1,20	.047	0,10	.004	-	-	3954432	3954473	-	3954474	5427374	5895293	5895294	5550906	5528976	6180297

M1200 Mini • HNPJ-HD • HN0704

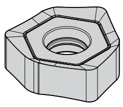


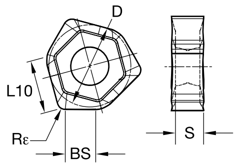
● first choice
○ alternate choice

	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	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	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNPJ0704ANSNHD	HNPJ0704ANSNHD	12	13	.500	6,80	.269	4,41	.174	1,45	.057	1,20	.047	0,14	.006	-	-	-	3954478	-	3954479	5427375	5895295	5895296	5550907	-	6180299
HNPJ070432ANSNHD	HNPJ070432ANSNHD	12	13	.500	6,84	.269	4,42	.174	—	—	3,20	.126	0,14	.006	-	-	-	3954482	-	3954483	-	-	-	5895297	-	6180311

M1200 Mini • XNGJ-LDJ-3 Wiper • XN0704



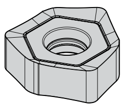


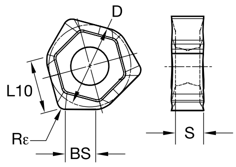
● first choice
○ alternate choice

		THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	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	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
XNGJ0704ANFNLDJ3W	XNGJ0704ANFNLDJ3W	3	13	.500	6,78	.267	4,47	.176	6,78	.267	1,30	.051	0,08	.003	3954433	-	-	-	-	-	-	-	-	-	-	-

M1200 Mini • XNGJ-LD3 Wiper • XN0704





● first choice
○ alternate choice

		THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	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	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
XNGJ0704ANENLD3W	XNGJ0704ANENLD3W	3	13	.500	6,78	.267	4,47	.176	6,78	.267	1,30	.051	0,08	.003	-	-	-	3954425	3954426	3954427	5427373	5895298	-	5895299	-	6180296

M1200 Mini • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	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	TN6510	**.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..GD	WS30PM
S4	.E..LD	WS30PM	**.S..GD**	**WS30PM**	.S..HD	WP40PM

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.

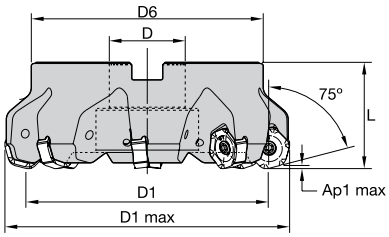
M1200 Mini • Recommended Starting Feeds [IPT]

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.

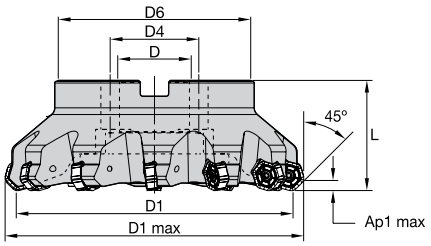
M1200 • 15° • High Feed • Shell Mills • Inch



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.

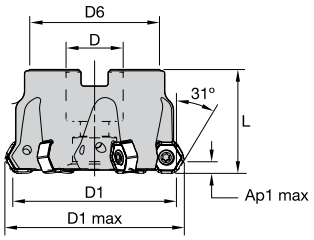
M1200 • 45° • Shell Mills • Inch



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



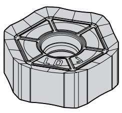
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4147879	**M1200HD250Z06S075HN09**	2.500	2.836	.750	1.986	1.575	.236	6	10000	Yes	1.36
4147880	**M1200HD300Z05S100HN09**	3.000	3.336	1.000	2.189	1.750	.236	5	8300	Yes	1.98
4147881	**M1200HD300Z08S100HN09**	3.000	3.336	1.000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

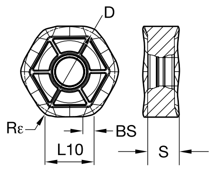
NOTE: Socket-head cap screw with coolant groove, coolant screw assembly, coolant lock screw, and coolant cap must be ordered separately.

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M1200 • HNGJ-LDJ • HN0905



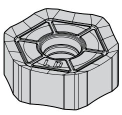


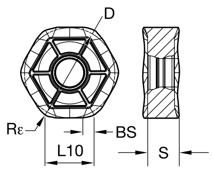
● first choice
○ alternate choice

	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	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNGJ0905ANFNLDJ	HNGJ535ANFNLDJ	12	16	.625	8,58	.338	5,56	.219	1,81	.071	1,20	.047	0,02	.001	3606383	3865373	-	-	-	-	-	-	-	-	-	-	-

M1200 • HNGJ-LD • HN0905



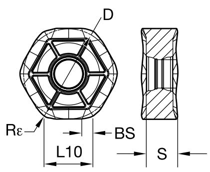


● first choice
○ alternate choice

	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	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNGJ0905ANENLD	HNGJ535ANENLD	12	16	.625	8,58	.338	5,56	.219	1,76	.069	1,20	.047	0,05	.002	-	-	-	3093559	3330950	3030034	-	-	5895346	5895347	5895348	5528973	6180276

M1200 • HNPJ-GD • HN0905

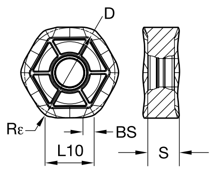


● first choice
○ alternate choice

	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	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNPJ0905ANSNGD	HNPJ535ANSNGD	12	16	.625	8,58	.338	5,56	.219	1,80	.071	1,20	.047	0,10	.004	-	-	-	3761185	-	3761187	5427372	-	5895374	5895375	5550908	-	6180278

M1200 • HNGJ-GD • HN0905

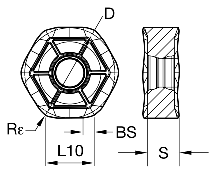


● first choice
○ alternate choice

	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	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

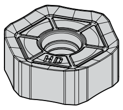


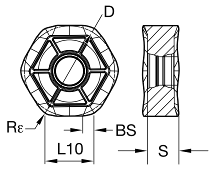
● first choice
○ alternate choice

	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	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





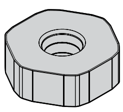
● first choice
○ alternate choice

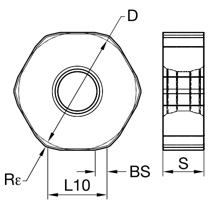
		THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
P						●	●			●	●	●	○	●
M						○	●			●	●	●	●	●
K		●		●	●	○	○	●	●	○	○			
N		○	●											○
S							●			●	○	○	●	●
H										○			○	

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
HNGJ090543ANSNHD	HNGJ53511ANSNHD	12	16	.625	8,50	.335	5,44	.214	–	–	4,35	.171	0,20	.008
HNGJ0905ANSNHD	HNGJ535ANSNHD	12	16	.625	8,59	.338	5,46	.215	1,65	.065	1,20	.047	0,17	.007

ISO catalog number	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNGJ090543ANSNHD	-	-	-	3564083	3564084	3564085	-	-	-	-	-	-	6180292
HNGJ0905ANSNHD	-	-	-	3563900	3563901	3563902	-	-	5895371	5895372	5895373	-	6180291

M1200 • HNEW-AN • HN0905





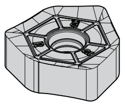
● first choice
○ alternate choice

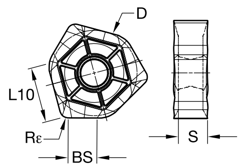
		THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
P						●	●			●	●	●	○	●
M						○	●			●	●	●	●	●
K		●		●	●	○	○	●	●	○	○			
N		○	●											○
S							●			●	○	○	●	●
H										○			○	

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
HNEC0905ANSN	HNEC535ANSN	12	16	.625	9,17	.361	5,56	.219	1,95	.077	1,20	.047	0,19	.008

ISO catalog number	THM-U	TN6501	TN6510	TN6520	TN6525	TN6540	WK15CM	WK25YM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNEC0905ANSN	-	-	-	-	-	-	-	5910033	-	-	-	-	-

M1200 • XNGJ-GD3 Wiper • HN0905





● first choice
○ alternate choice

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

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
XNGJ0905ANSNGD3W	XNGJ535ANSNGD3W	6	16	.625	9,56	.377	5,51	.217	6,00	.230	1,60	.063	0,09	.004	-	-	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

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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.

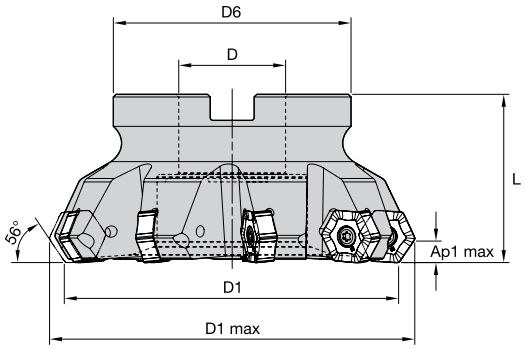
M1200 • Recommended Starting Feeds [IPT]

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

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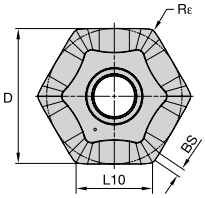
MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

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

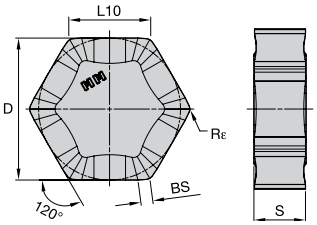


● first choice
○ alternate choice

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]

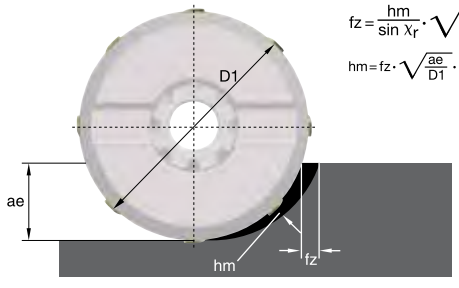
Light Machining	General Purpose	Heavy Machining

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:

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

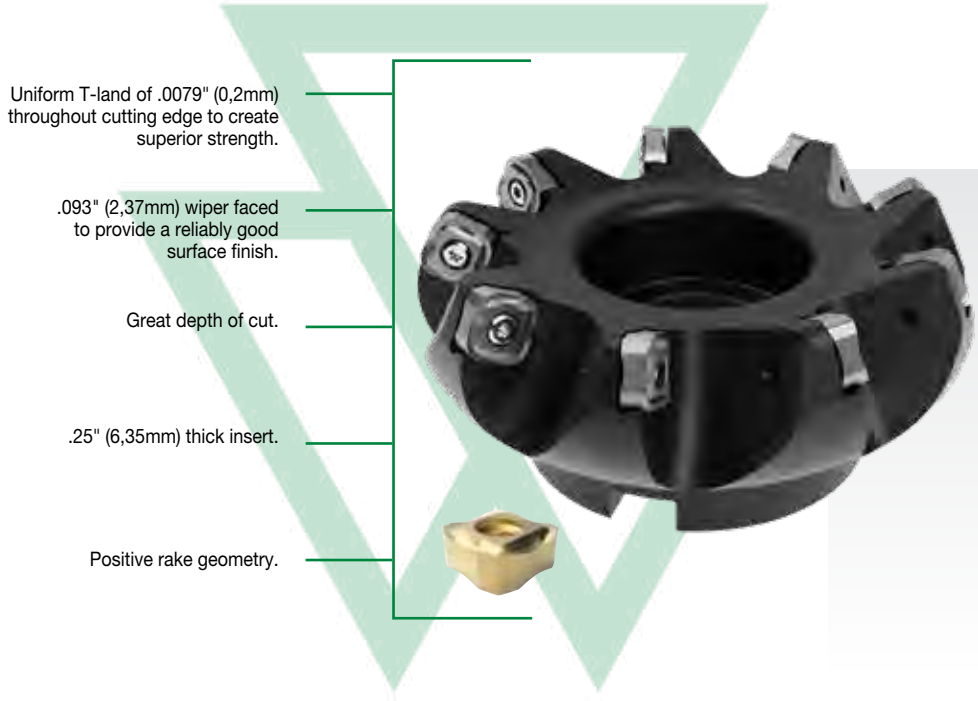
$$hm = fz \cdot \sqrt{\frac{ae}{D1}} \cdot \sin \chi_r$$



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

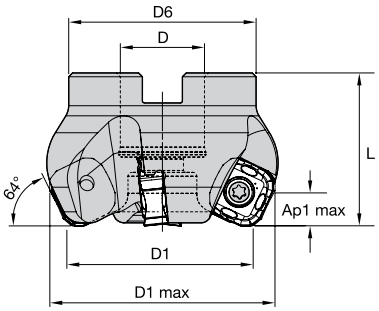
FACE MILLING

SIDE/SHOULDER MILLING: EASED CHAMFER

HEAVY DUTY

RELIABLE

M8065HD • 26° • Shell Mills • Inch

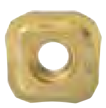


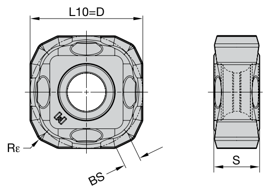
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	coolant supply	lbs
6921244	**M8065HU300Z06S100SN15**	3.000	3.348	1.000	2.750	1.750	.354	6	No	2.31
6921245	**M8065HU400Z07S150SN15**	4.000	4.348	1.250	2.875	2.000	.354	7	No	8.64
6921246	**M8065HU500Z09S150SN15**	5.000	5.348	1.500	3.810	2.380	.354	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

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
														P		●	●
														M		●	●
														K	●	○	○
														N			○
														S		○	○
														H			○
SNMX150612ZNSNMM	SNMX150612ZNSNMM	8	16	.625	15,88	.625	6,35	.250	2,37	.093	1,20	.047	0,05	.002	5649102	-	-
SNMX150612ZNSNMM	SNMX150612ZNSNMM	8	16	.625	15,88	.625	6,35	.250	2,37	.093	1,20	.047	0,06	.002	-	6852432	4137987
SNMX1506ZZXP	SNMX1506ZZXP	8	16	.625	15,88	.625	6,35	.250	2,37	.093	1,20	.047	—	—	-	6901786	-

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]

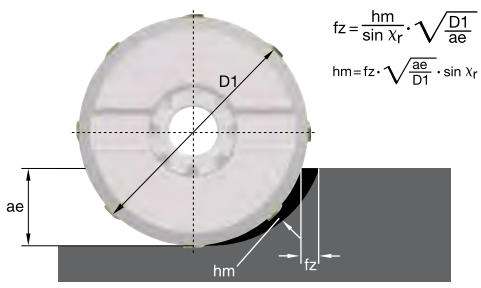
Light Machining	General Purpose	Heavy Machining

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.

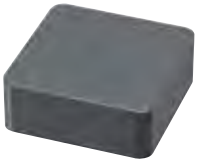
Axial adjustable wiper pocket seats to set up axial run-out within .0002" (0,005mm).

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.

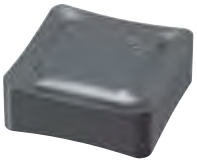
INSERTS OFFERED IN CARBIDE GRADE WK15PM, CERAMICS WK25YM, AND PCBN WBK40U



SNEN Insert

K

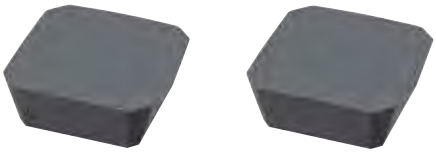
Ceramic insert with eight effective cutting edges



-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

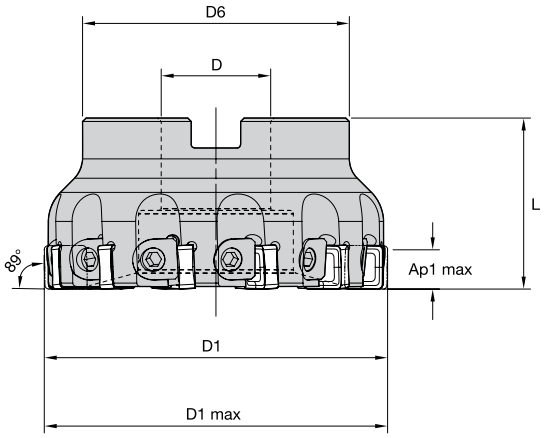
IRON MILLING

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

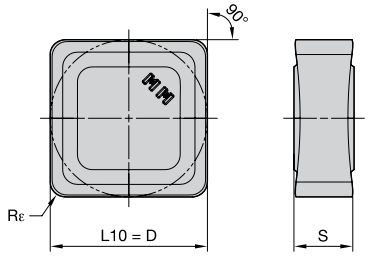


order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	coolant supply	lbs
6921193	**M8090U400Z10S150SN12**	4.000	4.015	1.250	2.875	2.000	.453	10	No	3.92
6921194	**M8090U400Z12S150SN12**	4.000	4.015	1.250	2.875	2.000	.453	12	No	3.85
6921195	**M8090U600Z15S200SN12**	6.000	6.015	2.000	4.875	2.380	.453	15	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

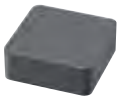


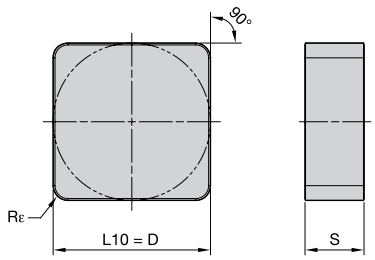
● first choice
○ alternate choice

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

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.

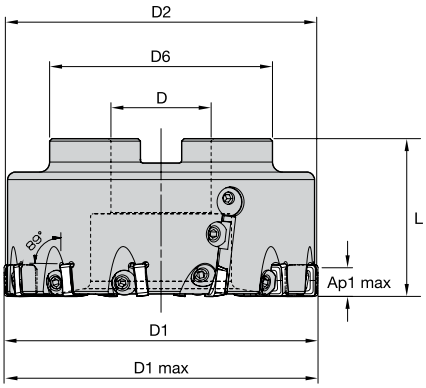
M8090 • Recommended Starting Feeds [IPT]

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

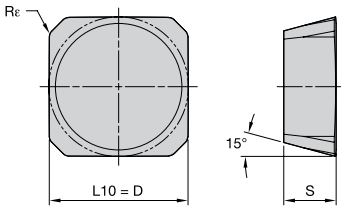
NOTE: Use "Light Machining" value as starting feed rate.
For new applications, starting at a lighter feed rate is recommended.
% = ae/Dc X 100 (ae = radial depth of cut, Dc = cutting diameter)

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

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	▪	▪	▪

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

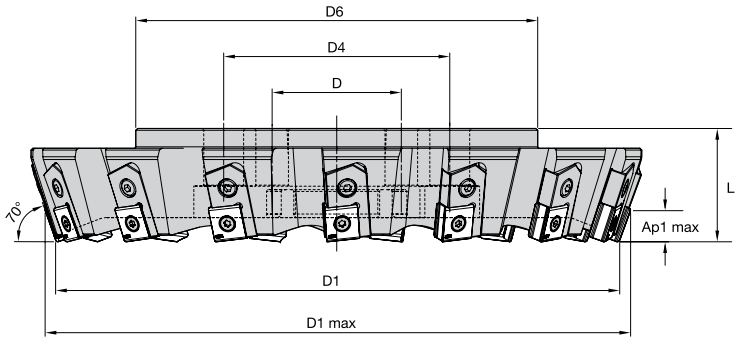
Hardened anvils to protect the cutter body from heavy-duty machining conditions.

SECURITY

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

TO TACKLE HEAVY-DUTY MACHINING CONDITIONS

M4070 • 20° • Shell Mills • Inch

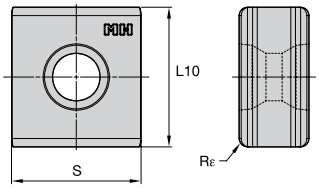


order number	catalog number	D1	D1 max	D	D4	D6	L	Ap1 max	Z	coolant supply	lbs
6921222	**M4070U600Z08S200LN20**	6.000	6.502	2.000	—	4.875	2.380	.681	8	No	12.90
6921223	**M4070U800Z10S250LN20**	8.000	8.501	2.500	4.000	5.118	2.380	.681	10	No	20.79
6921224	**M4070U1000Z12S250LN20**	10.000	10.501	2.500	4.000	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

P		●
M		●
K	●	○
N		
S		○
H		

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

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	—	**—**	—	—	**—**	—

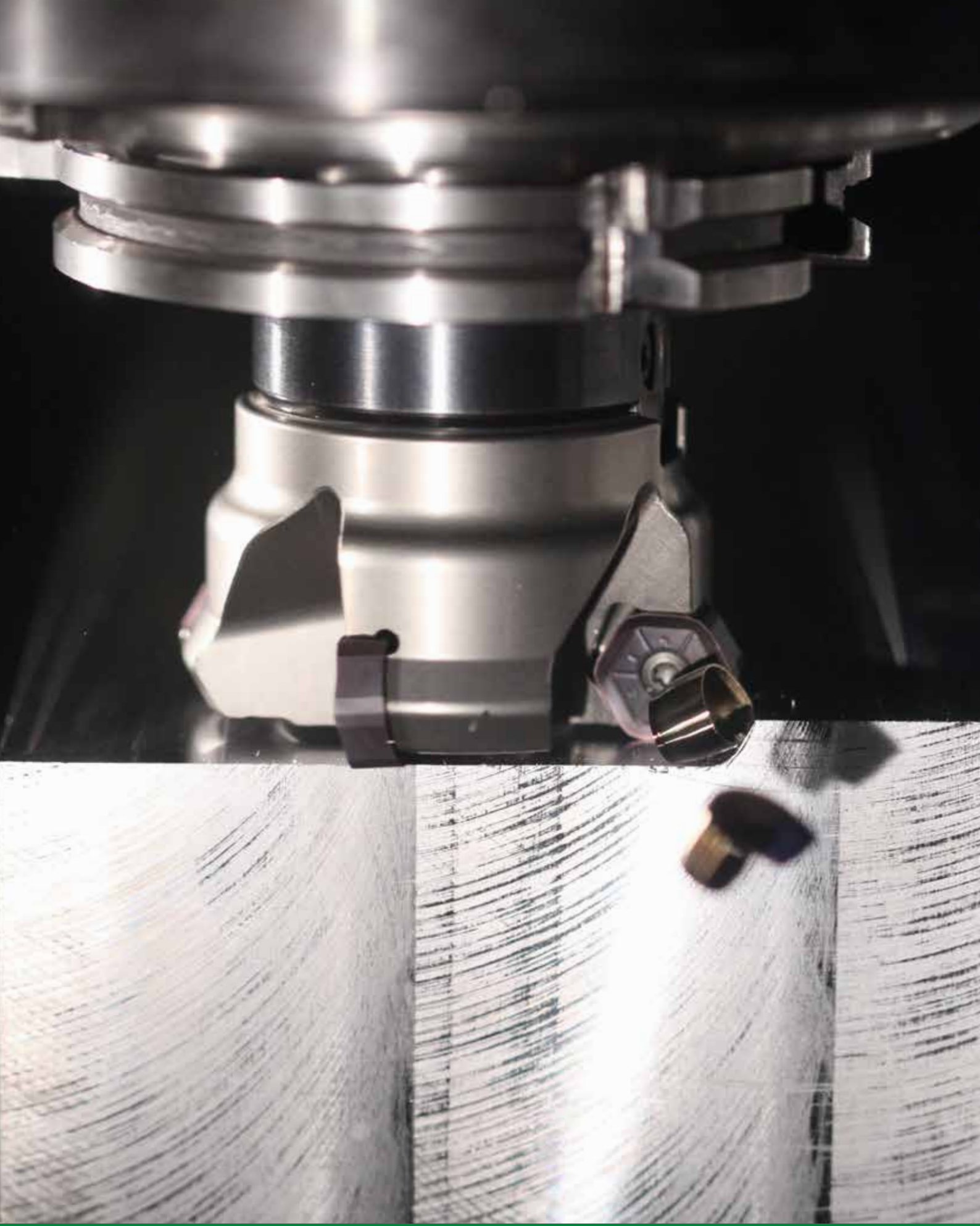
*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

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

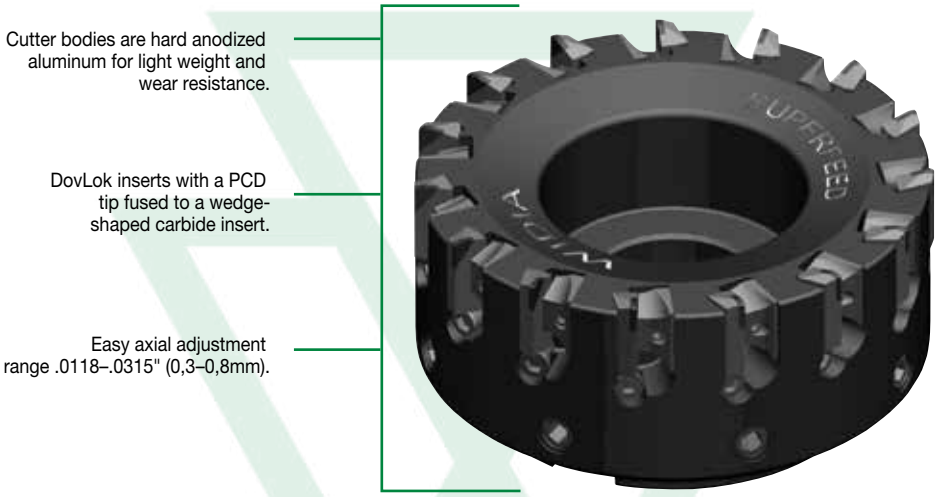
NOTE: Use "Light Machining" value as starting feed rate.
For new applications, starting at a lighter feed rate is recommended.
% = ae/Dc X 100 (ae = radial depth of cut, Dc = cutting diameter)



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

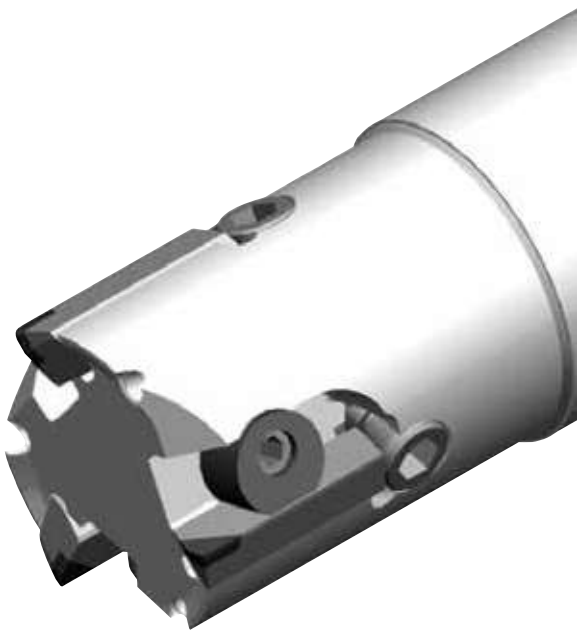
FACE MILLING

THROUGH COOLANT: RADIAL: INDEXABLE MILLING

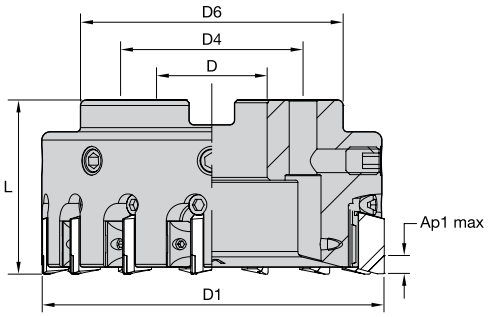
PCD

SIDE MILLING/ SHOULDER MILLING: SQUARE END

NON-FERROUS PCD



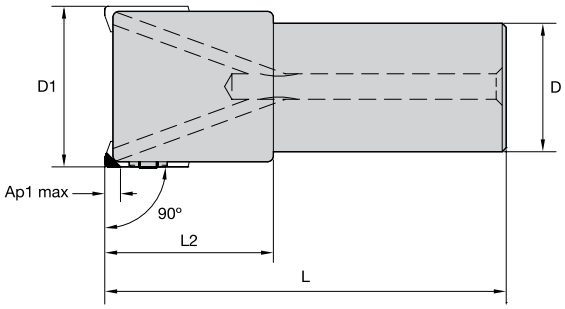
SuperFeed • Face Mills • Inch



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



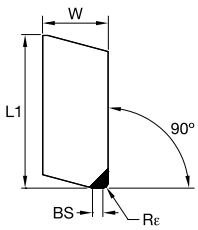
order number	catalog number	D1	D	L2	L	Ap1 max	Z	Z ADJ	lbs	max RPM
5363198	WSSEM1002RH	1.00	.75	1.50	3.50	.25	2	2	0.50	35500
5363199	WSSEM12503RH	1.25	1.00	1.75	4.00	.25	3	3	1.20	31700
5363250	WSSEM1504RH	1.50	1.00	1.75	4.00	.25	4	4	1.15	29000
5363251	WSSEM2005RH	2.00	1.00	1.70	4.50	.25	5	5	1.10	25100

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



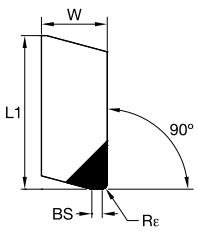
● first choice
○ alternate choice

P	
M	
K	
N	●
S	
H	

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

P	
M	
K	
N	●
S	
H	

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

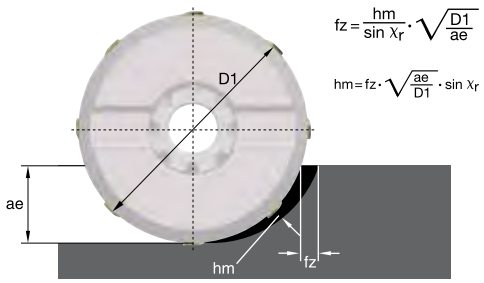
SuperFeed • Recommended Starting Feeds [IPT]

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

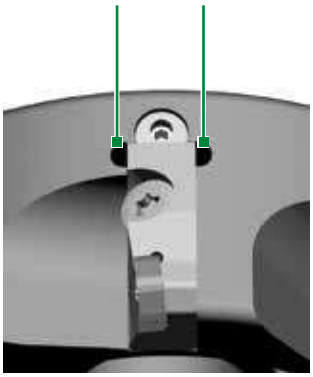
- Apply a small amount of lubricant to the following areas:
  - Threads of the cartridge locking screw.
  - Threads of the axial adjustment screw.
- Install cartridges applying light torque to the locking screws.
- Turn axial adjustment screw until the cartridge is 0,01–0,015mm below the final set height.
- 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

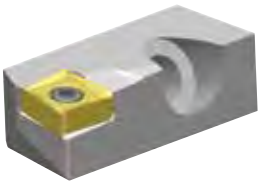
FACE MILLING

SIDE MILLING/ SHOULDER MILLING: SQUARE END

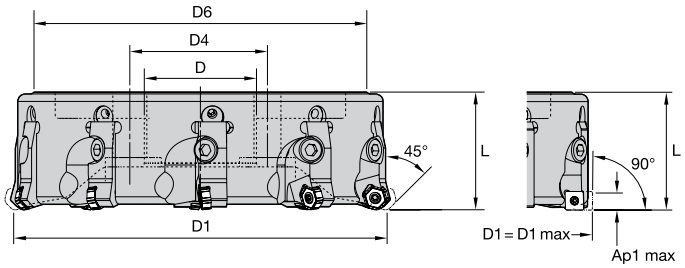
VSM890-12

CARTRIDGE FOR M4000

M4000CA-SNHX12
(MM6602179)



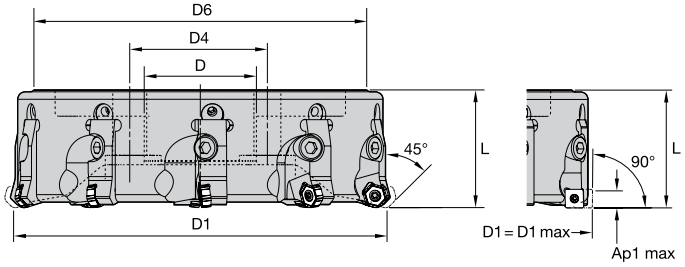
M4000 • Face Mills • Inch



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	—

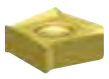
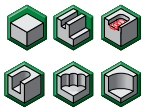
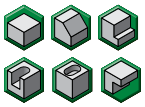
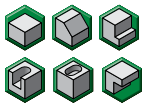
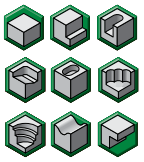
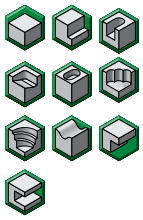
FOR SPARE PARTS, PLEASE VISIT WIDIA.COM OR WIDIANOVO.COM.

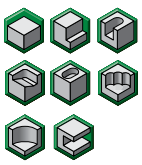
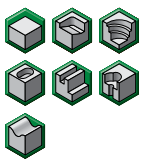
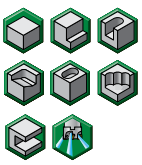
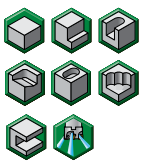
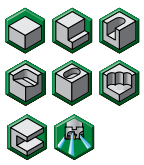
MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

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

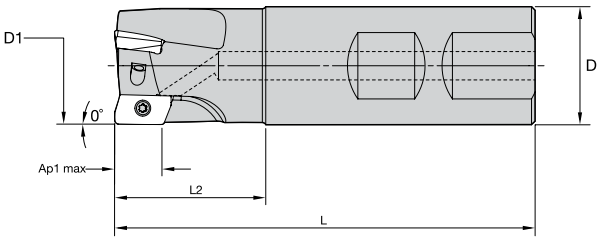

3D PROFILING


SIDE MILLING/ SHOULDER MILLING: BOTTOM SHOULDERING

LOW POWER CONSUMPTION

SINGLE-SIDED INSERTS

VSM11™ • Weldon® End Mills • Inch

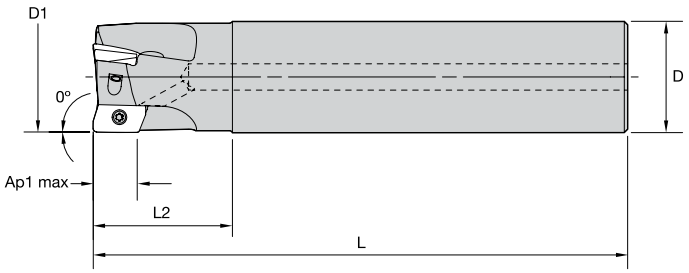


order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416416	VSM11D062Z02W062XD11	.625	.625	2.750	.844	.454	2	12.5°	41700	Yes	.18
5416417	VSM11D075Z02W075XD11	.750	.750	3.200	1.170	.455	2	8.6°	36300	Yes	.30
5416418	VSM11D075Z03W075XD11	.750	.750	3.200	1.170	.455	3	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.

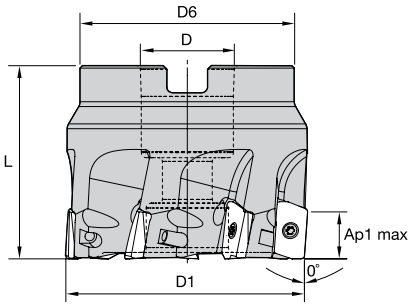
VSM11 • Cylindrical End Mills (regular and long version) • Inch



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.

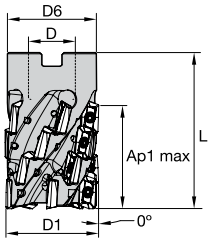
VSM11™ • Shell Mills • Inch



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

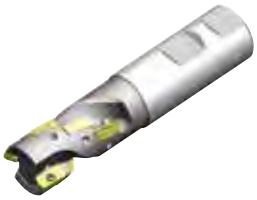


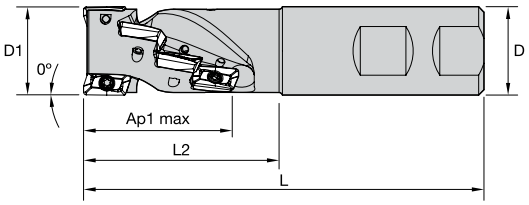
order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6081973	VHM11D200Z06S300XD11	2.000	1.000	1.910	3.000	2.032	30	6	1.8°	19700	Yes	1.60

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

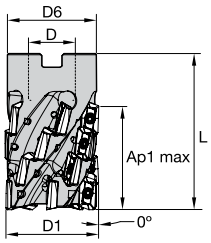




order number	catalog number	D1	D	L	L2	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6740596	VSM11H100Z02W100XD11	1.000	1.000	4.530	2.250	1.700	8	2	4.4°	29700	Yes	.74
6740598	VSM11H125Z03W125XD11	1.250	1.250	4.530	2.250	1.700	12	3	3.2°	26500	Yes	1.20
6740599	VSM11H125Z04W125XD11	1.250	1.250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



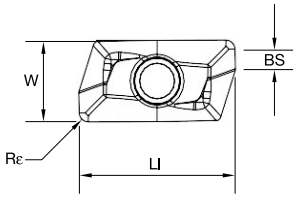
order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6740600	VSM11H150Z04S075XD11	1.500	.750	1.350	2.500	1.700	16	4	2.5°	23300	Yes	.65
6740671	VSM11H150Z05S075XD11	1.500	.750	1.350	2.500	1.650	20	5	2.5°	23300	Yes	.64
6740672	VSM11H200Z04S075XD11	2.000	.750	1.750	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

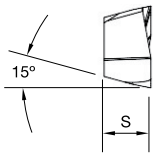
NOTE: Z = number of pockets; ZU = number of flutes.

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM11™ • XDCT-ALP



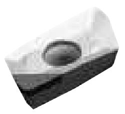


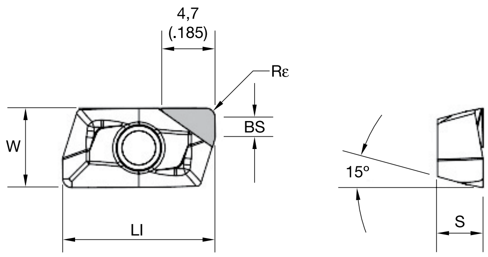
● first choice
○ alternate choice

		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



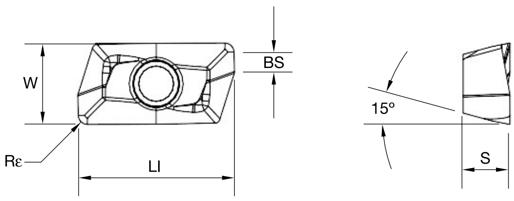


● first choice
○ alternate choice

		WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU20PM	WU35PM
P	blue						●	●	●	○	●	●	●
M	yellow						●	●	●	●	●	●	●
K	red		●	●			○	○				○	
N	green	●			●	●					○	○	
S	orange						●	○	○	●	●	○	●
H	grey						○			○		○	

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
XDCW110404PDFRPCD	XDCW1101RPCD	1	13,41	.528	2,22	.088	4,00	.157	6,90	.272	0,40	.016	0,02	.001	5415420	–	–	–	–	–	–	–	–	–	–	–
XDCW110408PDFRPCD	XDCW1102RPCD	1	13,42	.528	1,80	.071	4,00	.157	6,90	.272	0,80	.031	0,02	.001	5415421	–	–	–	–	–	–	–	–	–	–	–

VSM11 • XDCT-ML



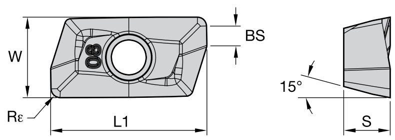
● first choice
○ alternate choice

		WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU20PM	WU35PM
P	blue						●	●	●	○	●	●	●
M	yellow						●	●	●	●	●	●	●
K	red		●	●			○	○				○	
N	green	●			●	●					○	○	
S	orange						●	○	○	●	●	○	●
H	grey						○			○		○	

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
XDCT110404PDERML	XDCT1101ERML	2	13,43	.529	2,09	.082	4,00	.157	6,90	.272	0,40	.016	0,04	.002	–	–	6242456	–	–	5536671	5536670	5642230	–	6180174	–	–
XDCT110408PDERML	XDCT1102ERML	2	13,44	.529	1,69	.067	4,00	.157	6,90	.272	0,80	.031	0,04	.002	–	5415549	6242457	–	–	5415548	5415547	5545065	5517826	6180173	–	5415546
XDCT110412PDERML	XDCT1103ERML	2	13,44	.529	1,29	.051	4,00	.157	6,90	.272	1,20	.047	—	—	–	–	–	–	–	6408003	–	–	–	6408002	–	–
XDCT110416PDERML	XDCT1104ERML	2	13,44	.529	0,88	.035	4,00	.157	6,89	.271	1,60	.063	0,04	.002	–	–	–	–	–	5964861	–	5964810	–	6408004	–	–
XDCT110424PDERML	XDCT1106ERML	2	13,44	.529	0,16	.006	4,00	.157	6,88	.271	2,40	.095	—	—	–	–	–	–	–	–	–	–	–	6408006	–	–
XDCT110432PDERML	XDCT1108ERML	2	12,86	.506	—	—	4,00	.157	6,89	.271	3,20	.125	—	—	–	–	–	–	–	–	–	–	–	6408007	–	–

WIDIA™

VSM11™ • XDET-MU

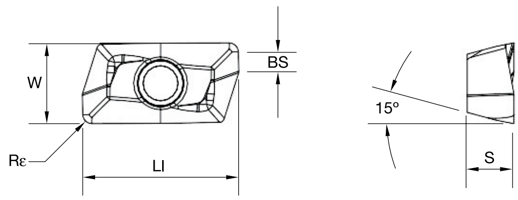


● first choice
○ alternate choice

	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
XDET110404PDERMU	XDET1101ERMU	2	13,43	.529	2,09	.082	4,00	.158	6,90	.272	0,40	.016	0,04	.001	-	-	-	-	-	-	-	-	-	-	6862949	-
XDET110408PDERMU	XDET1102ERMU	2	13,44	.529	1,69	.067	4,00	.157	6,90	.272	0,80	.031	0,04	.001	-	-	-	-	-	-	-	-	-	-	6862946	-

VSM11 • XDPT-MM

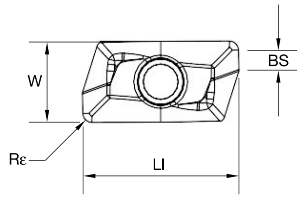


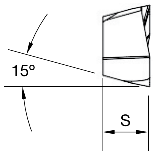
● first choice
○ alternate choice

	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
XDPT110404PDSRMM	XDPT1101SRMM	2	13,49	.531	2,06	.081	4,13	.163	6,94	.273	0,39	.015	0,06	.003	-	5415428	6242458	-	-	5642237	5415450	5642231	-	6180149	-	-
XDPT110408PDSRMM	XDPT1102SRMM	2	13,50	.532	1,66	.065	4,13	.163	6,90	.271	0,78	.031	0,06	.003	-	5415315	6242459	-	-	5415319	5415318	5545063	5519921	6180148	-	5415317
XDPT110412PDSRMM	XDPT1103SRMM	2	13,44	.529	1,29	.051	4,00	.157	6,90	.272	1,20	.047	0,06	.003	-	5415310	-	-	-	5415314	5415313	5642232	-	6180150	-	5415312
XDPT110416PDSRMM	XDPT1104SRMM	2	13,51	.532	0,85	.034	4,13	.163	6,95	.274	1,60	.062	0,06	.003	-	5415250	-	-	-	5415254	5415253	5642233	-	6180172	-	-
XDPT110420PDSRMM	XDPT1105SRMM	2	13,51	.532	0,45	.018	4,13	.163	6,94	.273	2,00	.079	0,06	.003	-	-	-	-	-	5980399	5980400	5980398	-	6408095	-	-
XDPT110424PDSRMM	XDPT1106SRMM	2	13,37	.526	—	—	4,01	.158	6,94	.273	2,40	.094	0,06	.003	-	-	-	-	-	5901355	-	5901354	-	6408096	-	-
XDPT110431PDSRMM	XDPT1108SRMM	2	12,94	.509	—	—	4,01	.158	6,94	.273	3,10	.122	0,06	.003	-	5415422	-	-	-	5415426	5415425	5642234	5517827	6279204	-	-

VSM11™ • XDPT-MH



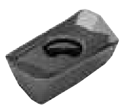


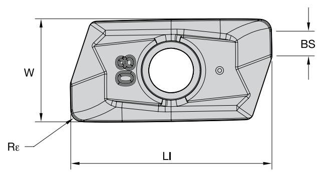
● first choice
○ alternate choice

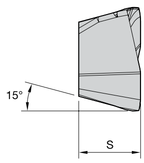
		WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU20PM	WU35PM
P							●	●	●	○	●	●	●
M							●	●	●	●	●	●	●
K			●	●			○	○				○	
N		●			●	●					○	○	
S							●	○	○	●	●	○	●
H							○			○		○	

ISO catalog number	ANSI catalog number	cutting edges	Ll mm	Ll 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
XDPT110408PDSRMH	XDPT1102SRMH	2	13,44	.529	1,68	.066	4,00	.157	6,90	.272	0,79	.031	0,13	.005	–	5415255	–	–	–	–	5415257	5545064	–	6408098	–	5415256
XDPT110412PDSRMH	XDPT1103SRMH	2	13,44	.529	1,29	.051	4,00	.157	6,90	.272	1,20	.047	0,13	.005	–	5415360	–	–	–	–	5415362	5642235	–	6408099	–	–
XDPT110416PDSRMH	XDPT1104SRMH	2	13,44	.529	0,90	.035	4,00	.157	6,90	.272	1,59	.062	0,13	.005	–	5415364	–	–	–	–	5415366	5642236	–	6408100	–	–

VSM11 • XDPT-MU







● 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	Ll mm	Ll 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
XDPT110408PDSRMU	XDPT1102SRMU	2	13,50	.531	1,66	.065	4,13	.163	6,94	.273	0,80	.031	0,06	.003	–	–	–	–	–	–	–	–	–	–	6487443	–
XDPT110416PDSRMU	XDPT1104SRMU	2	13,51	.532	0,85	.034	4,13	.163	6,95	.274	1,60	.063	0,06	.003	–	–	–	–	–	–	–	–	–	–	6862948	–

VSM11 • Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Universal Geometry	Universal Grade	Heavy Machining Geometry	Heavy Machining 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-MH	WS40PM
M3	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	**XD..-MU**	**WU20PM**	XDPT-MH	WS40PM
K1–K2	XDCT-ML	WK15CM	**XDPT-MM**	**WK15CM**	**XD..-MU**	**WU20PM**	XDPT-MH	WK15CM
K3	XDCT-ML	WP35CM	**XDPT-MM**	**WP35CM**	**XD..-MU**	**WU20PM**	XDPT-MH	WP35CM
N1–N2	XDCT-ALP	WN10HM	**XDCT-ALP**	**WN25PM**	–	–	XDCT-ALP	WN25PM
N3	XDCW-PCD	WDN10U	**XDCW-PCD**	**WDN10U**	–	–	XDCW-PCD	WDN10U
S1–S2	XDCT-ML	WP25PM	**XDPT-MM**	**WS40PM**	**XD..-MU**	**WU20PM**	XDPT-MH	WS40PM
S3	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	**XD..-MU**	**WU20PM**	XDPT-MH	WS40PM
S4	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	**XD..-MU**	**WU20PM**	XDPT-MH	WS40PM
H1	XDCT-ML	WP25PM	**XDPT-MM**	**WP25PM**	**XD..-MU**	**WU20PM**	XDPT-MU	WU20PM

NOTE: Use XDCT/XDET for precision.

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

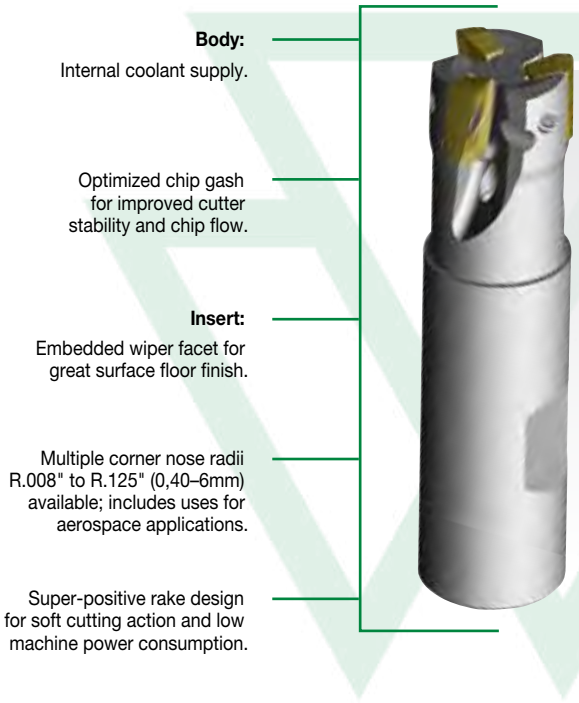
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%				
.F..PCD	.005	**.007**	.011	.003	**.005**	.008	.003	**.004**	.006	.002	**.003**	.005	.002	**.003**	.005		.F..PCD
.F..ALP	.005	**.009**	.013	.003	**.006**	.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

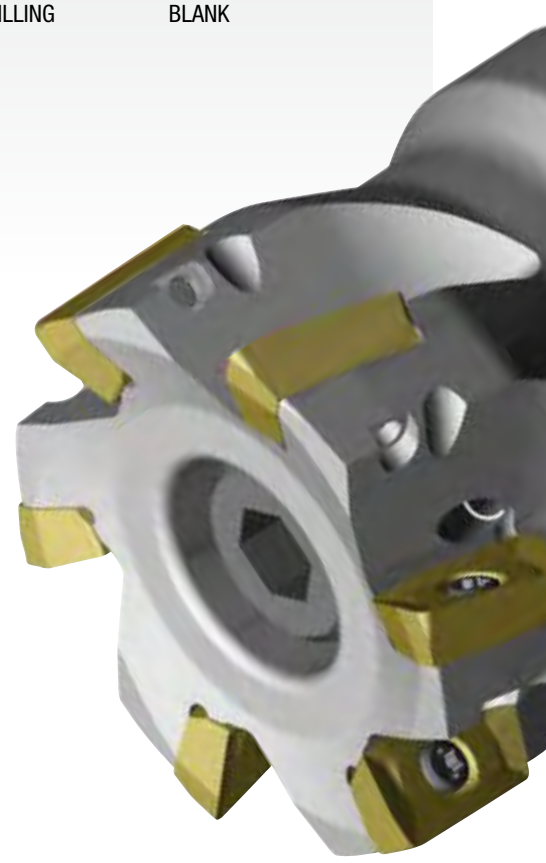

RAMPING BLANK


HELICAL INTERPOLATION/ POCKET MILLING


3D PROFILING


POCKETING

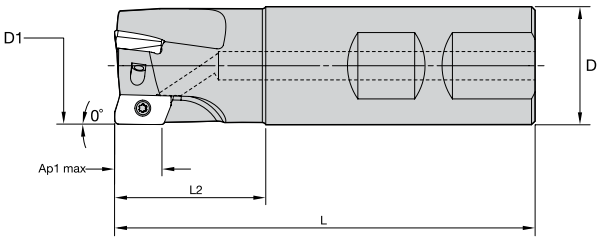

PLUNGE MILLING



LOW POWER CONSUMPTION

SINGLE-SIDED INSERTS

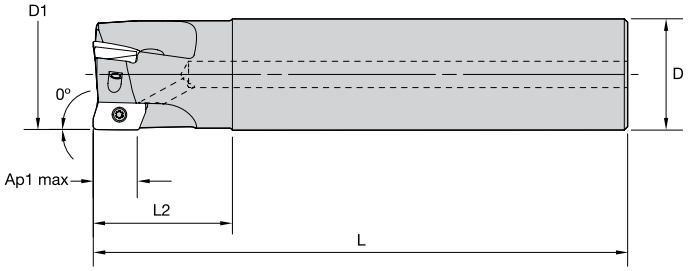
VSM17™ • Weldon® End Mills • Inch



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.
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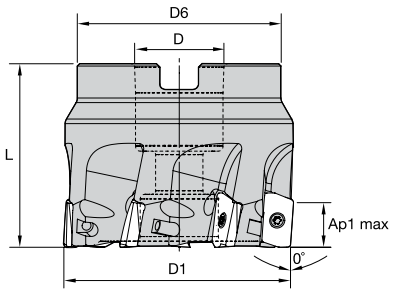
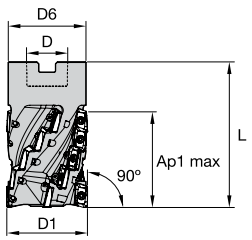
VSM17™ • Shell Mills • Inch



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.

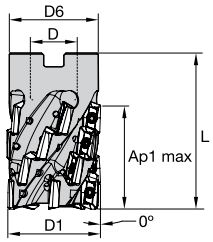
VSM17H • Helical Shell Mills • Long Reach • Inch



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

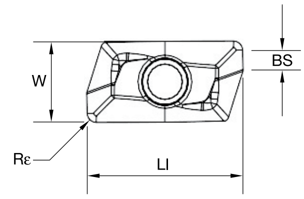
NOTE: Z = number of pockets; ZU = number of flutes.

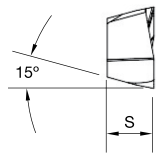
VSM17H™ • Helical Shell Mills • Inch



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

		WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	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
XDCT170404PEFRALP	XDCT1701RALP	2	19,15	.754	2,62	.103	4,90	.193	9,60	.378	0,40	.016	0,02	.001
XDCT170408PEFRALP	XDCT1702RALP	2	19,15	.754	2,22	.088	4,90	.193	9,60	.378	0,80	.031	0,02	.001
XDCT170412PEFRALP	XDCT1703RALP	2	19,16	.754	1,82	.072	4,90	.193	9,60	.378	1,20	.047	0,02	.001
XDCT170416PEFRALP	XDCT1704RALP	2	19,17	.755	1,42	.056	4,90	.193	9,60	.378	1,60	.063	0,02	.001
XDCT170420PEFRALP	XDCT1705RALP	2	19,17	.755	1,01	.040	4,90	.193	9,60	.378	2,00	.079	0,02	.001
XDCT170424PEFRALP	XDCT1706RALP	2	19,17	.755	0,63	.025	4,90	.193	9,60	.378	2,40	.094	0,02	.001
XDCT170432PEFRALP	XDCT1708RALP	2	18,85	.742	—	—	4,88	.192	9,59	.378	3,20	.125	0,02	.001
XDCT170440PEFRALP	XDCT1710RALP	2	18,33	.722	—	—	4,87	.192	9,59	.377	4,00	.157	0,02	.001
XDCT170460PEFRALP	XDCT1715RALP	2	17,02	.670	—	—	4,80	.189	9,56	.376	6,00	.235	0,02	.001

ISO catalog number	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU20PM	WU35PM
XDCT170404PEFRALP	ı	ı	6007341	6007220	ı	ı	ı	ı	ı	ı
XDCT170408PEFRALP	ı	ı	6007345	6007344	ı	ı	ı	ı	ı	ı
XDCT170412PEFRALP	ı	ı	6007342	6001537	ı	ı	ı	ı	ı	ı
XDCT170416PEFRALP	ı	ı	ı	6001256	ı	ı	ı	ı	ı	ı
XDCT170420PEFRALP	ı	ı	ı	6001254	ı	ı	ı	ı	ı	ı
XDCT170424PEFRALP	ı	ı	ı	6001252	ı	ı	ı	ı	ı	ı
XDCT170432PEFRALP	ı	ı	ı	6001240	ı	ı	ı	ı	ı	ı
XDCT170440PEFRALP	ı	ı	ı	6001238	ı	ı	ı	ı	ı	ı
XDCT170460PEFRALP	ı	ı	ı	6118070	ı	ı	ı	ı	ı	ı

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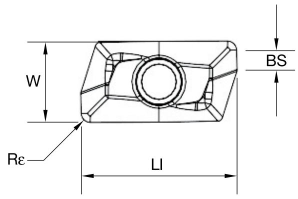
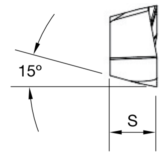
VSM17™ • XDCT-ML



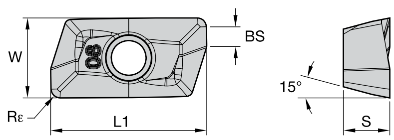


● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	Ll mm	Ll in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU20PM	WU35PM
XDCT170404PEERML	XDCT1701ERML	2	19,15	.754	2,62	.103	4,90	.193	9,60	.378	0,40	.016	0,04	.002	'	'	'	'	5989010	'	'	'	'	'
XDCT170408PEERML	XDCT1702ERML	2	19,15	.754	2,22	.088	4,90	.193	9,60	.378	0,80	.031	0,04	.002	'	'	'	'	5988983	5988982	5988981	6180180	'	'
XDCT170412PEERML	XDCT1703ERML	2	19,16	.754	1,82	.072	4,90	.193	9,60	.378	1,20	.047	0,04	.002	'	'	'	'	5988988	5988987	5988986	6180211	'	'
XDCT170416PEERML	XDCT1704ERML	2	19,17	.755	1,42	.056	4,90	.193	9,60	.378	1,60	.062	0,04	.002	'	'	'	'	6001257	'	'	6425261	'	'
XDCT170420PEERML	XDCT1705ERML	2	19,17	.755	1,01	.040	4,90	.193	9,60	.378	2,00	.079	0,04	.002	'	'	'	'	6001255	'	'	6425263	'	'
XDCT170424PEERML	XDCT1706ERML	2	19,17	.755	0,63	.025	4,90	.193	9,60	.378	2,40	.094	0,04	.002	'	'	'	'	6001253	'	'	6425264	'	'
XDCT170432PEERML	XDCT1708ERML	2	18,85	.742	—	—	4,89	.192	9,59	.378	3,20	.125	0,04	.002	'	'	'	'	6001251	'	'	6425265	'	'
XDCT170440PEERML	XDCT1710ERML	2	18,33	.722	—	—	4,87	.192	9,59	.377	4,00	.157	0,04	.002	'	'	'	'	6001239	'	'	6425266	'	'
XDCT170460PEERML	XDCT1715ERML	2	17,02	.670	—	—	4,80	.189	9,56	.376	6,00	.235	0,04	.002	'	'	'	'	'	'	6118069	6232053	'	'

VSM17™ • XDET -MU



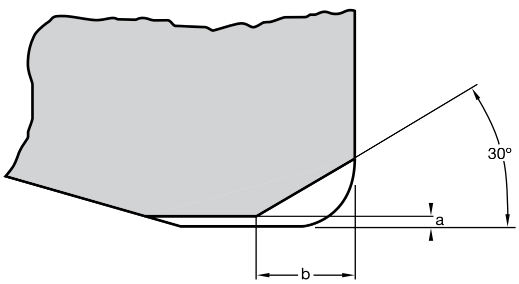
● first choice
○ alternate choice

		WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	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	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU20PM	WU35PM
XDET170408PEERMU	XDET1702ERMU	2	19,15	.754	2,22	.088	4,90	.193	9,60	.378	0,80	.031	0,04	.002	ı	ı	ı	ı	ı	ı	ı	ı	6862947	ı

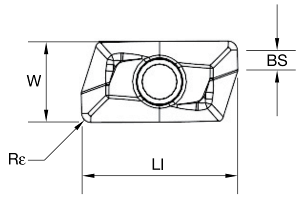
Application Example

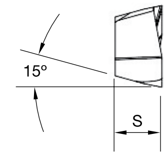
Modification Instructions for Use of Larger Radii Inserts
(Shoulder Mills and Helical Mills)



insert corner radius	material to remove a	material to remove b
0.122"	0.008"	0.071"

VSM17™ • XDPT-MM



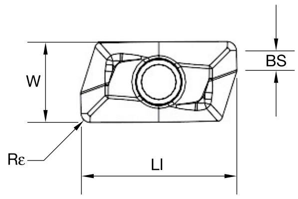


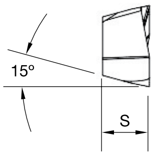
● first choice
○ alternate choice

	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	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	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU20PM	WU35PM
XDPT170404PESRMM	XDPT1701SRMM	2	19,15	.754	2,52	.099	4,90	.193	9,60	.378	0,40	.016	0,10	.004	–	–	–	–	–	–	5987689	–	–	5987690
XDPT170408PESRMM	XDPT1702SRMM	2	19,15	.754	2,15	.085	4,90	.193	9,60	.378	0,80	.031	0,10	.004	5987948	6242460	–	–	5987949	5987947	5987946	6180212	–	5987950
XDPT170412PESRMM	XDPT1703SRMM	2	19,16	.754	1,77	.070	4,90	.193	9,60	.378	1,20	.047	0,10	.004	5988138	–	–	–	5988151	5988140	5988139	6180213	–	5988152
XDPT170416PESRMM	XDPT1704SRMM	2	19,17	.755	1,38	.054	4,90	.193	9,60	.378	1,60	.063	0,10	.004	5988153	–	–	–	5988155	5988156	5988154	6180214	–	–
XDPT170420PESRMM	XDPT1705SRMM	2	19,17	.755	0,99	.039	4,90	.193	9,60	.378	2,00	.079	0,10	.004	–	–	–	–	5988158	5988160	5988159	6425145	–	–
XDPT170424PESRMM	XDPT1706SRMM	2	19,17	.755	0,62	.024	4,90	.193	9,60	.378	2,40	.094	0,10	.004	–	–	–	–	5988203	–	5988202	6425146	–	–
XDPT170432PESRMM	XDPT1708SRMM	2	18,85	.742	—	—	4,89	.192	9,59	.378	3,20	.125	0,10	.004	–	–	–	–	5988206	5988204	5988205	6277261	–	–
XDPT170440PESRMM	XDPT1710SRMM	2	18,33	.722	—	—	4,87	.192	9,59	.377	4,00	.157	0,10	.004	–	–	–	–	5988970	–	5988969	6425147	–	–

VSM17™ • XDPT-MH



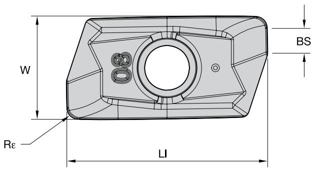


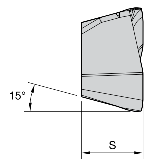
● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	Ll mm	Ll in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU20PM	WU35PM
XDPT170408PESRMH	XDPT1702SRMH	2	19,15	.754	2,10	.083	4,91	.193	9,60	.378	0,80	.031	0,13	.005	5989053	-	-	-	-	5989054	5989052	6425148	-	-
XDPT170412PESRMH	XDPT1703SRMH	2	19,16	.754	1,73	.068	4,91	.193	9,60	.378	1,20	.047	0,13	.005	5991817	-	-	-	-	5991816	5991815	6425149	-	-

VSM17 • XDPT-MU





● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	Ll mm	Ll in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU20PM	WU35PM
XDPT170408PESRMU	XDPT1702SRMU	2	19,15	.754	2,15	.085	4,90	.193	9,60	.378	0,80	.031	0,05	.002	-	-	-	-	-	-	-	-	6487444	-

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

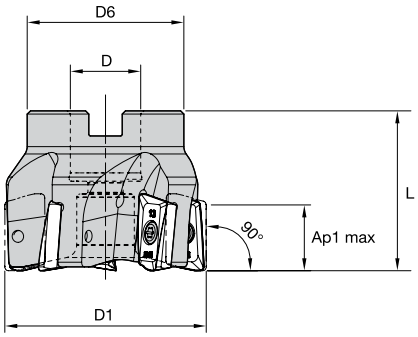
HEAVY DUTY

.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

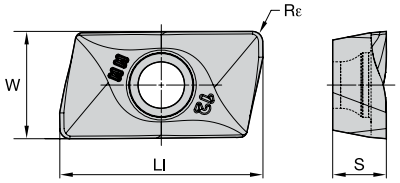


order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
6921226	**VSM22U300Z06S100XP22**	3.000	1.000	2.750	1.750	.787	6	—	Yes	1.77
6921227	**VSM22U400Z08S150XP22**	4.000	1.250	2.875	2.000	.787	8	—	Yes	3.09
6921228	**VSM22U600Z10S200XP22**	6.000	2.000	4.875	2.380	.787	10	6800	Yes	9.17

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM22 • XPHT-MM

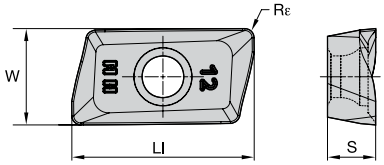


● first choice
○ alternate choice

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

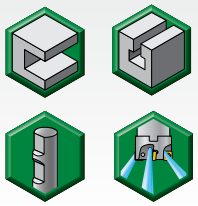
NOTE: Use "Light Machining" value as starting feed rate.
For new applications, starting at a lighter feed rate is recommended.
% = ae/Dc X 100 (ae = radial depth of cut, Dc = cutting diameter)

*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.

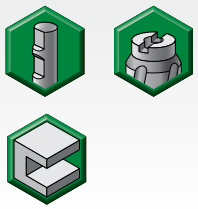
APPLICATIONS



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.

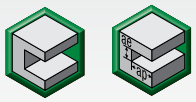
APPLICATIONS



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.

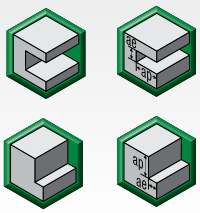
APPLICATIONS



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

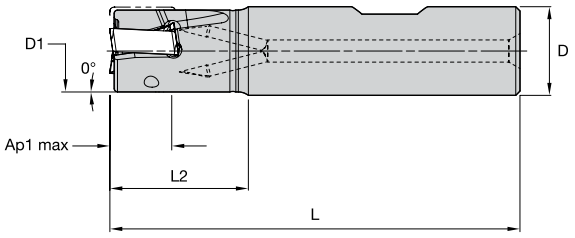
TRANSPORTATION

AEROSPACE

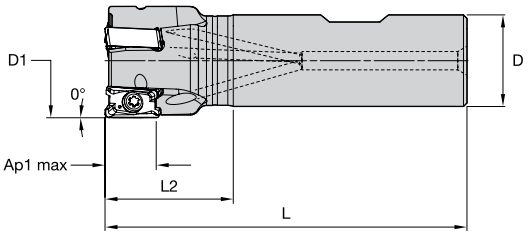
ENERGY

GENERAL ENGINEERING

VSM490-10 • Weldon® End Mills • Inch



Regular Shank

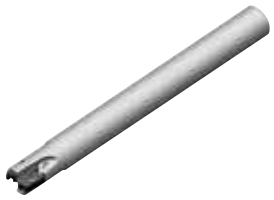


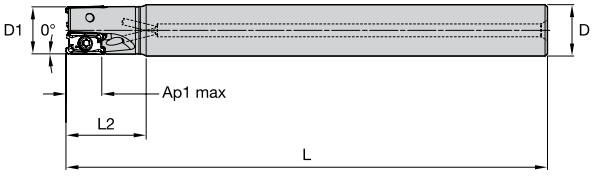
Reduced Shank

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

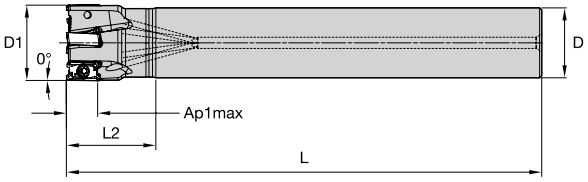
NOTE: Weldon type not recommended for finishing operations.

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





Regular Shank



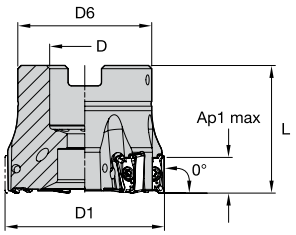
Reduced Shank

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

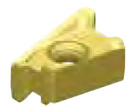


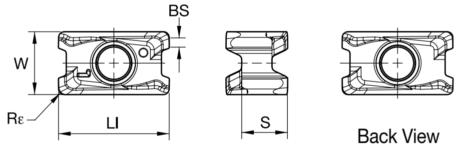
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
6425383	**VSM490D150Z04S075XN10**	1.500	.750	1.421	1.577	.394	4	26200	Yes	.44
6425384	**VSM490D150Z06S075XN10**	1.500	.750	1.421	1.577	.394	6	26200	Yes	.44
6425385	**VSM490D150Z07S075XN10**	1.500	.750	1.421	1.577	.394	7	26200	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



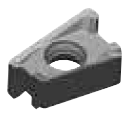


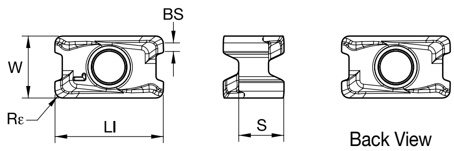
● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
XNGU100404ERML	XNGU1001ERML	4	11,66	.459	4,83	.190	6,60	.260	1,37	.054	0,40	.016	0,02	.001	-	-	-	6425414	-	-	6425415	-
XNGU100408ERML	XNGU1002ERML	4	11,66	.459	4,83	.190	6,60	.260	1,00	.039	0,80	.031	0,02	.001	-	-	-	6425369	-	-	6425370	6425421

VSM490-10 • XNPU-ML • Light Machining



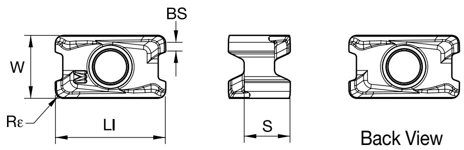


● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
XNPU100408ERML	XNPU1002ERML	4	11,60	.457	4,83	.190	6,60	.260	0,90	.036	0,80	.031	0,02	.001	-	6425366	-	6425367	-	-	6425368	-

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

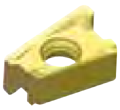


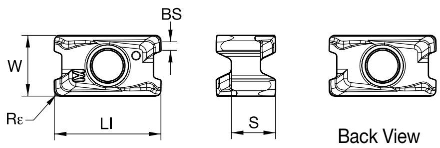
● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
XNGU100404SRMM	XNGU1001SRMM	4	11,66	.459	4,83	.190	6,60	.260	1,37	.054	0,40	.016	0,08	.003	-	-	-	6425416	-	-	6425417	-
XNGU100408SRMM	XNGU1002SRMM	4	11,66	.459	4,83	.190	6,60	.260	1,00	.039	0,80	.031	0,08	.003	-	-	-	6425422	-	-	6425423	6425424

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



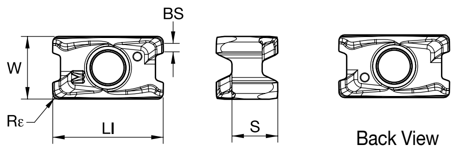


● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
XNPU100408SRMM	XNPU1002SRMM	4	11,60	.457	4,83	.190	6,60	.260	0,90	.036	0,80	.031	0,08	.003	6425364	6425270	-	6425361	6425365	6425363	6425362	-
XNPU100412SRMM	XNPU1003SRMM	4	11,61	.457	4,83	.190	6,60	.260	0,50	.022	1,20	.047	0,08	.003	6425355	-	-	6425352	-	6425354	6425353	-
XNPU100416SRMM	XNPU1004SRMM	4	11,61	.457	4,83	.190	6,60	.260	0,10	.002	1,60	.062	0,08	.003	-	-	-	6425267	-	6425269	6425268	-

VSM490-10 • XNGU-MH • Heavy Roughing

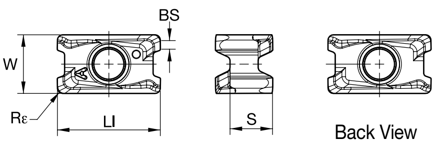


● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
XNGU100408SRMH	XNGU1002SRMH	4	11,66	.459	4,83	.190	6,60	.260	0,90	.036	0,80	.032	0,08	.003	6425359	-	-	6425356	6425360	6425357	-	-

VSM490-10 • XNGU-ALP • For Aluminum and Other Non-Ferrous Alloys



● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
XNGU100404ERALP	XNGU1001ERALP	4	11,66	.459	4,83	.190	6,60	.260	1,37	.054	0,40	.016	0,02	.001	-	-	6425382	-	-	-	-	-
XNGU100408ERALP	XNGU1002ERALP	4	11,66	.459	4,83	.190	6,60	.260	1,00	.039	0,80	.031	0,02	.001	-	-	6425411	-	-	-	-	-

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.*

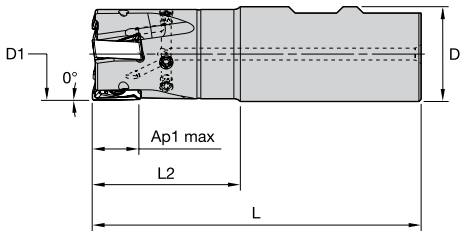
VSM490-10 • Recommended Starting Feeds [IPT]

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.

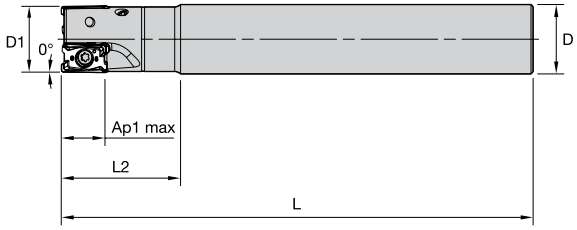
VSM490-15 • Weldon® End Mills • Inch



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

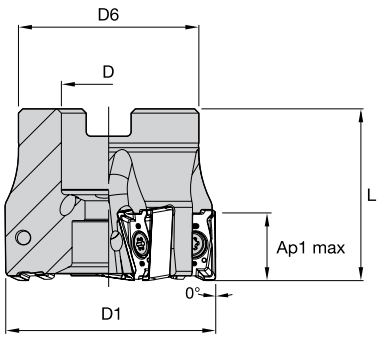
NOTE: Weldon type not recommended for finishing operations.

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

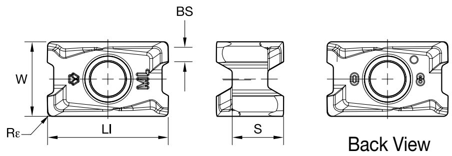


order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5710593	**VSM490D150Z05S050XN15**	1.500	.500	1.420	1.575	.591	5	19500	Yes	.43
5710594	**VSM490D200Z05S075XN15**	2.000	.750	1.750	1.575	.591	5	16100	Yes	.78
5710595	**VSM490D200Z06S075XN15**	2.000	.750	1.750	1.575	.591	6	16100	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

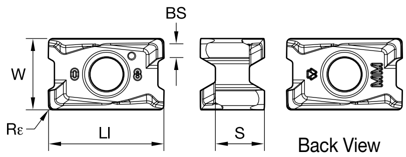


● first choice
○ alternate choice

	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNGU15T604ERML	XNGU1501ERML	4	16,20	.638	6,88	.271	10,00	.394	2,20	.088	0,40	.016	0,08	.003	-	-	-	5890821	-	5890822	6180323	5890823
XNGU15T608ERML	XNGU1502ERML	4	16,20	.638	6,88	.271	10,00	.394	1,80	.072	0,80	.032	0,08	.003	-	6242523	-	5873481	-	5873482	6180324	5873483

VSM490-15 • XNPU-ML • Light Machining

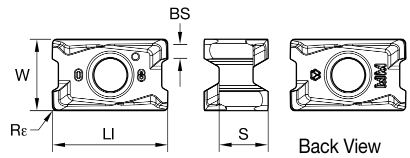


● first choice
○ alternate choice

	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNPU15T608ERML	XNPU1502ERML	4	16,10	.634	6,88	.271	10,00	.394	1,90	.073	0,80	.032	0,08	.003	-	-	-	5883097	-	5883098	-	5883099

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

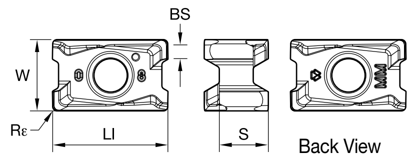


● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNGU15T604SRMM	XNGU1501SRMM	4	16,20	.638	6,88	.271	10,00	.394	2,20	.088	0,40	.016	0,10	.004	-	6242521	-	5949204	-	5949205	-	5949206
XNGU15T608SRMM	XNGU1502SRMM	4	16,20	.638	6,88	.271	10,00	.394	1,90	.073	0,80	.031	0,10	.004	-	6242522	-	5710527	-	5710528	-	5710529
XNGU15T612SRMM	XNGU1503SRMM	4	16,20	.638	6,88	.271	10,00	.394	1,50	.058	1,20	.047	0,08	.003	6234707	-	-	-	-	-	-	-

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

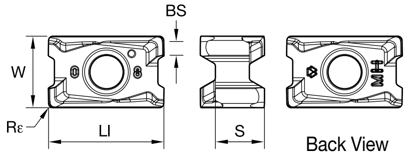


● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNPU15T608SRMM	XNPU1502SRMM	4	16,10	.634	6,88	.271	10,00	.394	1,90	.076	0,80	.032	0,10	.004	5873420	5873419	-	5873415	5873418	5873416	6180320	5873417
XNPU15T612SRMM	XNPU1503SRMM	4	16,10	.634	6,88	.271	10,00	.394	1,50	.059	1,20	.047	0,10	.004	5890763	5890762	-	5890728	5890761	5890729	6180321	5890730
XNPU15T616SRMM	XNPU1504SRMM	4	16,10	.634	6,88	.271	10,00	.394	1,10	.045	1,60	.063	0,10	.004	5883522	5883521	-	5883447	5883450	5883448	6180322	5883449
XNPU15T620SRMM	XNPU1505SRMM	4	16,10	.634	6,88	.271	10,00	.394	0,70	.027	2,00	.079	0,10	.004	6030375	-	-	6030372	6030374	6030373	-	-

VSM490-15 • XNGU-MH • Heavy Roughing



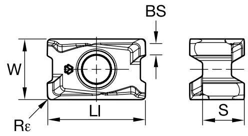
Back View

● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNGU15T608SRMH	XNGU1502SRMH	4	16,20	.638	6,88	.271	10,00	.394	1,80	.069	0,80	.032	0,10	.004	6003725	6003724	-	6003570	6003723	6003721	-	6003722
XNGU15T616SRMH	XNGU1504SRMH	4	16,20	.638	6,88	.271	10,00	.394	1,00	.040	1,60	.063	0,10	.004	6030380	6030378	-	6030376	6030377	-	-	-

VSM490-15 • XNGU-ALP • For Aluminum and Other Non-Ferrous Alloys



● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
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	hm mm	hm in	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNGU15T604ERALP	XNGU1501ERALP	4	16,20	.638	6,88	.271	10,00	.394	2,20	.088	0,40	.016	0,03	.001	-	-	6082644	-	-	-	-	-
XNGU15T608ERALP	XNGU1502ERALP	4	16,20	.638	6,88	.271	10,00	.394	1,80	.072	0,80	.032	0,03	.001	-	-	6082645	-	-	-	-	-

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.

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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

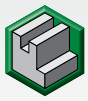
GENERAL ENGINEERING

TRANSPORTATION

ENERGY

APPLICATIONS


FACE MILLING


SIDE/ SHOULDER MILLING: SLOTTING: SHOULDER


SLOTTING: TROCHOIDAL MILLING


PLUNGE MILLING

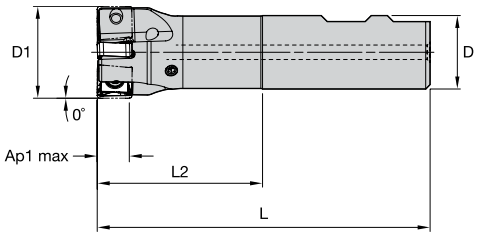

SLOTTING: SQUARE END


POCKET MILLING

VERSATILITY

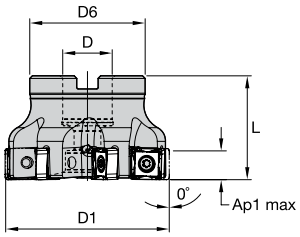
Apply VSM890 in a variety of applications.

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

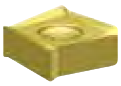


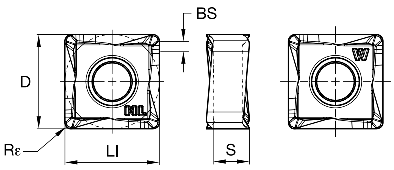
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
6596131	VSM890D200Z04S075SN12	2.000	.750	1.750	1.575	.387	4	23800	Yes	.73
6596132	VSM890D200Z05S075SN12	2.000	.750	1.750	1.575	.387	5	23800	Yes	.70
6596133	VSM890D250Z05S075SN12	2.500	.750	1.750	1.575	.387	5	20700	Yes	1.06
6596134	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



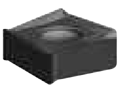


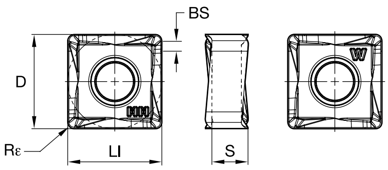
● first choice
○ alternate choice

	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
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	BS mm	BS in	Rε mm	Rε in	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
SNHX120408PNERML	SNHX1202PNERML	8	12,00	.472	4,61	.181	12,00	.472	1,34	.053	0,80	.032	-	-	6596398	-	-	6596399	-

VSM890-12 • SNHX-MM • Universal Geometry for Medium Machining



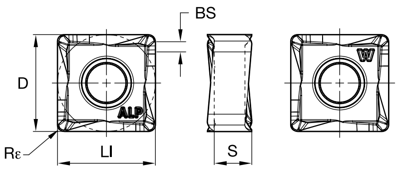


● first choice
○ alternate choice

	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
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	BS mm	BS in	Rε mm	Rε in	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
SNHX120408PNSRMM	SNHX1202PNSRMM	8	12,00	.472	4,61	.181	12,00	.472	1,34	.053	0,80	.032	6667462	-	6596431	6797597	6596432	6596433	6596400
SNHX120416PNSRMM	SNHX1204PNSRMM	8	12,00	.472	4,58	.180	12,00	.472	1,00	.039	1,60	.063	6712874	-	6712875	-	6712876	6712877	-

VSM890-12 • SNHX-ALP • For Aluminum and Other Non-Ferrous Alloys



● first choice
○ alternate choice

	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
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	BS mm	BS in	Rε mm	Rε in	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU10PM
SNHX120408PNERALP	SNHX1202PNERALP	8	12,00	.472	4,61	.181	12,00	.472	1,34	.053	0,80	.032	-	6596397	-	-	-	-	-

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

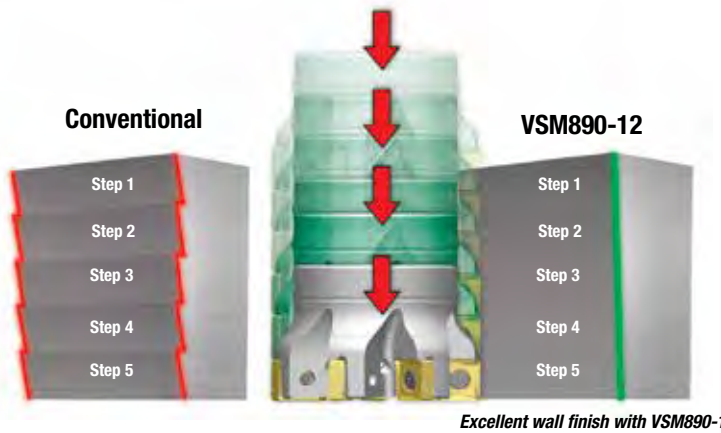
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..ALP	.005	**.010**	.015	.003	**.007**	.011	.003	**.005**	.008	.002	**.005**	.007	.002	**.004**	.006	.E..ALP
.E..ML	.007	**.012**	.023	.005	**.009**	.017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

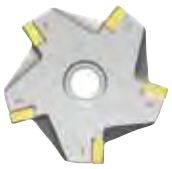
True 0° roughing tool with embedded finishing capabilities all in one tool.

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.

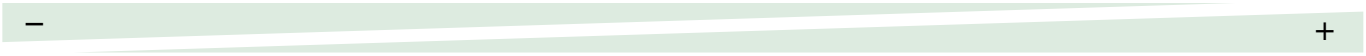
Medium Pitch

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

Fine Pitch

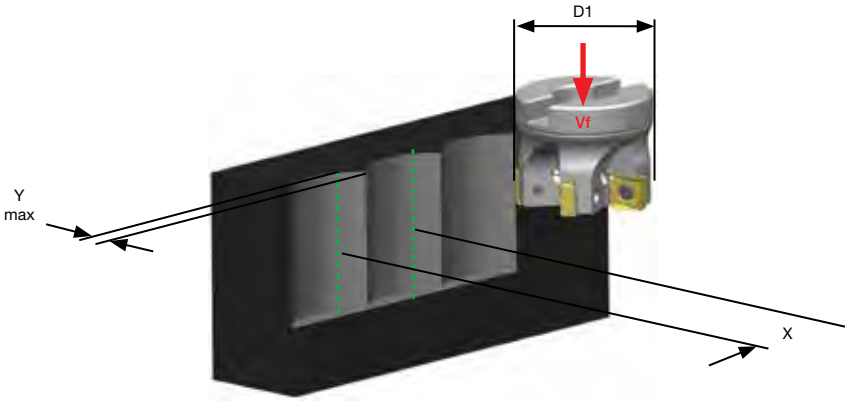
- Rigid setup.
- High spindle power.
- Low axial depth of cut Ap1.
- High feed rate.
- Boost productivity and cut into cycle time.

Machining Stability



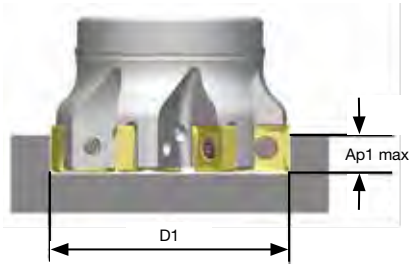
VSM890-12 Z-Axis Plunge Milling

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

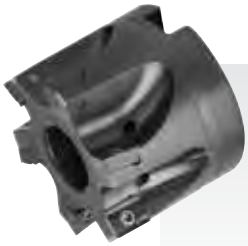
M680-09, M680-16, and M680+ Shoulder Mills

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.



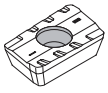
M680+

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

SERIES	DIAMETER RANGE
M680-09	.625–1.25" (16–32mm)
M680-16	1–2" (16–160mm)
M680+	25–40mm (only available in metric sizes)

INSERTS

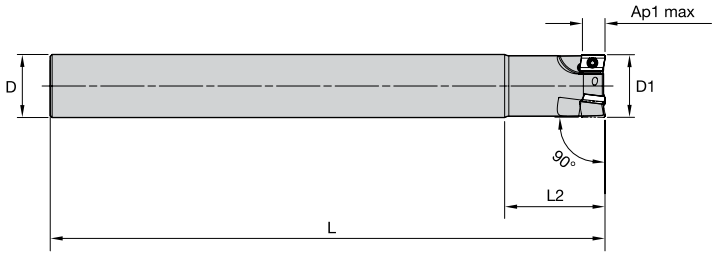
INSERT TYPE	GRADE	MATERIALS
XDHT, MM	WK15PM, WU20PM	P M K N S H
ALP, AL, GE, XP..16, MR	THR, THM-U, TN6501, TN6502, TN6510, TN6520, TN6525, TN6540, TTM08, WK15PM, WP35CM, WU20PM, TTI25, THM, WK15CM, WP40PM, WS30PM	P M K N S H
ML, MM, MH	THM, TN6510, TN6520, TN6540, WK15CM, WP35CM	P M K N S

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



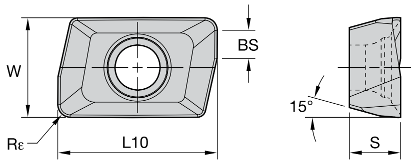
order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
6921188	**M680U062Z02C062XD09L600**	.625	.625	6.000	1.250	.354	2	22000	No	.48
6921189	**M680U075Z02C075XD09L800**	.750	.750	8.000	1.610	.354	2	—	No	.95
6921191	**M680U100Z03C100XD09L800**	1.000	1.000	8.000	2.100	.354	3	—	No	1.67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

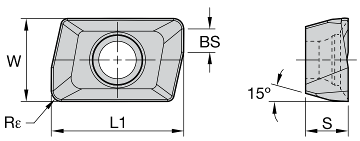


● first choice
○ alternate choice

		THM	THM-U	THR	TN6501	TN6502	TN6510	TN6520	TN6525	TN6540	TTI25	TTM08	WK15CM	WK15PM	WP35CM	WP40PM	WS30PM	WU20PM
P									●	●	●	●			●	●	○	●
M									○	●	○				●	●	●	●
K		○	●	○			●	●	○	○	○		●	●	○			○
N		●	○	○	●	●												○
S				○						●					○	○	●	○
H																	○	○

ISO catalog number	ANSI catalog number	cutting edges	W mm	W in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	THM	THM-U	THR	TN6501	TN6502	TN6510	TN6520	TN6525	TN6540	TTI25	TTM08	WK15CM	WK15PM	WP35CM	WP40PM	WS30PM	WU20PM
XDHT090320	XDHT090320	2	6,35	.250	8,88	.349	3,18	.125	—	—	2,00	.080	0,05	.002	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2634307
XDHT090316	XDHT090316	2	6,35	.250	8,96	.353	3,18	.125	—	—	1,60	.064	0,05	.002	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3954913
XDHT090312	XDHT090312	2	6,35	.250	9,00	.355	3,18	.125	0,61	.024	1,20	.048	0,05	.002	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4113802
XDHT090304	XDHT090304	2	6,35	.250	9,18	.361	3,18	.125	0,37	.014	0,40	.015	0,05	.002	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2568226
XDHT090308	XDHT222	2	6,35	.250	9,47	.373	3,18	.125	1,00	.039	0,80	.031	0,04	.001	2025281	–	–	–	–	–	–	–	–	2028938	2028940	–	–	–	–	–	–
XDHT090308	XDHT222	2	6,35	.250	9,47	.373	3,18	.125	1,00	.039	0,80	.031	—	—	–	–	–	–	–	–	–	–	–	–	–	–	–	6843556	–	–	–
XDHT090308	XDHT090308	2	6,35	.250	9,48	.373	3,18	.125	1,00	.039	0,80	.031	0,04	.002	–	–	–	–	–	–	–	–	–	–	–	6724746	–	–	–	–	–

M680-09 • XDMT-MM

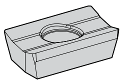


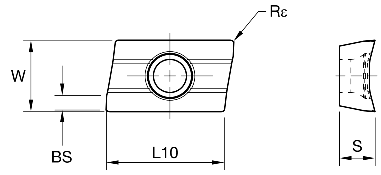
● first choice
○ alternate choice

		THM	THM-U	THR	TN6501	TN6502	TN6510	TN6520	TN6525	TN6540	TTI25	TTM08	WK15CM	WK15PM	WP35CM	WP40PM	WS30PM	WU20PM
P									●	●	●	●			●	●	○	●
M									○	●	○				●	●	●	●
K		○	●	○			●	●	○	○	○		●	●	○			○
N		●	○	○	●	●												○
S				○						●					○	○	●	○
H																	○	○

ISO catalog number	ANSI catalog number	cutting edges	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	THM	THM-U	THR	TN6501	TN6502	TN6510	TN6520	TN6525	TN6540	TTI25	TTM08	WK15CM	WK15PM	WP35CM	WP40PM	WS30PM	WU20PM
XDMT090308PZSRMM	XDMT090308PZSRMM	2	9,88	.389	3,18	.125	2,52	.099	0,80	.031	0,04	.002	–	–	–	–	–	–	–	–	–	–	–	–	6870182	–	–	–	–
XDMT090308PZSRMM	XDMT090308PZSRMM	2	9,88	.389	3,18	.125	2,52	.099	0,80	.031	0,05	.002	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4041195

M680-09 • XDHT-AL





● first choice
○ alternate choice

		THM	THM-U	THR	TN6501	TN6502	TN6510	TN6520	TN6525	TN6540	TTI25	TTM08	WK15CM	WK15PM	WP35CM	WP40PM	WS30PM	WU20PM
P									●	●	●	●			●	●	○	●
M									○	●	○				●	●	●	●
K		○	●	○			●	●	○	○	○		●	●	○			○
N		●	○	○	●	●												○
S				○						●					○	○	●	○
H																	○	○

ISO catalog number	ANSI catalog number	cutting edges	W mm	W in	L10 mm	L10 in	S mm	S in	BS mm	BS in	Rε mm	Rε in	hm mm	hm in	THM	THM-U	THR	TN6501	TN6502	TN6510	TN6520	TN6525	TN6540	TTI25	TTM08	WK15CM	WK15PM	WP35CM	WP40PM	WS30PM	WU20PM
XDHT090308AL	**XDHT222AL**	2	6,71	.264	9,46	.372	3,08	.121	1,00	.039	0,80	.031	0,02	.001	**2031793**	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I

M680-09 • Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	.XDHT..	WU20PM	**.XDHT..**	**WU20PM**	..SRMM	WU20PM
P3–P4	.XDHT..	WU20PM	**.XDHT..**	**WU20PM**	..SRMM	WU20PM
P5–P6	.XDHT..	WU20PM	**..SRMM**	**WU20PM**	..SRMM	WU20PM
M1–M2	.XDHT..	WU20PM	**.XDHT..**	**WU20PM**	..SRMM	WU20PM
M3	.XDHT..	WU20PM	**..SRMM**	**WU20PM**	..SRMM	WU20PM
K1–K2	.XDHT..	WK15CM	**.XDHT..**	**WK15CM**	..SRMM	WK15PM
K3	.XDHT..	WK15CM	**..SRMM**	**WK15PM**	..SRMM	WK15PM
N1–N2	.XDHT..	WU20PM	**.XDHT..**	**WU20PM**	.XDHT..	WU20PM
N3	.XDHT..	WU20PM	**.XDHT..**	**WU20PM**	..SRMM	WU20PM
S1–S2	.XDHT..	WU20PM	**.XDHT..**	**WU20PM**	..SRMM	WU20PM
S3	.XDHT..	WU20PM	**..SRMM**	**WU20PM**	..SRMM	WU20PM
S4	..SRMM	WU20PM	**..SRMM**	**WU20PM**	..SRMM	WU20PM
H1	.XDHT..	WU20PM	–	–	–	–

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

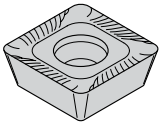
The M690 is an economical, four-edged shoulder mill designed to deliver optimal chip evacuation, excellent shoulder finish, and free cutting action.

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

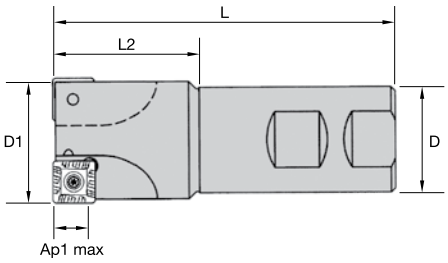
APPLICATIONS

SIDE MILLING/ SHOULDER MILLING: SQUARE END

FACE MILLING

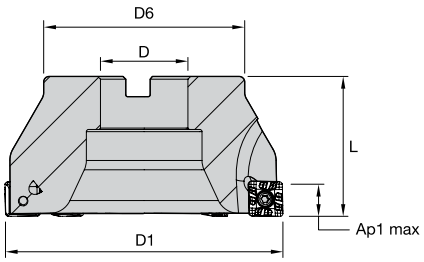
SLOTTING: SQUARE END

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



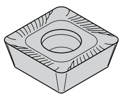
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2646785	**M690D200Z05S075SD12**	2.000	.750	1.700	1.500	.400	5	22400	Yes	.50
2646788	**M690D250Z06S100SD12**	2.500	1.000	2.200	1.750	.400	6	20000	Yes	1.35
2646790	**M690D300Z06SD12**	3.000	1.000	2.305	2.000	.400	6	17200	No	1.84

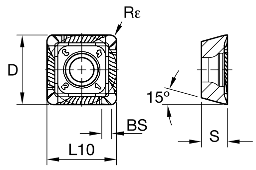
NOTE: Standard milling cutters will accept insert nose radius up to 0.79" without modification.
For larger radii, clearance must be added.

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M690 • SDMT-ML • SD1204..



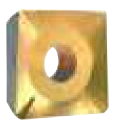


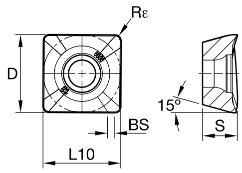
● first choice
○ alternate choice

		THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	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	THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	WS30PM	WS40PM
SDMT1204PDRML	SDMT43PDRML	4	13	.500	12,70	.500	4,77	.188	1,10	.043	1,20	.047	0,08	.003	-	3094667	-	3020185	5427423	-	-	6180319

M690 • SDMX-MM • SD1204..



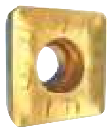


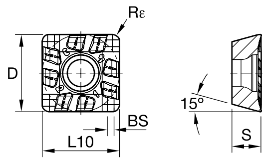
● first choice
○ alternate choice

		THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	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	THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	WS30PM	WS40PM
SDMX120408RMM	SDMX432RMM	4	13	.500	12,70	.500	4,76	.188	1,93	.076	0,80	.031	0,10	.004	-	-	3950588	3950589	-	-	5522490	6180317
SDMX120408RMM	SDMX432RMM	4	13	.500	12,70	.500	4,76	.188	1,93	.076	0,80	.031	—	—	-	-	-	-	-	6842067	-	-
SDMX120412RMM	SDMX433RMM	4	13	.500	12,70	.500	4,76	.188	1,50	.061	1,20	.048	0,10	.004	-	-	-	3950597	-	-	5519572	6180318
SDMX120412RMM	SDMX433RMM	4	13	.500	12,70	.500	4,76	.188	1,50	.061	1,20	.048	—	—	-	-	-	-	-	6842095	-	-
SDMX120416RMM	SDMX434RMM	4	13	.500	12,70	.500	4,76	.188	1,50	.059	1,60	.063	0,10	.004	-	4145063	-	4145065	-	-	-	-

M690 • SDMT-MH • SD1204..



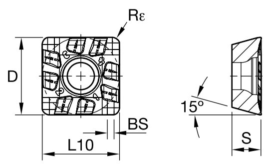


● first choice
○ alternate choice

	THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	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	THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	WS30PM	WS40PM
SDMT1204PDRMH	SDMT43PDRMH	4	13	.500	12,70	.500	4,81	.189	1,10	.043	1,20	.047	0,14	.006	–	–	3325040	3326330	5427422	–	–	–

M690 • SDMX-MH • SD1204..

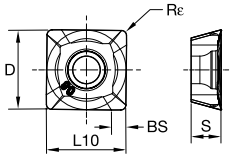


● first choice
○ alternate choice

	THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	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	THM-U	TN6520	TN6525	TN6540	WK15CM	WP35CM	WS30PM	WS40PM
SDMX120408RMH	SDMX432RMH	4	13	.500	12,70	.500	4,76	.188	1,93	.076	0,80	.031	0,14	.006	–	–	–	3950592	5427427	–	–	–
SDMX120408RMH	SDMX432RMH	4	13	.500	12,70	.500	4,76	.188	1,93	.076	0,80	.031	–	–	–	–	–	–	–	6842069	–	–
SDMX120412RMH	SDMX433RMH	4	13	.500	12,70	.500	4,76	.188	1,54	.061	1,20	.047	0,14	.006	–	3950614	3950601	3950603	5427428	–	–	–
SDMX120412RMH	SDMX433RMH	4	13	.500	12,70	.500	4,76	.188	1,54	.061	1,20	.047	–	–	–	–	–	–	–	6842093	–	–
SDMX120416RMH	SDMX434RMH	4	13	.500	12,70	.500	4,76	.188	1,50	.059	1,60	.063	0,14	.006	–	–	–	3950607	–	–	–	–
SDMX120416RMH	SDMX434RMH	4	13	.500	12,70	.500	4,76	.188	1,50	.059	1,60	.063	–	–	–	–	–	–	–	6842070	–	–

M690 • SDEX-ALP • SD1204..



● 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
SDEX120408FRALP	4	.500	.504	.187	.060	.031	.001	5281790	-	-	-	-	-	-	-

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.

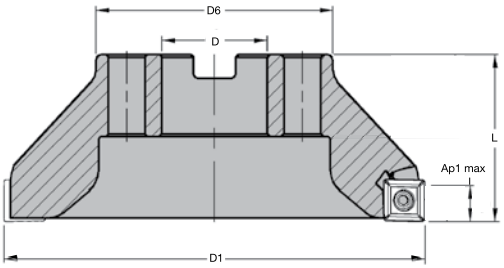
M690 SD1204 • Recommended Starting Feeds [IPT]

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.

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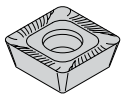
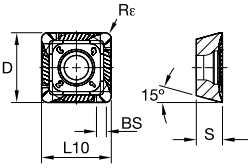
M690 • SDMT-ML • SD1506..



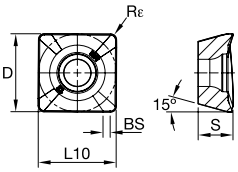


● first choice
○ alternate choice

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..

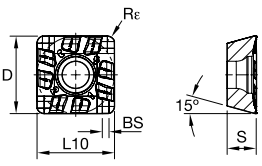


● first choice
○ alternate choice

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..

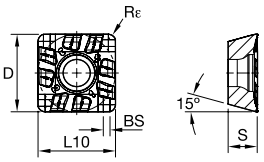


● first choice
○ alternate choice

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.

Flute engineered for maximum chip evacuation.

Cylindrical shank designed and balanced to G6.3 at 30,000 RPM.

Internal coolant to enable chip evacuation.

Inserts with different radii are held without losing and gauge height of the cutter length.

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

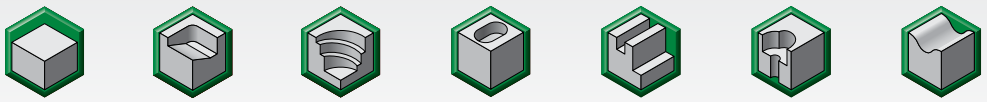
Cylindrical End Mills
Monoblocks
Shell Mills

INDUSTRY

AEROSPACE

GENERAL ENGINEERING

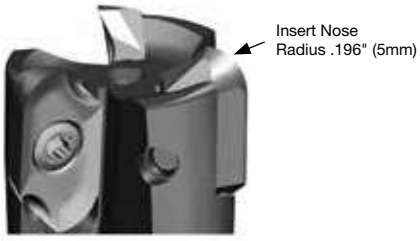
APPLICATIONS



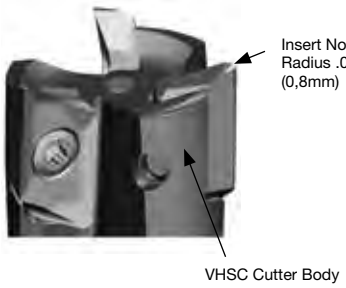
FACE MILLING | RAMPING BLANK | HELICAL MILLING | POCKETING | SIDE/ SHOULDER MILLING: SLOTTING: SHOULDER | SPIRAL/ CIRCULAR | 3D PROFILING

USER-FRIENDLY SETUP MAKES A BIG DIFFERENCE

LARGE CORNER RADIUS

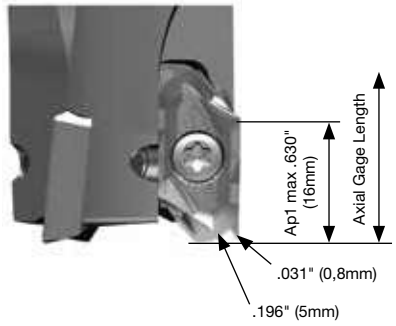


SMALL CORNER RADIUS



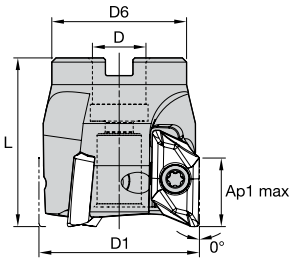
- Unique feature has a great impact on significant cost savings.
- Only one cutter body needed to load inserts with corner nose radii from R.020" to R.236" (R0,4–R0,6mm) max.
- All other suppliers require modification and rebalance of the cutter body.

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.

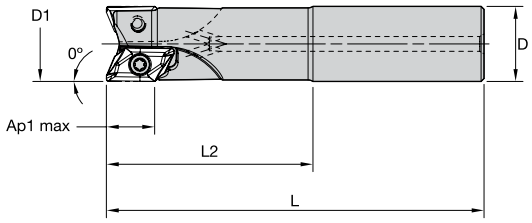
VHSC • Shell Mills • Inch



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

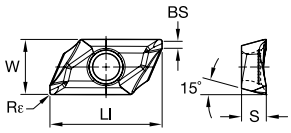
NOTE: Pre-balanced to G6.3/30,000 RPM.

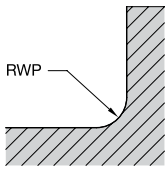
NOTE: It is important to change the screw each time the insert is changed to ensure the highest security. A dynamometric key and the correct insert screw torque value are key for HSC applications. Adjustable torque wrench (order number 6197561) and Torx Plus 20 bit (order number 6205891) may be purchased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

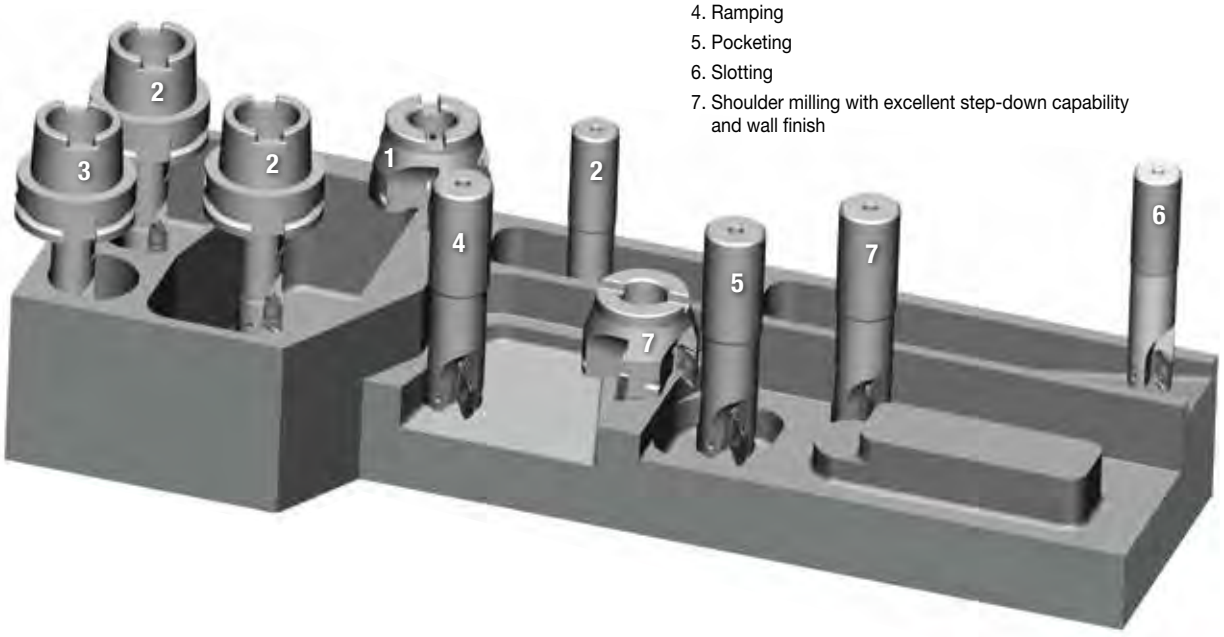
Technical Information

▼ Machinability by Materials • Aluminum

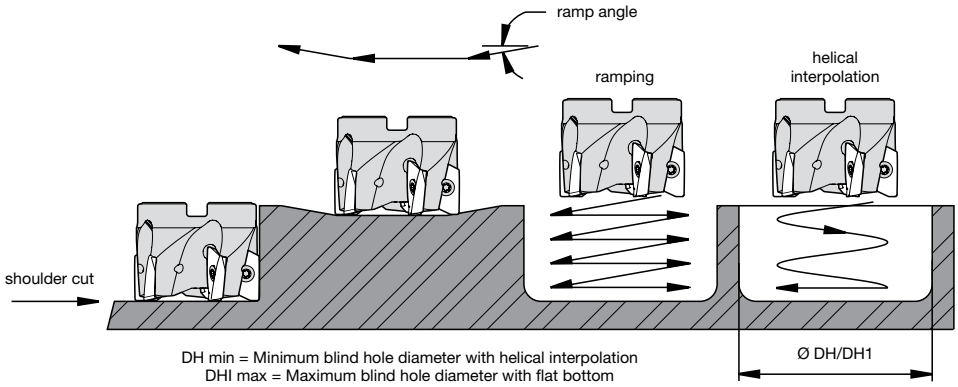
Alloy Group	Alloy Designation	Chemical Composition Limits (WT%)												Typical Temper	Rm (Mpa)	Machinability Chip Formation	Machinability
		Cu	Si	Fe	Mn	Mg	Zn	Cr	Ti	Pb	Bi	Al	Others				
Al	1050	0.05	0.25	0.40	0.50	0.05	0.05	–	–	–	–	99.50min	–	H14	105	D	A
	1100	0.05–0.20	Si+Fe 1.00 max	–	0.05	–	0.10	–	–	–	–	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

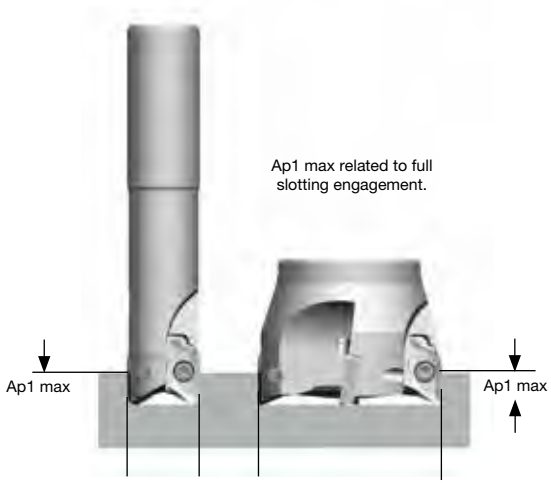
▼ Ap1 max at Helical Interpolation for 360° Tool Path

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)

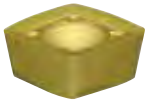
VXF-09
Ap1 Max:
0.0591" (1,5mm)
Fz Max:
0.079"/z (2,0mm/z)

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

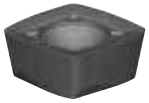
-MM



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.

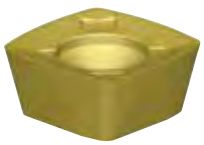
-MH

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.

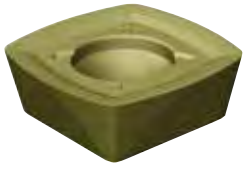
-MH

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

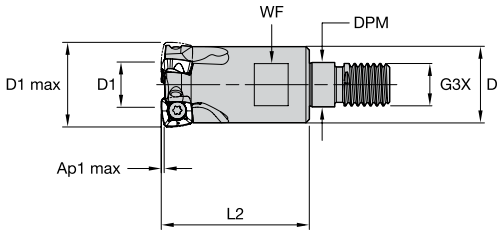
INDUSTRY

73.5°

LEAD ANGLE

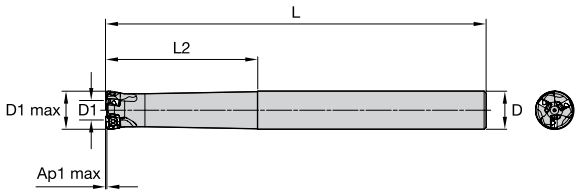
redistributes cutting forces in the spindle z-axis direction.

VXF-07 • Screw-On End Mills • Inch



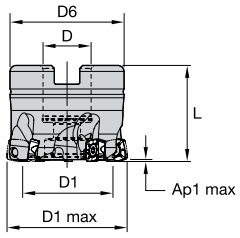
order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6712878	VXF075Z03M10XP07	.750	.384	.709	.413	M10	1.378	.589	.035	3	6.7°	57000	Yes	.13
6712879	VXF100Z04M12XP07	1.000	.631	.827	.492	M12	1.378	.667	.035	4	4.3°	49000	Yes	.21
6712880	VXF125Z05M16XP07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

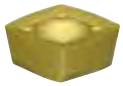


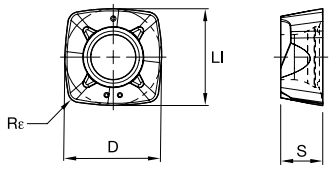
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6712975	VXF150Z05S075XP07	1.500	1.129	.750	1.417	1.260	.035	5	1.0°	35800	Yes	.33
6712976	VXF200Z07S075XP07	2.000	1.629	.750	1.654	1.575	.035	7	.7°	31000	Yes	.80

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VXF-07 • XPPT-MM



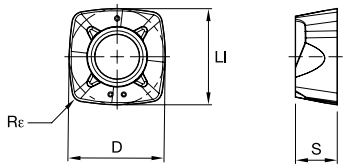


● first choice
○ alternate choice

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)

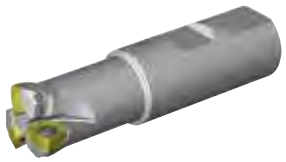
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.018	**.051**	.094	.013	**.035**	.059	.009	**.025**	.042	.008	**.022**	.037	.007	**.020**	.033	.E..MM
.S..MH	.032	**.070**	.118	.023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

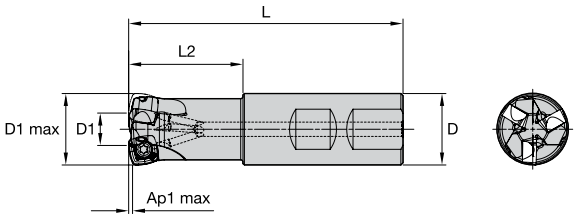
At .035 Axial Depth of Cut (AP1)

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

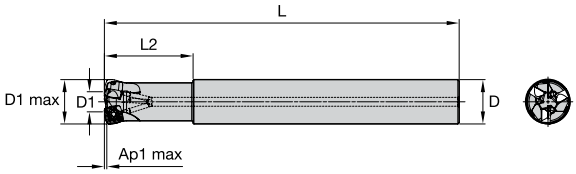




order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6597756	VXF100Z03W100XD09	1.000	.462	1.000	3.856	1.575	.059	3	2.7°	48000	Yes	.67
6597757	VXF125Z03W100XD09	1.250	.711	1.000	3.856	1.575	.059	3	1.5°	40500	Yes	.82
6597758	VXF125Z04W100XD09	1.250	.711	1.000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

NOTE: Please order wrench separately.

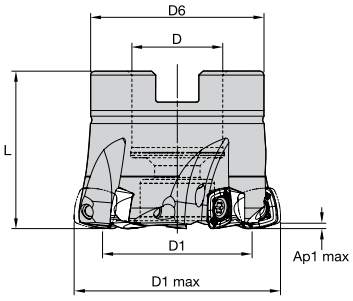
VXF-09 • Cylindrical End Mills • Inch



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.

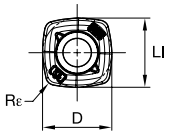
VXF-09 • Shell Mills • Inch



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

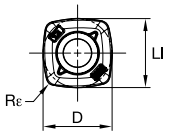


● first choice
○ alternate choice

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

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

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)

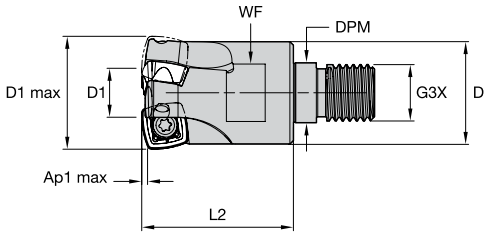
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.018	**.053**	.083	.013	**.038**	.057	.010	**.028**	.042	.009	**.024**	.036	.008	**.022**	.033	.E..MM
.S..MH	.026	**.058**	.097	.019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

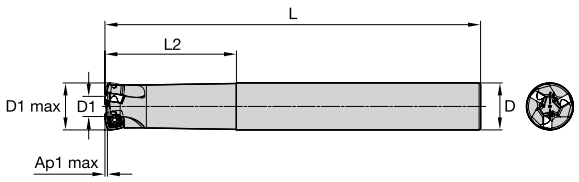
VXF-12 • Screw-On End Mills • Inch



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.

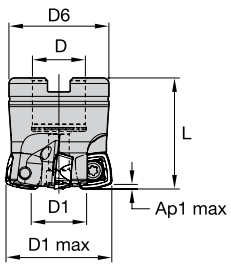
VXF-12 • Cylindrical End Mills • Inch



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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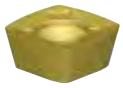
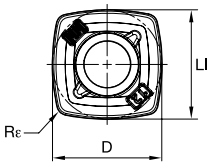
MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VXF-12 • XDPT-MM



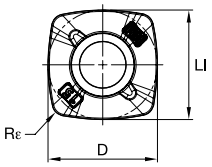


● first choice
○ alternate choice

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)

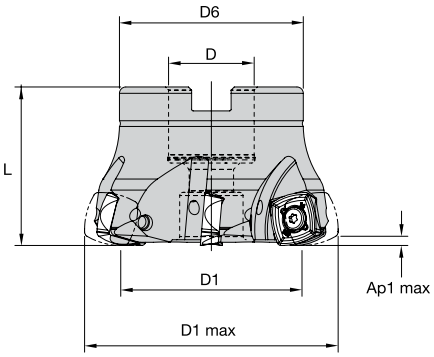
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.018	**.051**	.094	.013	**.035**	.059	.009	**.025**	.042	.008	**.022**	.037	.007	**.020**	.033	.E..MM
.S..MH	.032	**.070**	.118	.023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

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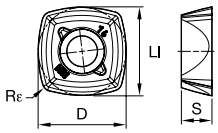
VXF-16 • XEPT-MM



● 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)

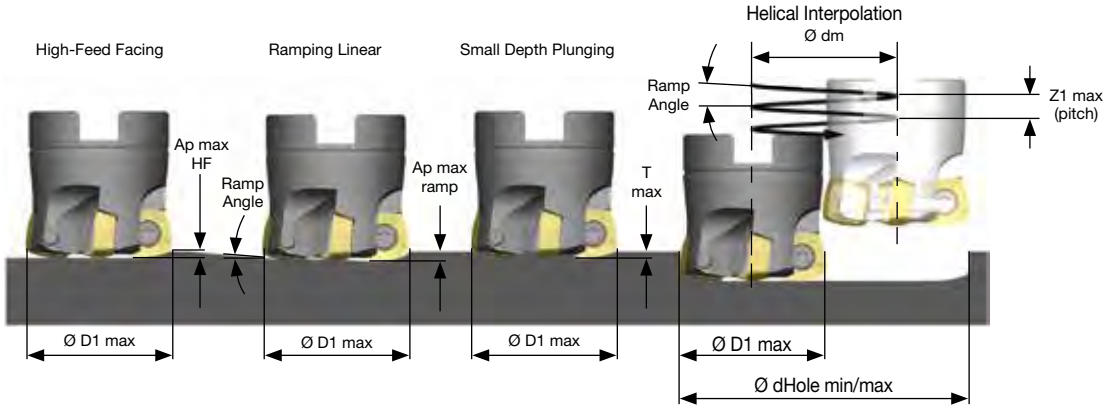
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.014	**.046**	.077	.010	**.033**	.055	.008	**.024**	.041	.007	**.021**	.036	.006	**.019**	.032	.E..MM

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.

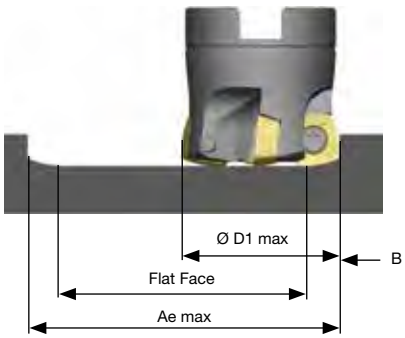
Best Practices



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

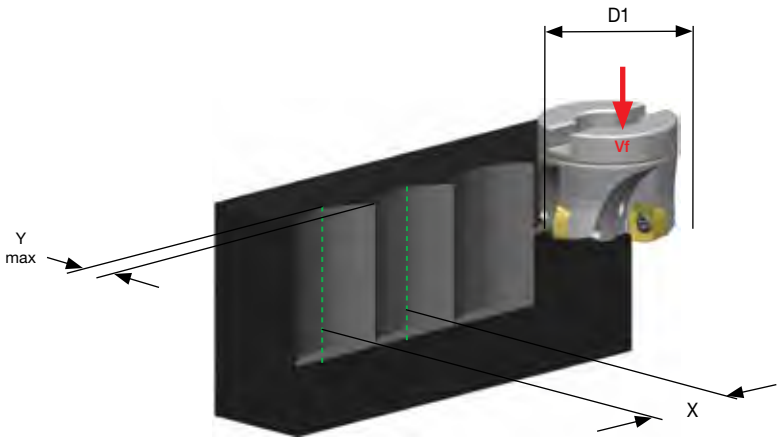
Ødm = ØHole–ØD1 max
Z1 = Ødm x 3,14 x tan ramp angle. Z1 ≤ Z1 max and ≤ ramp angle max
Ramp angle = arc tan x ((Z1)/Ødm x 3,14))

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)

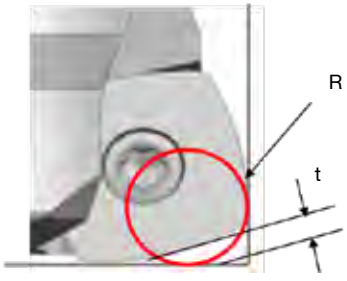
Light Machining	General Purpose	Heavy Machining

	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

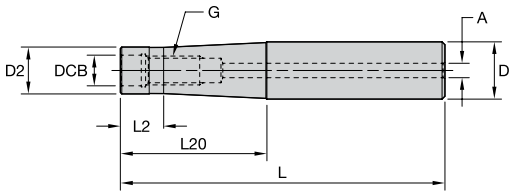
CAM Programming

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

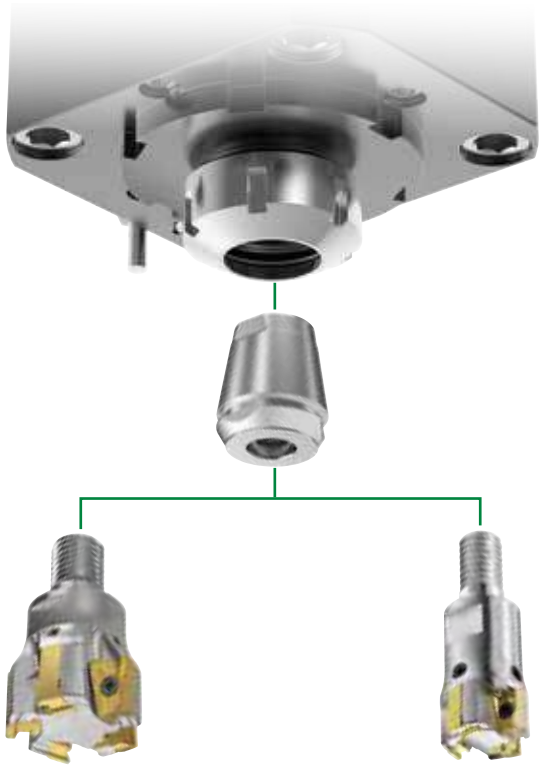
NOTE: Cylindrical shank extensions can be used with all modular heads found in several product family series.

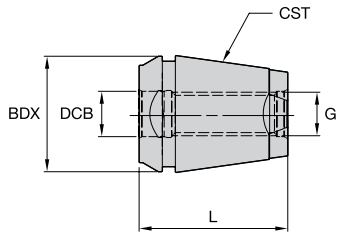
Solid ER Collets

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.





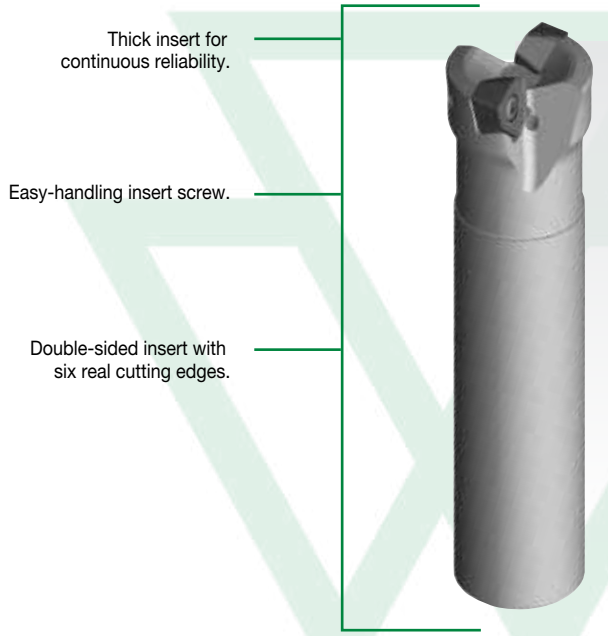
ERICKSON™

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™

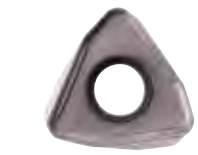
M370 IC08, M370 IC12 High-Feed Mill

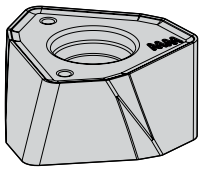
The M370 Series is six-edged high-feed mill designed for high feed rate productivity in steel and cast iron materials.



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

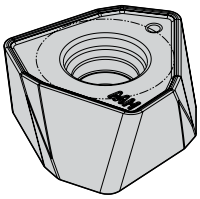




-MM

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

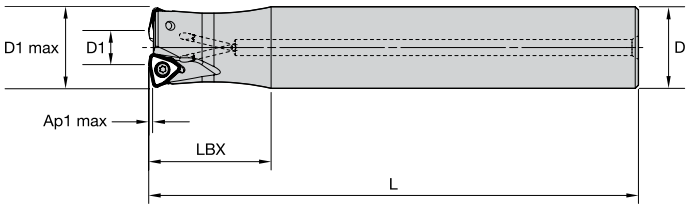
GENERAL ENGINEERING

APPLICATIONS

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

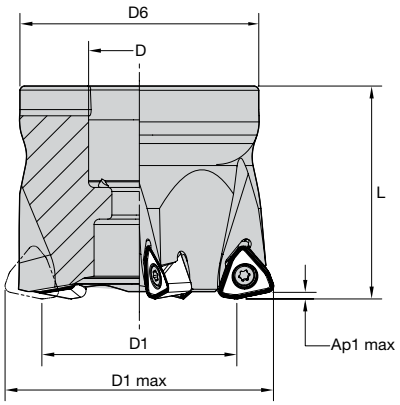
POCKETING | HELICAL MILLING | PLUNGE MILLING | THROUGH COOLANT: RADIAL: INDEXABLE MILLING

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



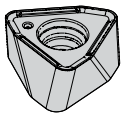
		D1 max		D1		D		D6		L		Ap1 max							
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
4047660	M370D150Z04S050WO08	38,10	1.500	24,10	.950	12,70	.500	36,00	1.417	40,00	1.575	1,25	.049	4	1.5	34500	Yes	0,19	.41
4047661	M370D200Z05S075WO08	50,80	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

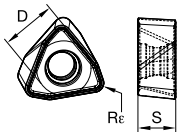
NOTE: Socket-head cap screw with coolant groove must be ordered separately.

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M370 • WOEJ-MM • W00804..

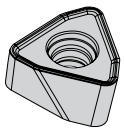


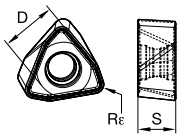


● first choice
○ alternate choice

								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.

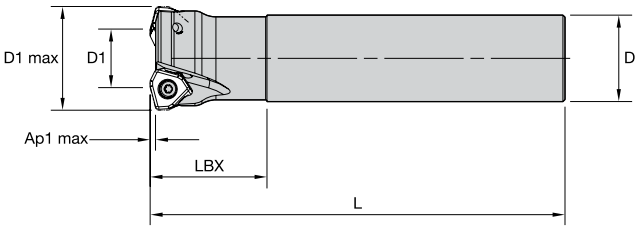
M370 • 08 • Recommended Starting Feeds [IPT]

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

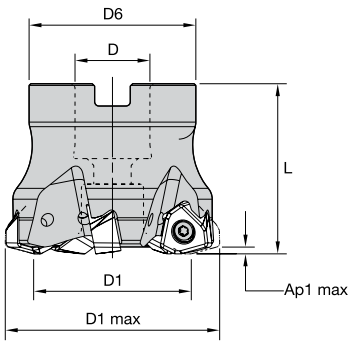
NOTE: Use "Light Machining" value as starting feed rate.

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



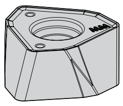
		D1 max		D1		D		D6		L		Ap1 max							
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
5352397	M370D200Z04S075WO12	50,80	2.000	33,91	1.335	19,10	.750	44,45	1.750	40,00	1.575	2,00	.078	4	3.6	19380	Yes	0,31	.69
5698432	M370D200Z04S075WO12L200	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

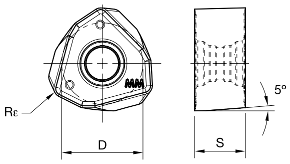
NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly must be ordered separately.

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M370 • WOEJ-MM • WO.J1207



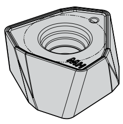


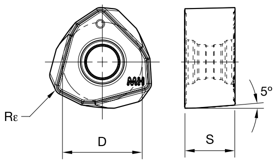
● first choice
○ alternate choice

		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	TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
WOEJ120712SRMM	6	12,00	.472	7,30	.287	1,27	.050	-	-	-	5419648	5419791	5542346	5520249	6284471	5419649

M370 • WOEJ-MH • WO.J1207



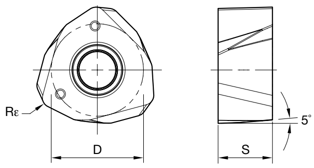


● first choice
○ alternate choice

		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	TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
WOEJ120712SRMH	6	12,00	.472	7,30	.287	1,27	.050	-	-	5338860	5338818	5338862	5542347	-	6411157	5338819

M370 • WOEJ-MR • WO.J1207



● 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	TN6525	TN6540	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
WOEJ120712SRMR	6	12,00	.472	7,1000	.280	1,27	.050	-	-	-	5698343	-	5698342	-	6335211	-

M370 • 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	...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) 5%			10%			20%			30%			40–100%			Insert Geometry
...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.

Thick inserts paired with the rigid body design provide rigidity and consistency.

Anti-rotation systems in the larger iC inserts provide stability to allow for higher depth of cuts.

Large chip gashes and through tool coolant capabilities provide smooth and increased chip evacuation.

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

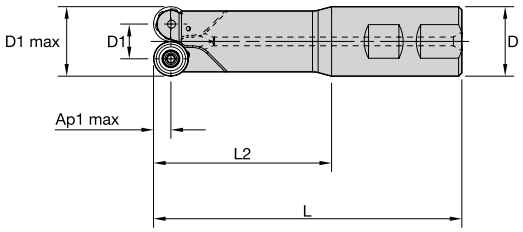
CONSISTENCY

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



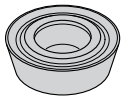
order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646596	**M100D075Z02W075RD08L453**	.750	.435	.750	4.530	2.500	.158	2	22.0	26000	Yes	.85

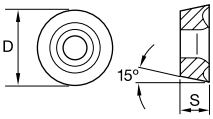
NOTE: All spare parts except the insert screws must be ordered separately.

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M100 • RDMT-M0T • RD0802..



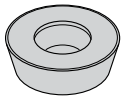


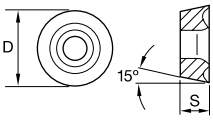
● first choice
○ alternate choice

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

catalog number	D in	D mm	S in	S mm	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
RDMT0802M0T	.315	8,0000	.094	2,3800	-	-	-	-	-	6901186	-	-
RDMT1003M0T	.394	10,0000	.125	3,1800	-	-	-	-	-	6901187	-	-

M100 • RDMW-M0 / -M0T • RD0802..





● 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
RDMW0802M0	8,00	.315	2,38	.094	0,09	.004	2012566	-	-	-	-	-	-	-
RDMW0802M0T	8,00	.315	2,38	.094	0,09	.004	-	-	3353278	-	-	-	-	-

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)

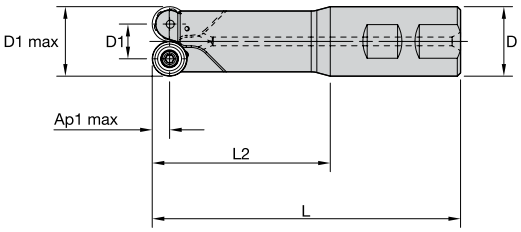
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDMW-	.011	**.017**	.025	.008	**.012**	.018	.006	**.009**	.013	.005	**.008**	.012	.005	**.007**	.011	RDMW-
RDHT-T	.014	**.018**	.037	.010	**.013**	.027	.007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



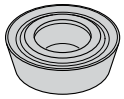
order number	catalog number	D1 max mm	D1 max in	D1 mm	D1 in	D mm	D in	L mm	L in	L2 mm	L2 in	Ap1 max mm	Ap1 max in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
2646602	M100D075Z02W100RD10L628	19,05	.750	9,04	.356	25,40	1.000	159,51	6.280	101,60	4.000	5,00	.197	2	40.0	26000	Yes	0,50	1.10

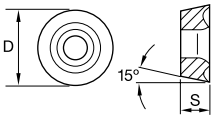
NOTE: All spare parts except the insert screws must be ordered separately.

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M100 • RDMT-M0T • RD1003..



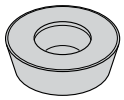


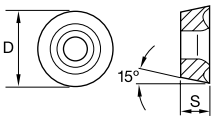
● first choice
○ alternate choice

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)

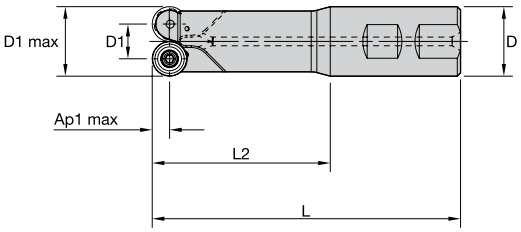
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-T	.014	**.023**	.039	.010	**.017**	.028	.007	**.012**	.021	.006	**.011**	.018	.006	**.010**	.017	RDHT-T
RDHW-MH	.014	**.025**	.053	.010	**.018**	.038	.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.

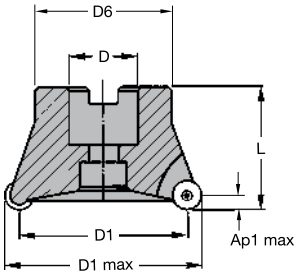
M100 • Weldon® End Mills • iC12 • Inch



		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



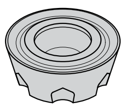
		D1 max		D1		D		D6		L		Ap1 max								
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
2646725	M100D200Z05S075RD12	50,80	2.000	38,86	1.530	19,05	.750	43,18	1.700	41,40	1.630	6,00	.236	5	10.0	15000	Yes	0,25	.55

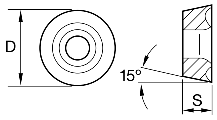
NOTE: All spare parts except the insert screws must be ordered separately.

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

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

M100 • RDMT-TX • RD1204..



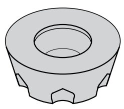


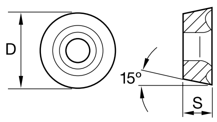
● first choice
○ alternate choice

	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
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..



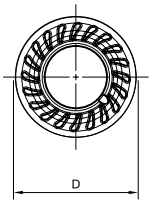


● first choice
○ alternate choice

	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
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)

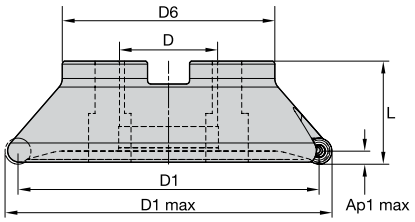
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
RDHT-TX	.021	**.020**	.033	.015	**.014**	.024	.011	**.011**	.018	.010	**.009**	.016	.009	**.009**	.014	RDHT-TX
RDMT-TX	.021	**.025**	.042	.015	**.018**	.030	.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



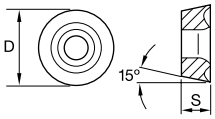
		D1 max		D1		D		D6		L		Ap1 max								
order number	catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Z	max ramp angle	max RPM	coolant supply	kg	lbs
2646723	M100D200Z04S075RC16	50,80	2.000	34,79	1.370	19,05	.750	43,18	1.700	41,40	1.630	8,00	.315	4	12.0	15000	Yes	0,27	.60

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..

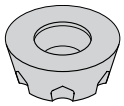


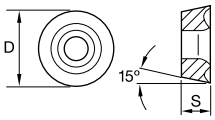
● first choice
○ alternate choice

	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
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
RDMT1605M0TX	6	16,0000	.630	5,5600	.219	–	–	▪	▪	▪	▪	▪	6901189	▪	▪

M100 • RDMW-M0TX • RD1605..



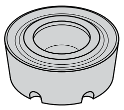


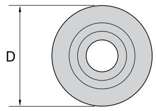
● first choice
○ alternate choice

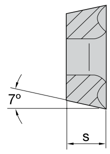
	THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
P	●	●	●		●	○	○	●
M	○	●			●	●	●	●
K	○	○	○		●	○		
N	●							○
S			●			○	●	●
H							○	

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
RDMW1605M0TX	6	16,00	.630	5,56	.219	0,15	.006	▪	▪	3523083	2012608	▪	▪	▪	▪
RDMW1605M0TX	6	16,00	.630	5,56	.219	–	–	▪	▪	▪	▪	▪	6901191	▪	▪

M100 • RCMT-M0TX • RC1606..







● first choice
○ alternate choice

		THM	TN6525	TN6540	TTM08	WK15CM	WP35CM	WS30PM	WS40PM
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		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	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

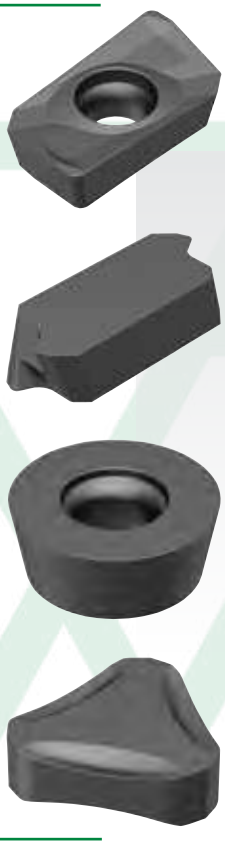
Use general milling and ISO inserts in the latest WIDIA™ grades as an economical solution for improved productivity in face milling, shoulder milling, and copy milling applications.

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

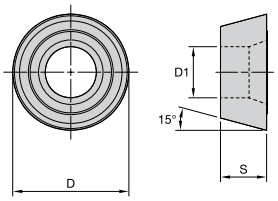
PERFORMANCE

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

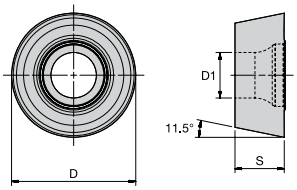


● first choice
○ alternate choice

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

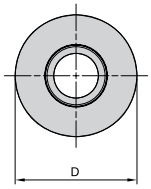


● first choice
○ alternate choice

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

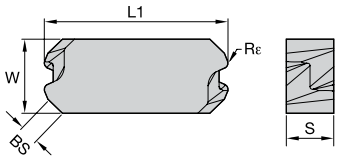


● first choice
○ alternate choice

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

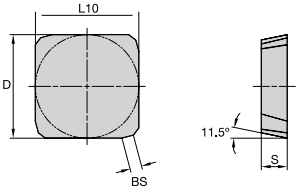


● first choice
○ alternate choice

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

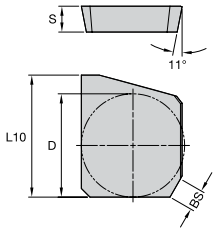


● first choice
○ alternate choice

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

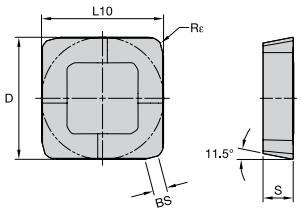


● first choice
○ alternate choice

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

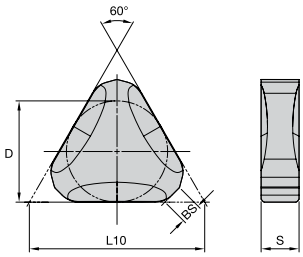


● first choice
○ alternate choice

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

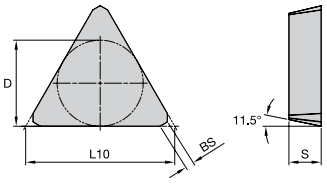


● first choice
○ alternate choice

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

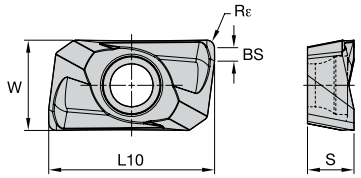


● first choice
○ alternate choice

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

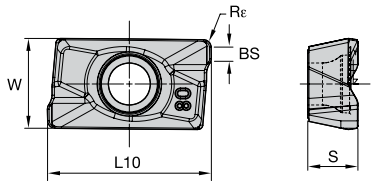


● first choice
○ alternate choice

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

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WIDIA™

Solid End Milling

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

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	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

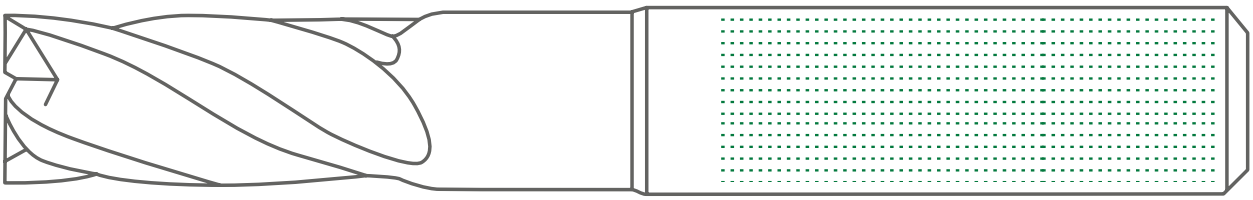
to reduce vibrations and increase overall cutting stability.

ECCENTRIC RELIEF

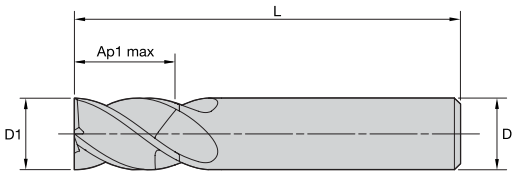
to provide vibration dampening and increase tool life on stainless steels.

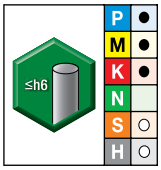
CORE APER

for improved chip evacuation and tool stability.



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



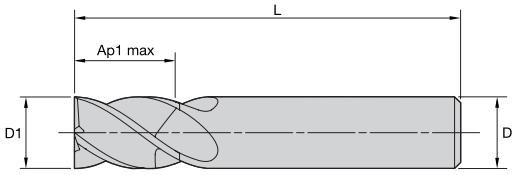


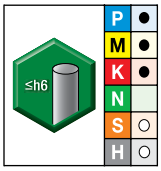
WU20PE

● 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



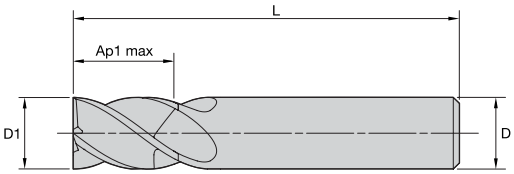


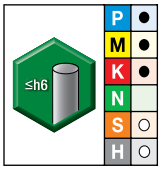
WU20PE

● 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



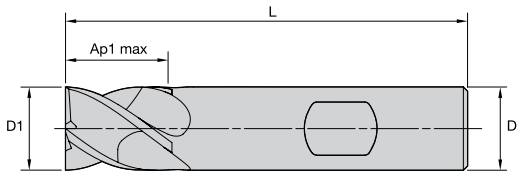


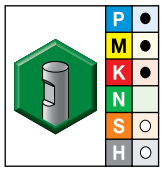
● first choice
○ alternate choice

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



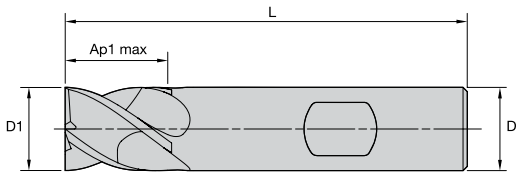


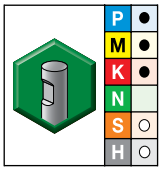
● first choice
○ alternate choice

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



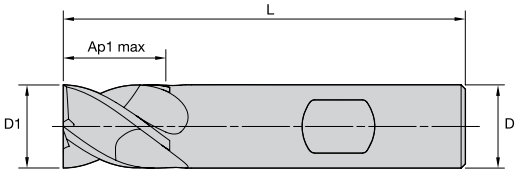


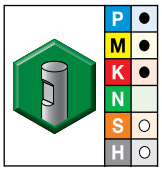
● first choice
○ alternate choice

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



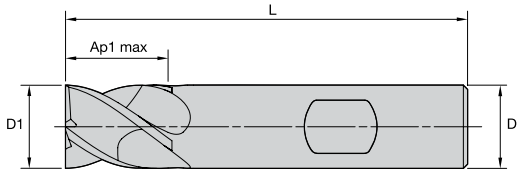


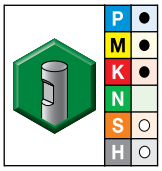
● first choice
○ alternate choice

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



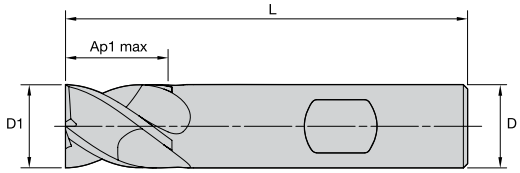


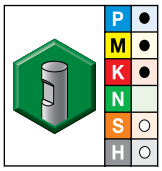
● first choice
○ alternate choice

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



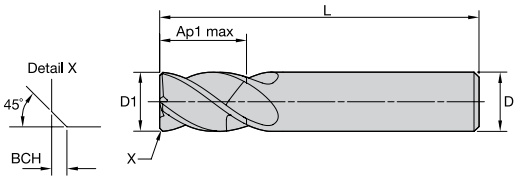


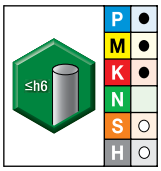
● first choice
○ alternate choice

WU20PE

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



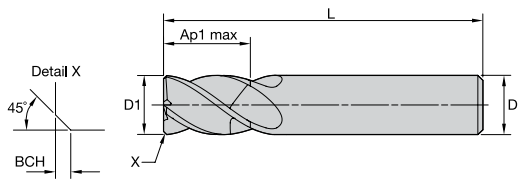


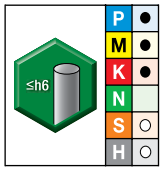
● first choice
○ alternate choice

WU20PE

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



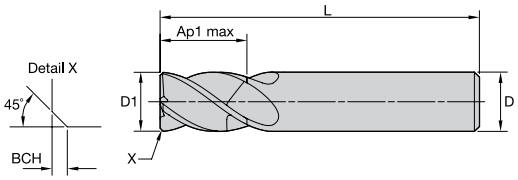


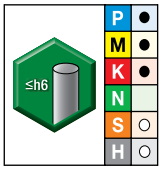
● first choice
○ alternate choice

WU20PE

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



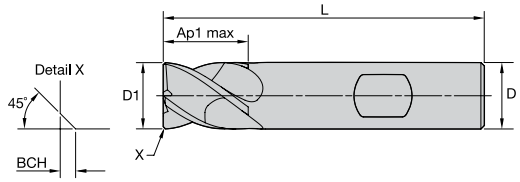


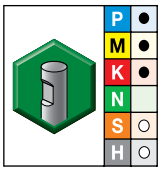
● first choice
○ alternate choice

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



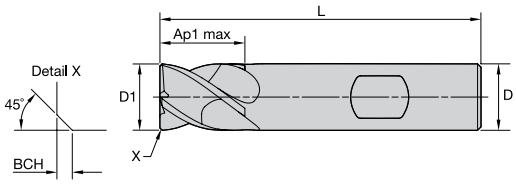


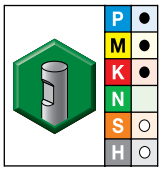
● first choice
○ alternate choice

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



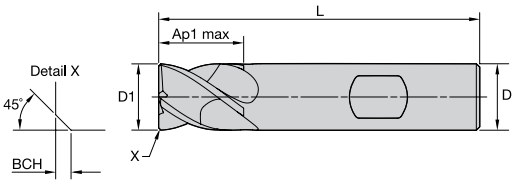


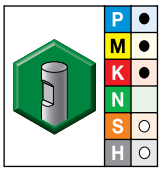
● first choice
○ alternate choice

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



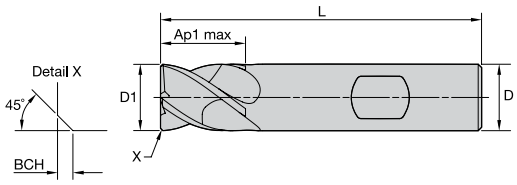


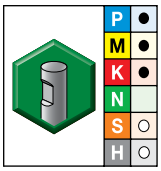
● first choice
○ alternate choice

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



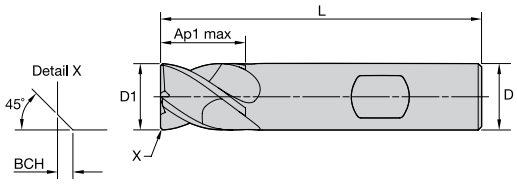


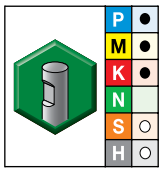
WU20PE

● 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



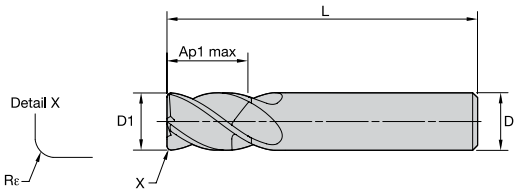


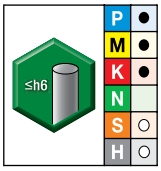
WU20PE

● 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



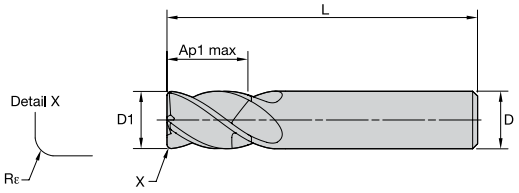


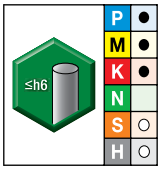
WU20PE

● 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



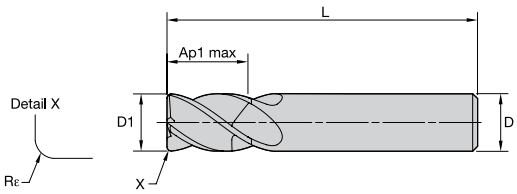


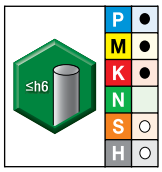
WU20PE

● 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



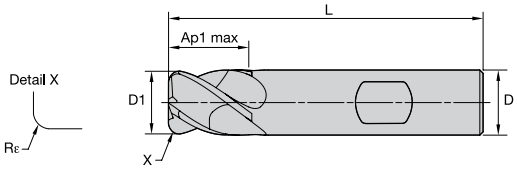


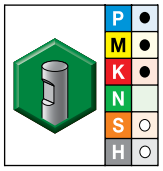
● first choice
○ alternate choice

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



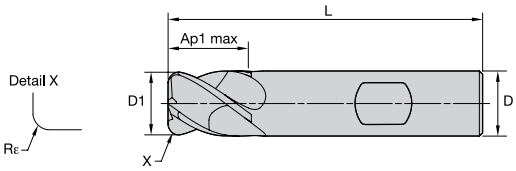


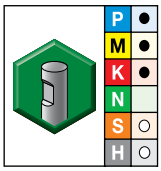
● first choice
○ alternate choice

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



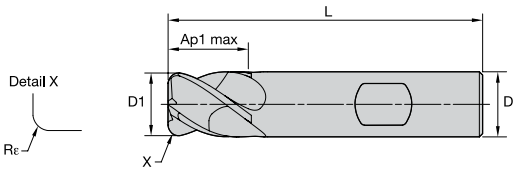


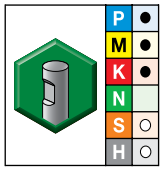
WU20PE

● 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



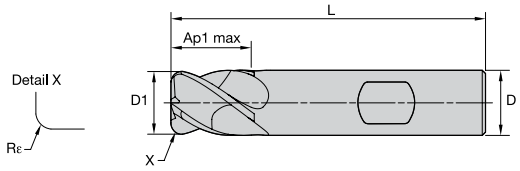


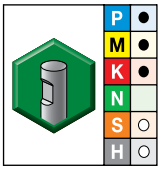
WU20PE

● 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



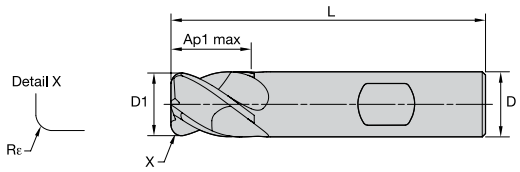


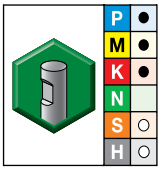
● first choice
○ alternate choice

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



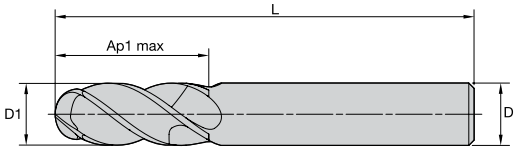


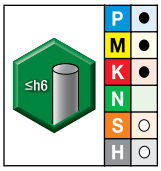
● first choice
○ alternate choice

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



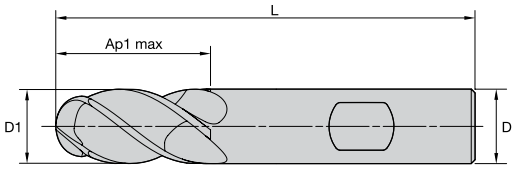


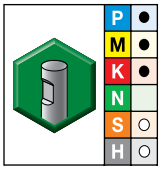
● first choice
○ alternate choice

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



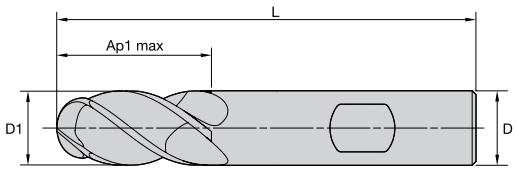


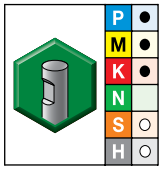
● first choice
○ alternate choice

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



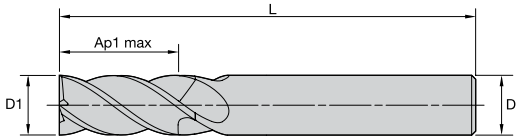


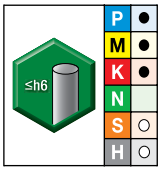
● first choice
○ alternate choice

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



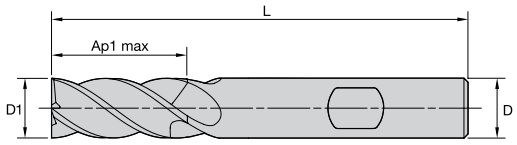


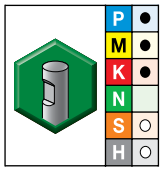
● first choice
○ alternate choice

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



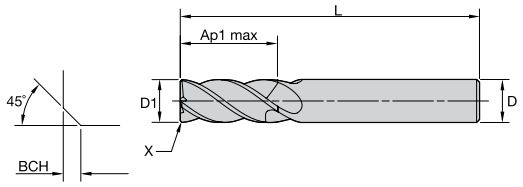


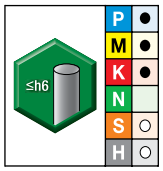
WU20PE

● 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



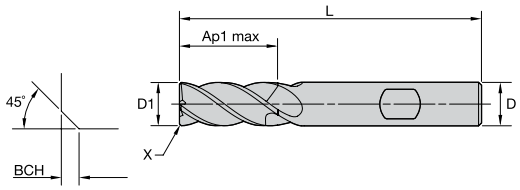


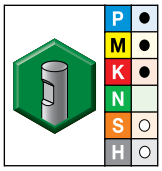
WU20PE

● 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



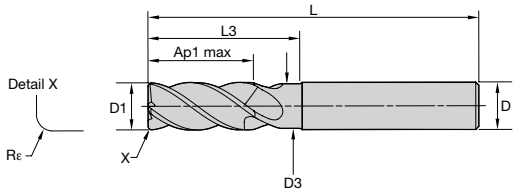


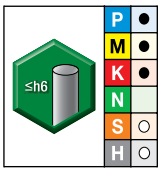
● first choice
○ alternate choice

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





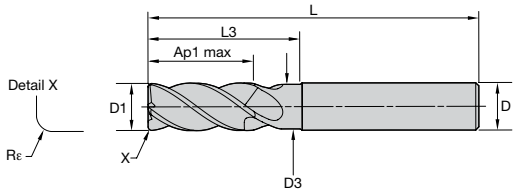
● first choice
○ alternate choice

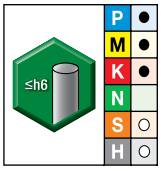
WU20PE

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)



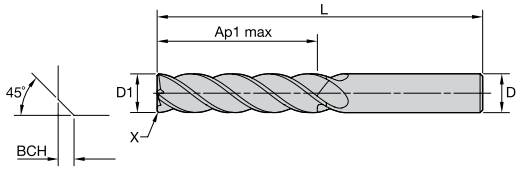


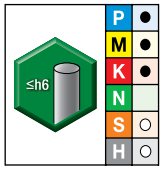
● first choice
○ alternate choice

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



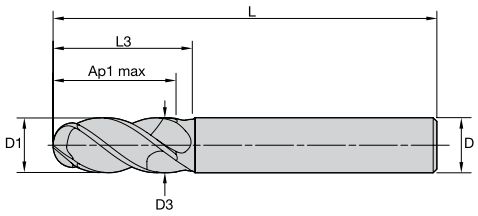


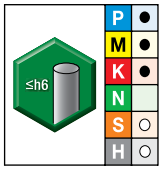
● first choice
○ alternate choice

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



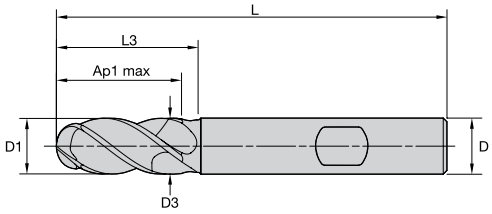


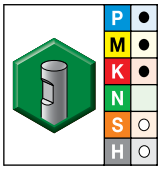
● first choice
○ alternate choice

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%.													
		ap	ae	ap	min	Start	max	mm	D1 — Diameter 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.													
		ap	ae	min	Start	max	mm	D1 — Diameter 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

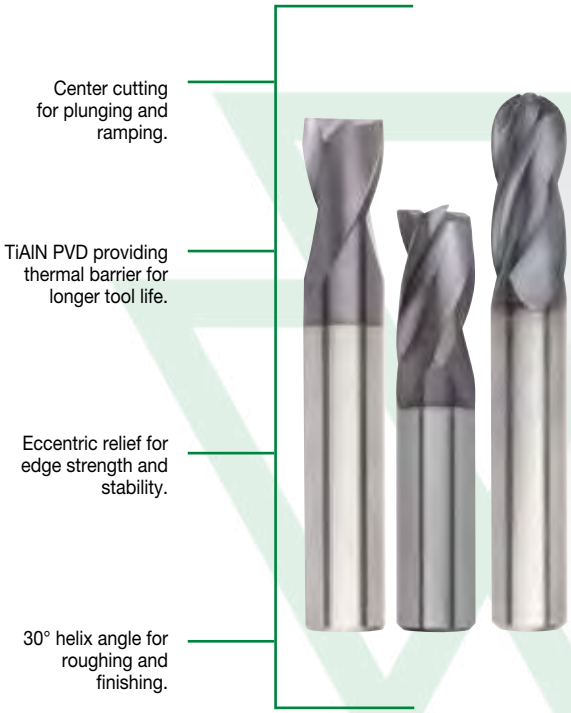
Metric

	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

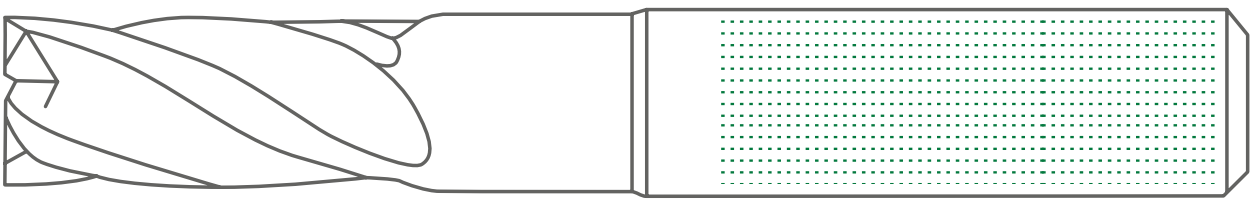
ECCENTRIC RELIEF

for edge strength and stability.

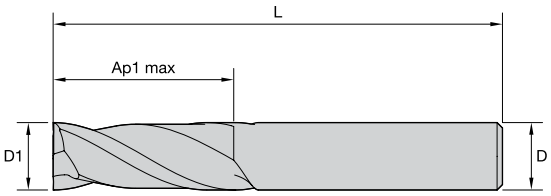
30° HELIX ANGLE

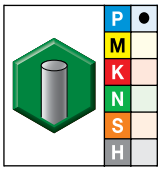
for high versatility.

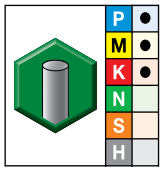
CYLINDRICAL AND WELDON® SHANK



GP End Mills • Series I2S • Sharp Edge • 2 Flute • Inch





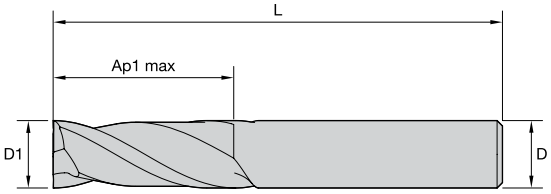


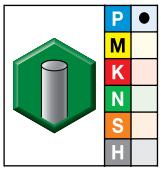
● first choice
○ alternate choice

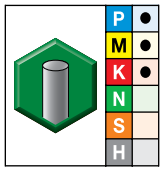
UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
–		5872793	I2S0016T003R	1/64	1/8	1/32	1 1/2	2
5873649	I2S0031T007R	5872794	I2S0031T007R	1/32	1/8	5/64	1 1/2	2
5873661	I2S0062T012R	5872796	I2S0062T012R	1/16	1/8	1/8	1 1/2	2
5873650	I2S0062T018L	5872795	I2S0062T018L	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)



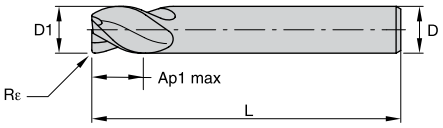


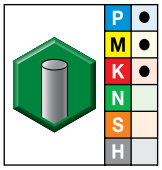


● first choice
○ alternate choice

UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
—		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



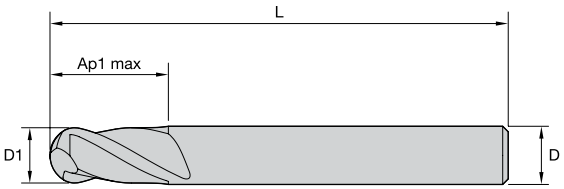


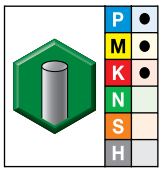
● first choice
○ alternate choice

TiAlN

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
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



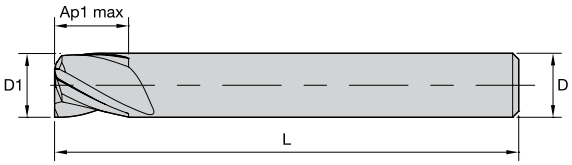


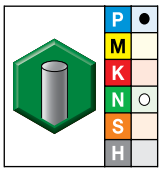
● first choice
○ alternate choice

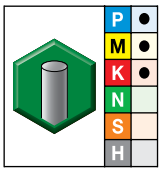
TiAlN

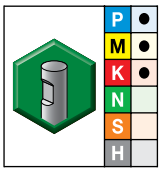
order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
5878172	I2B0031T007R	1/32	1/8	5/64	1 1/2	2
5878174	I2B0046T018R	3/64	1/8	3/16	1 1/2	2
5878173	I2B0062T018R	1/16	1/8	3/16	1 1/2	2
5878175	I2B0078T018R	5/64	1/8	3/16	1 1/2	2
5878176	I2B0093T018R	3/32	1/8	3/16	1 1/2	2
5878177	I2B0093T037L	3/32	1/8	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





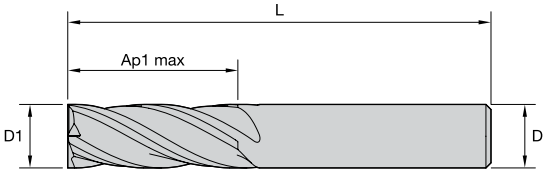


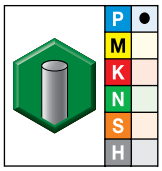


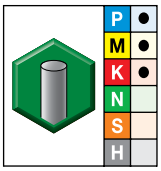
● first choice
○ alternate choice

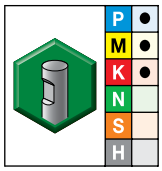
UNCOATED		TiAlN		TiAlN						
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6144206	I3S0031T007R	6144077	I3S0031T007R		–	1/32	1/8	5/64	1 1/2	3
6144208	I3S0062T019R	6144079	I3S0062T019R		–	1/16	1/8	3/16	1 1/2	3
–		6144080	I3S0078T011R		–	5/64	1/8	7/64	1 1/2	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

GP End Mills • Series I4S • Sharp Edge • 4 Flute • Inch







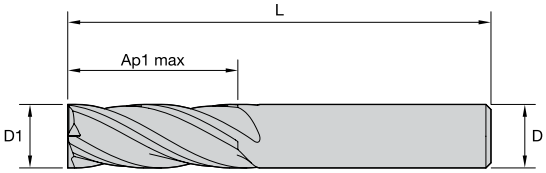


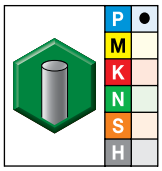
● first choice
○ alternate choice

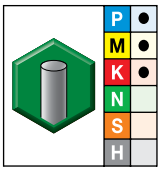
UNCOATED		TiAlN		TiAlN						
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
	–	5879053	I4S0016T003R		–	1/64	1/8	1/32	1 1/2	4
	–	5879054	I4S0031T008R		–	1/32	1/8	5/64	1 1/2	4
5879198	I4S0062T010R	5879055	I4S0062T011R		–	1/16	1/8	7/64	1 1/2	4
5879199	I4S0078T019R		–		–	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

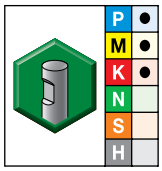
GP End Mills • Series I4S • Sharp Edge • 4 Flute • Inch

(continued)





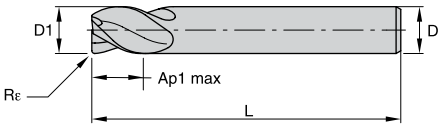


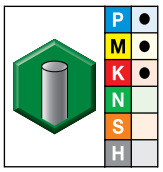


● first choice
○ alternate choice

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



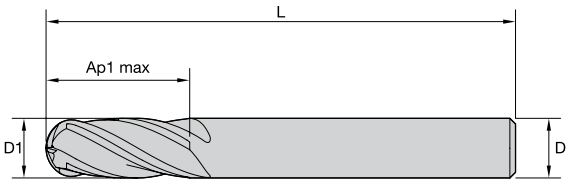


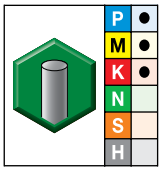
● first choice
○ alternate choice

TiAlN

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



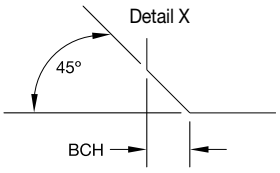


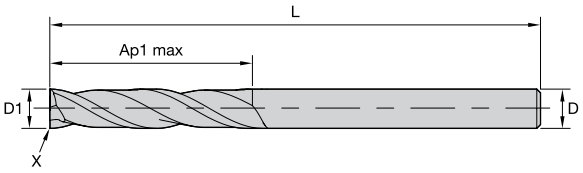
● first choice
○ alternate choice

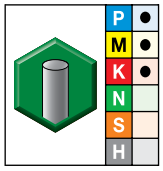
TiAlN

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







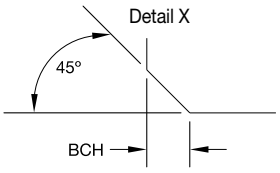
● first choice
○ alternate choice

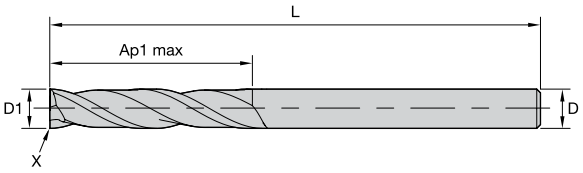
TiAlN

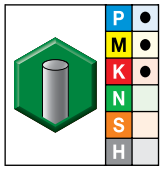
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
5873484	40020100T004	1,0	3	4,00	38	–	2
5873485	40020150T004	1,5	3	4,00	38	–	2
5873486	40020180T004	1,8	3	4,00	38	–	2
5873487	40020200T006	2,0	3	6,30	38	–	2
5873488	40020250T006	2,5	3	6,30	38	–	2
5873489	40020300T009	3,0	3	9,50	38	–	2
5873490	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

(continued)





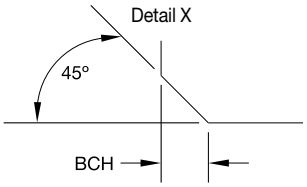


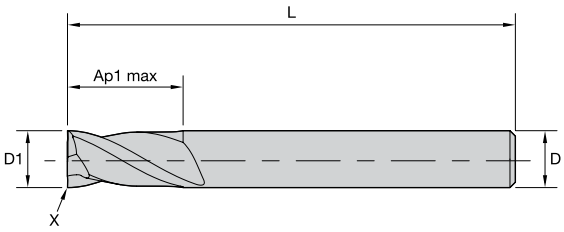
● first choice
○ alternate choice

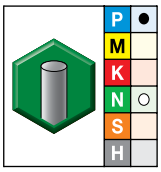
TiAlN

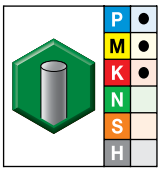
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
5873517	40021400T032	14,0	14	32,00	83	0,30	2
6092653	40021400T050S	14,0	14	50,00	100	–	2
5873518	40021400T050	14,0	14	50,00	100	0,30	2
6092654	40121400T075S	14,0	14	75,00	150	–	2
5873519	40121400T075	14,0	14	75,00	150	0,30	2
5873520	40021600T032	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

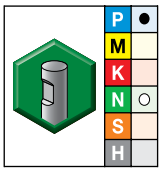
GP End Mills • Series D002 D012 • Square End • 2 Flute • Metric

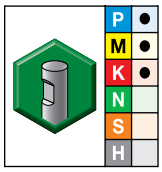








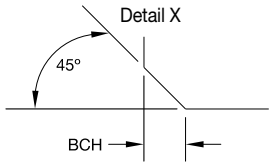


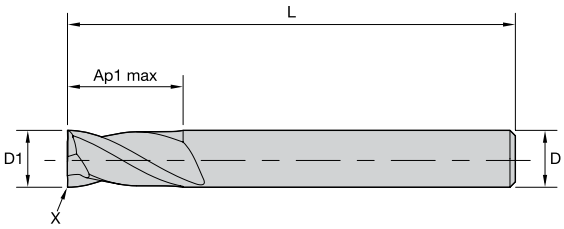


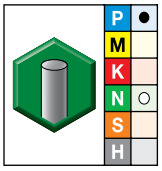
● first choice
○ alternate choice

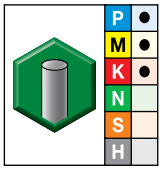
UNCOATED		TiAlN		UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
5877567	D0020200T003	5877330	D0020200T003	–		–		2,0	6	3,00	50	–	2
	–	5877501	D0020250T003	–		–		2,5	6	3,00	50	–	2
5877569	D0120250T007	5877502	D0120250T007	–		–		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





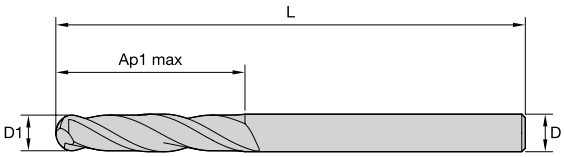


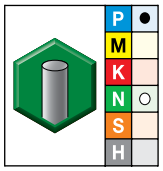


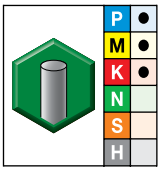
● first choice
○ alternate choice

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



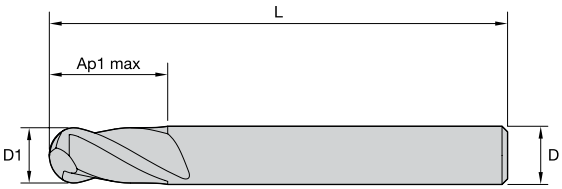


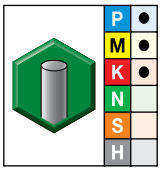


● first choice
○ alternate choice

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



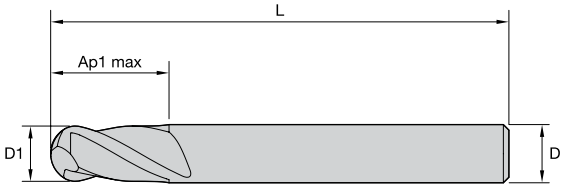


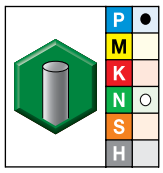
● first choice
○ alternate choice

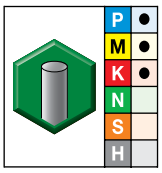
TiAlN

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



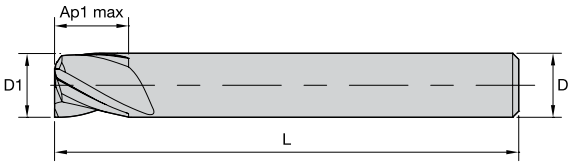


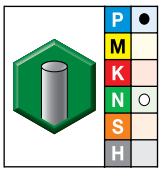


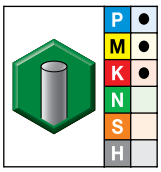
● first choice
○ alternate choice

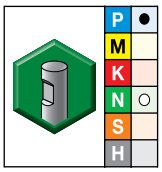
UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
–		5880451	28380200T007	2,0	2	7,00	50	2
–		5880452	28380300T007	3,0	3	7,00	50	2
–		5880453	28380400T008	4,0	4	8,00	50	2
–		5880454	28380500T010	5,0	5	10,00	50	2
5880465	28380600T010	5880455	28380600T010	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

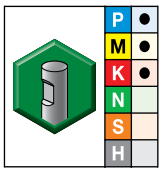
GP End Mills • Series 4003 4013 • Sharp Edge • 3 Flute • Metric







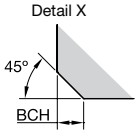


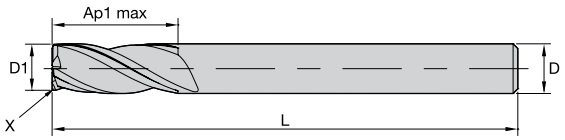


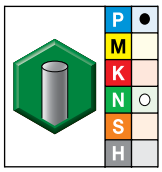
● first choice
○ alternate choice

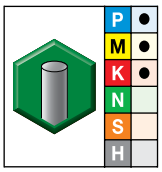
UNCOATED		TiAlN		UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6144570	40030100T004S	6144056	40030100T004S		–		–	1,0	3	4,00	38	3
6144651	40030150T004S	6144057	40030150T004S		–		–	1,5	3	4,00	38	3
6144652	40030200T006S	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

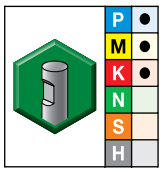
GP End Mills • Series 4003 4013 • Chamfered • 3 Flute • Metric







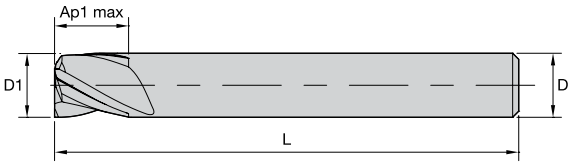


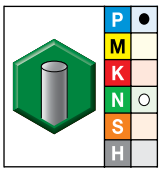


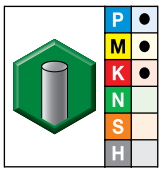
● first choice
○ alternate choice

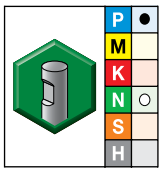
UNCOATED		TiAlN		TiAlN							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
	–	6145107	40030400T012		–	4,0	4	12,00	50	0,10	3
	–	6145181	40130400T019		–	4,0	4	19,00	63	0,10	3
6145275	40130500T020	6145182	40130500T020	6145190	40130500W020	5,0	6	20,00	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

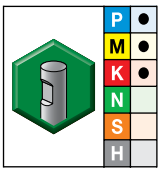
GP End Mills • Series D003 D013 • Sharp Edge • 3 Flute • Metric







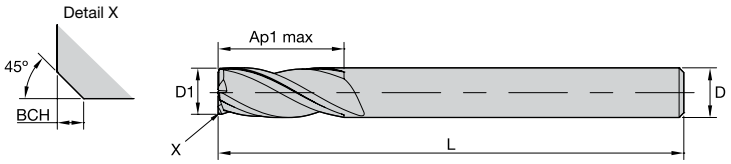


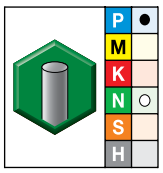


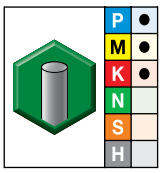
● first choice
○ alternate choice

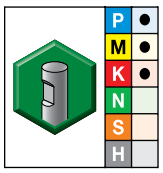
UNCOATED		TiAlN		UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6144450	D0030200T003S	6144351	D0030200T003S		–	6144388	D0030200W003S	2,0	6	3,00	50	3
6143764	D0130200T006S	6144441	D0130200T006S	6143831	D0130200W006S	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





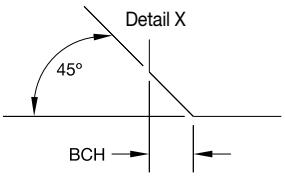


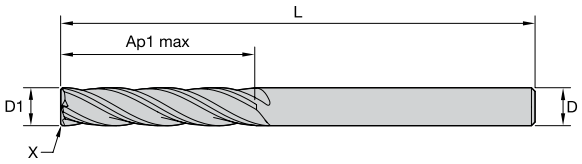


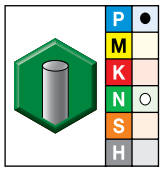
● first choice
○ alternate choice

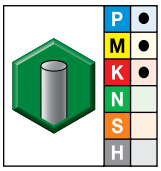
UNCOATED		TiAlN		TiAlN							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
–		6144295	D0030400T005	6144318	D0030400W005	4,0	6	5,00	54	0,10	3
–		6144359	D0130400T008	6144395	D0130400W008	4,0	6	8,00	57	0,10	3
–		6144296	D0030450T005	6144319	D0030450W005	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

UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
5826085	40040100T004	5826016	40040100T004	1,0	3	4,00	38	–	4
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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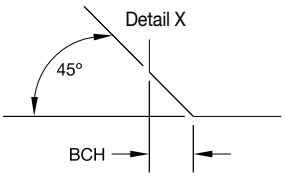
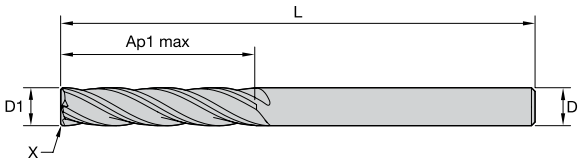
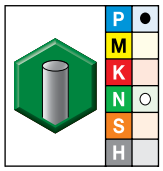
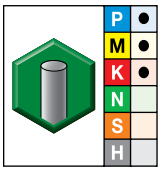




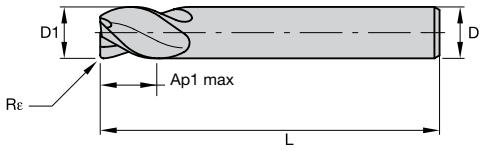


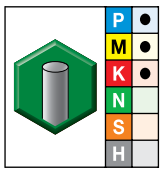


● first choice
○ alternate choice

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



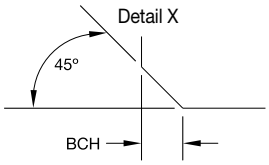


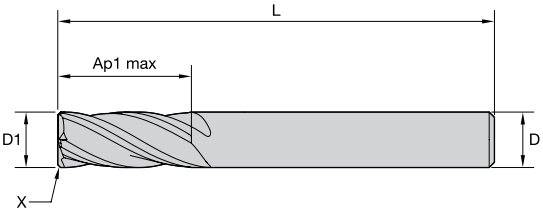
● first choice
○ alternate choice

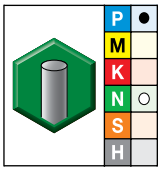
TiAlN

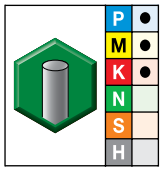
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6337590	40040200T006R050	2,0	3	6,30	38	0,50	4
6337731	40040300T009R050	3,0	3	9,50	38	0,50	4
6337732	40040300T009R100	3,0	3	9,50	38	1,00	4
6337892	40140300T019R050	3,0	3	19,00	63	0,50	4
6338335	40240300T025R050	3,0	3	25,00	75	0,50	4
6337733	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

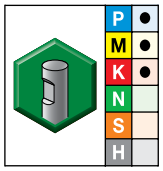
GP End Mills • Series D004 D014 • Square End • 4 Flute • Metric DIN 6527









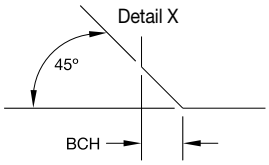


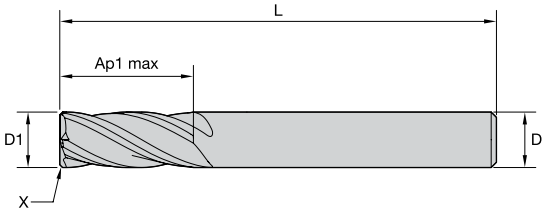
● first choice
○ alternate choice

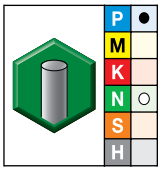
TiAlN		UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
5825894	D0040200T004	–		–		2,0	6	4,00	50	–	4
5825895	D0140200T007	–		–		2,0	6	7,00	57	–	4
5825896	D0140250T008	–		–		2,5	6	8,00	57	–	4
5825897	D0040300T005	–		–		3,0	6	5,00	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

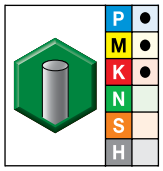
GP End Mills • Series D004 D014 • Square End • 4 Flute • Metric DIN 6527

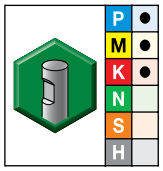
(continued)







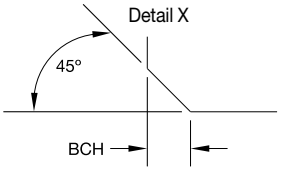


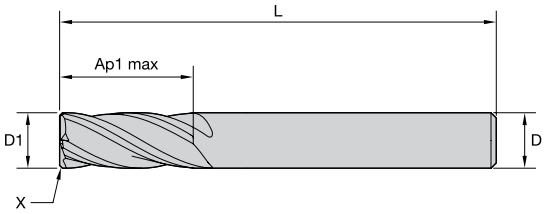


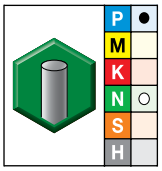
● first choice
○ alternate choice

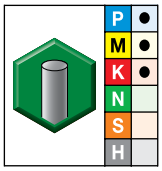
TiAlN		UNCOATED		TiAlN							
order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6085392	D0041800T024S	6086478	D0041800W024S	6085402	D0041800W024S	18,0	18	24,00	84	–	4
5825954	D0041800T024		–	5825964	D0041800W024	18,0	18	24,00	84	0,30	4
6085393	D0141800T032S		–	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





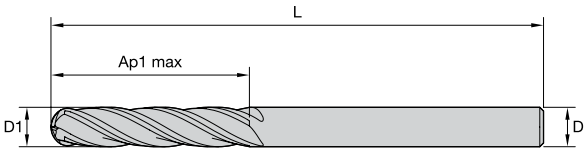


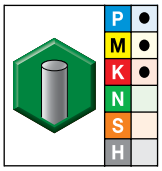


● first choice
○ alternate choice

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



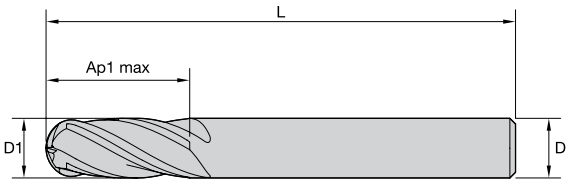


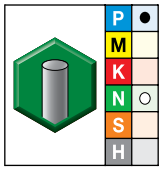
● first choice
○ alternate choice

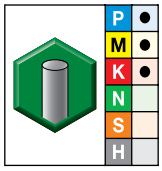
TiAlN

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



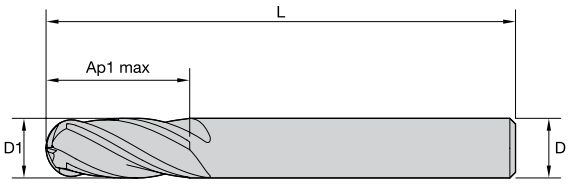


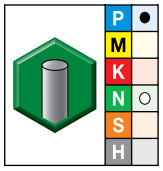


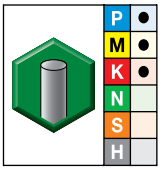
● first choice
○ alternate choice

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

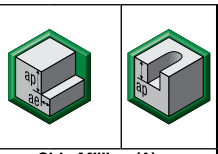
UNCOATED		TiAlN						
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
–		5825545	28480400T011	4,0	4	11,00	50	4
–		5825546	28480500T013	5,0	5	13,00	50	4
–		5825547	28480600T013	6,0	6	13,00	57	4
5825597	28480800T019	5825548	28480800T019	8,0	8	19,00	63	4
–		5825549	28481000T022	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

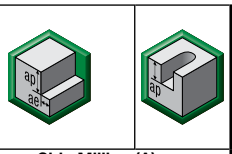
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For 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%. D1 — Diameter 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

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). D1 — Diameter 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 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.	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
	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
	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
	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
	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.	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	Ap1 max	0.1 x D	390	–	520	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	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.	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	0.5 x D	390	–	520	IPT	.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	.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	.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 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

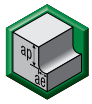
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

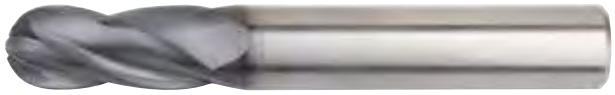
GP End Mills • Series I4S..L I4S..X • Application Data • TiAlN • Inch

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

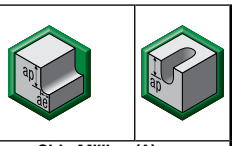


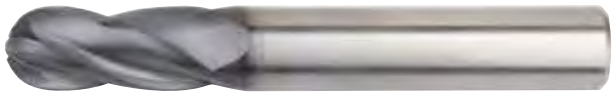


Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A).										
		A		Cutting Speed – vc SFM				D1 – Diameter									
		ap	ae	min		max	frac. dec.	3/32 .0938	1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	1/2 .5000	5/8 .6250	3/4 .7500	1 1.0000
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	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..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
	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 D002 4002 • 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	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)		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

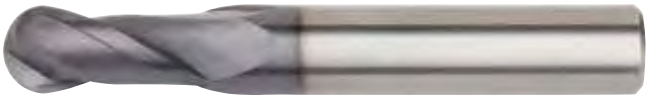
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions.
For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series D012 2819 4012 4022 • 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 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

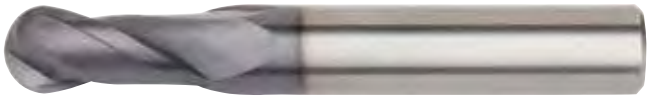
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions.
For 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.

GP End Mills • Series 4011 4021 • 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

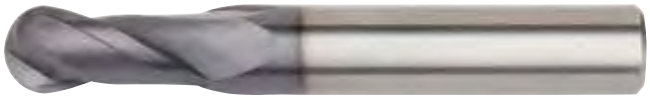
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions.
For smaller taper machining centers, please adjust parameters accordingly on >12mm diameters.

GP End Mills • Series D012 4012 • 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.

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.

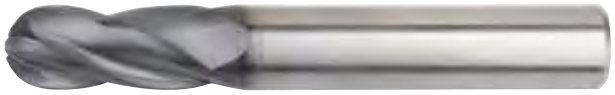
GP End Mills • Series D014 2528 4014 4024 • Application Data • Uncoated • Metric


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
	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.

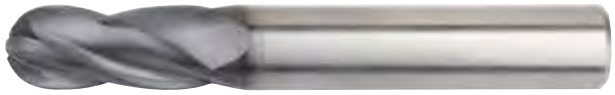
GP End Mills • Series 4004 4014 4024 • Application Data • TiAlN • Metric



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
	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 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

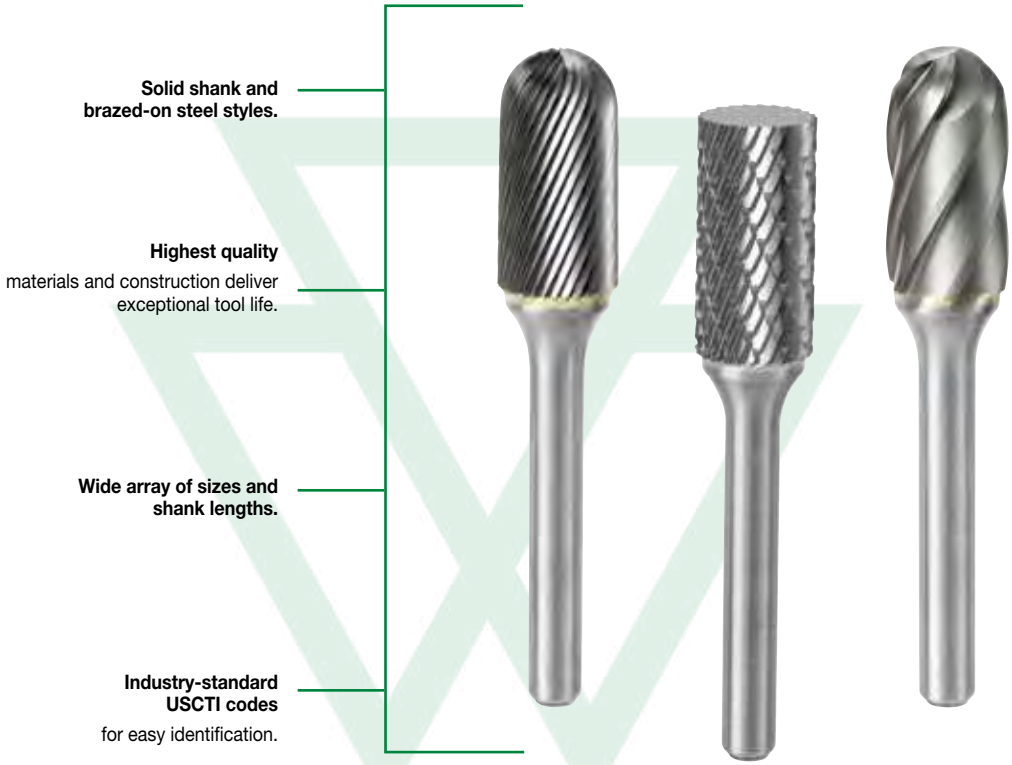
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For 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.

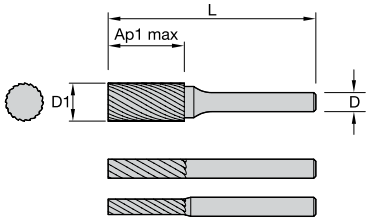
COARSE-CUT AND FINE-CUT RHS AVAILABLE AS SPECIALS.

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

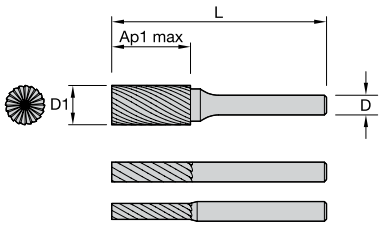
Single Cut



	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

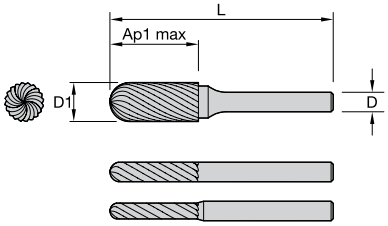
Single Cut



	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

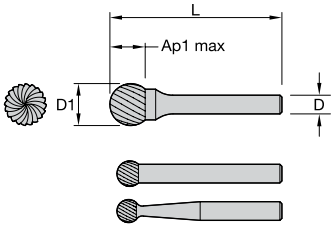
Single Cut



	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

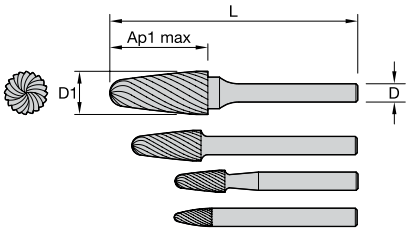
Single Cut



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

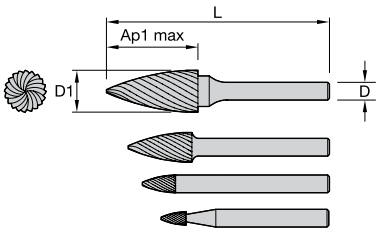
Single Cut



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

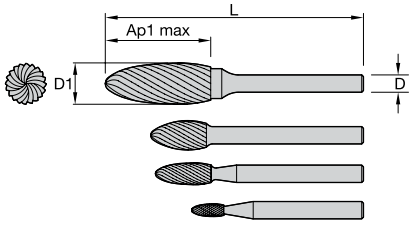
Single Cut



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

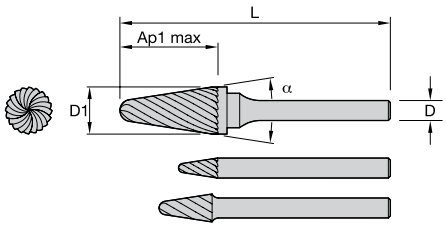

Single Cut



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

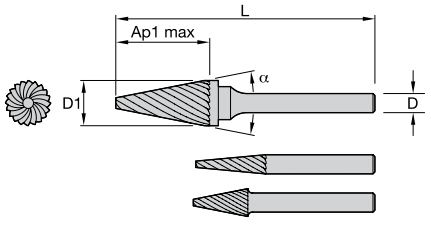


α = KRA

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

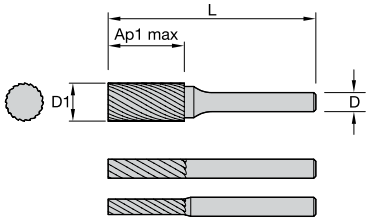


α = KRA

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

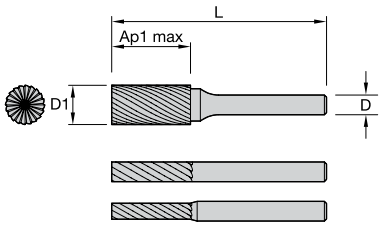
Single Cut



	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

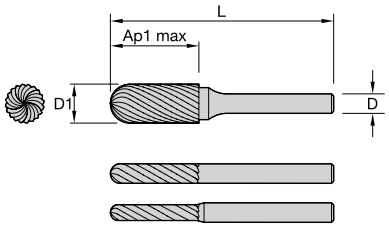
Single Cut



	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

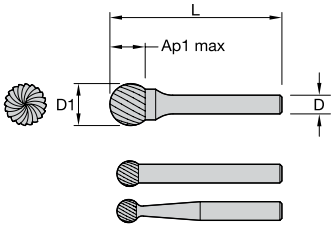
Single Cut



	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

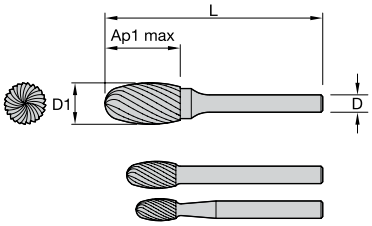
Single Cut



	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

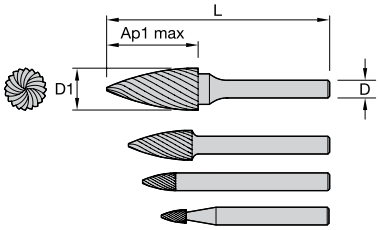
Master Cut



	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

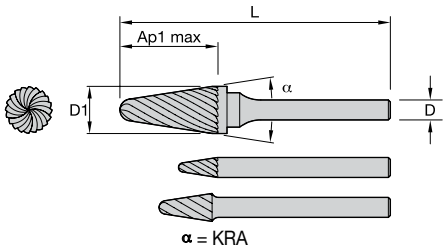
Single Cut



	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

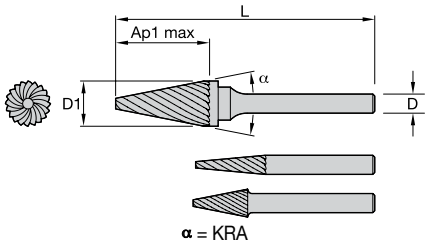
Single Cut



USCTI Number	Single Cut order #	Single Cut catalog #	D1	D	Ap1 max	length 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

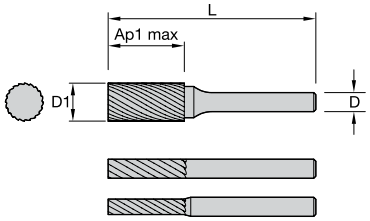
Single Cut



USCTI Number	Single Cut order #	Single Cut catalog #	D1	D	Ap1 max	length 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

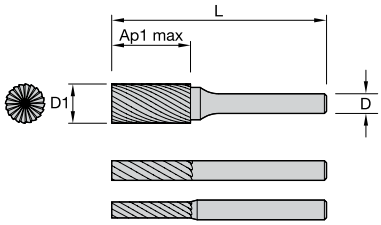
Master Cut



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

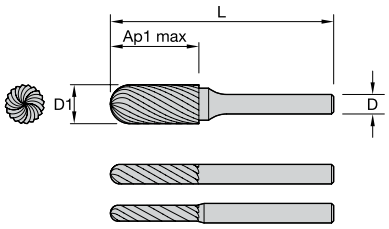
Master Cut



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

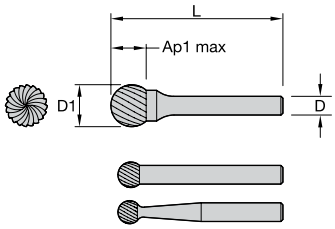
Master Cut



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

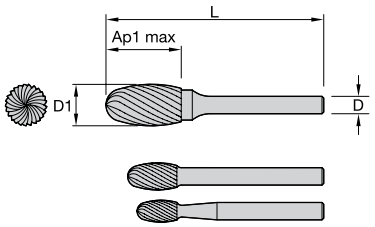
Master Cut



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

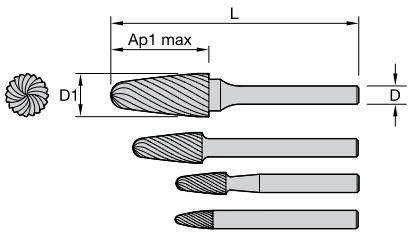
Master Cut



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

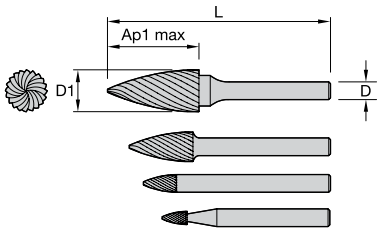
Master Cut



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

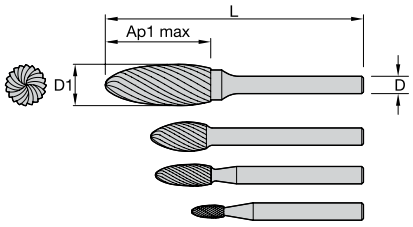
Master Cut



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

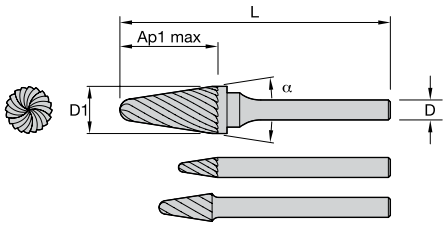
Master Cut



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

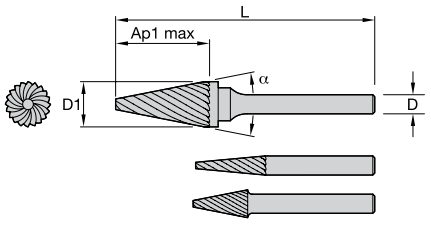


α = KRA

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

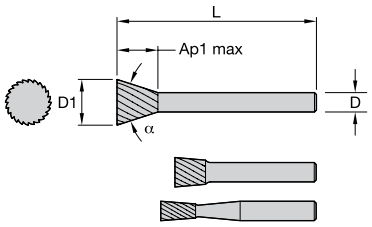


α = KRA

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

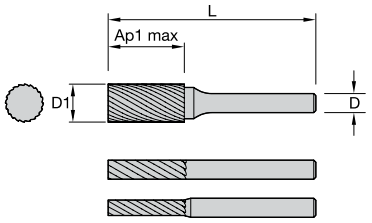


α = KRA

	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

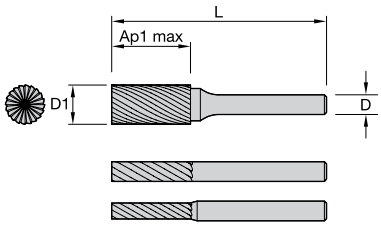
Master Cut



	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

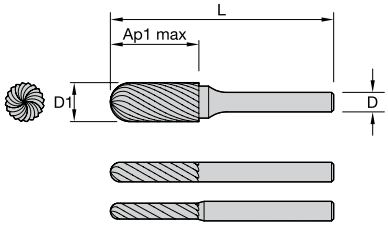
Master Cut



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

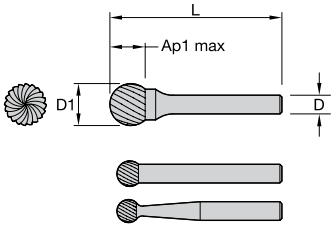
Master Cut



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

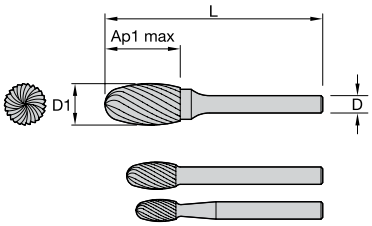
Master Cut



USCTI Number	Master Cut order #	Master Cut 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

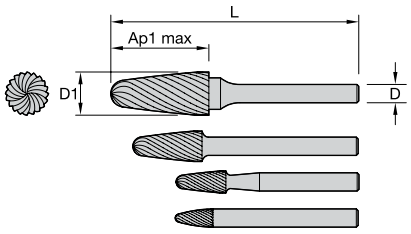
Master Cut



USCTI Number	Master Cut order #	Master Cut 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

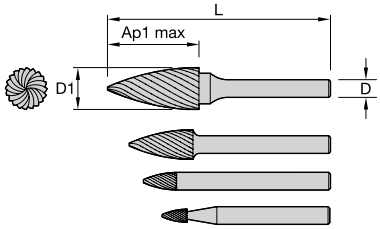
Master Cut



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

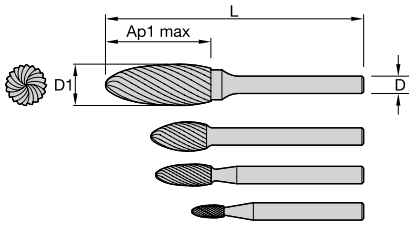
Master Cut



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

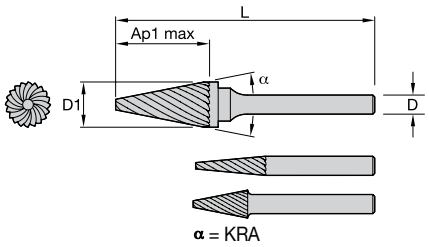
Master Cut



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

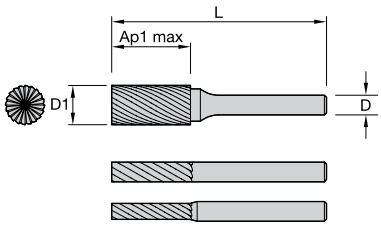
Master Cut



	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

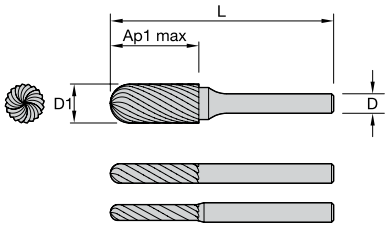
Aluminum Cut



	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

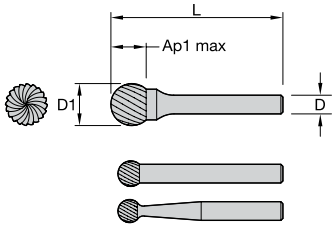
Aluminum Cut



	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

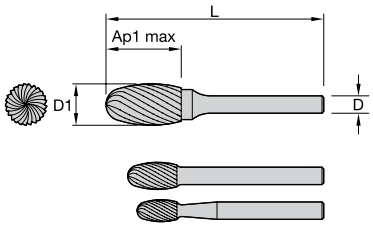
Aluminum Cut



	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

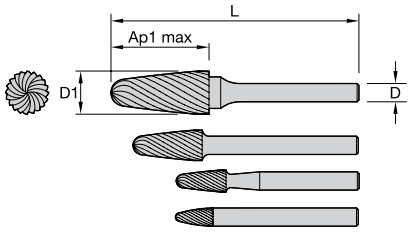
Aluminum Cut



	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

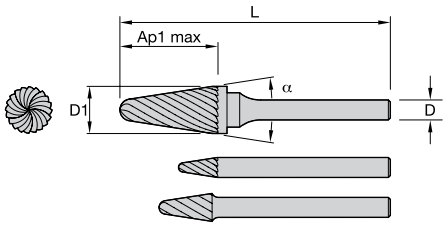
Aluminum Cut



	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

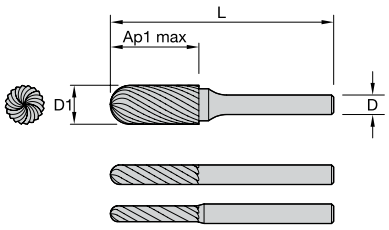


α = KRA

	Aluminum Cut							
USCTI Number	order #	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

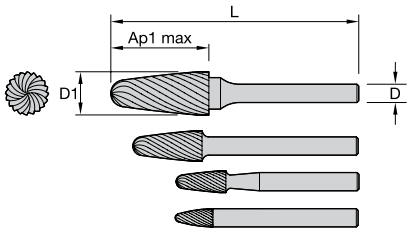
Aluminum Cut



	Aluminum Cut						
USCTI Number	order #	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

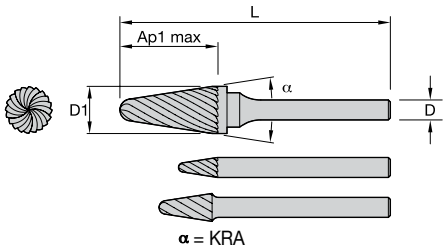
Aluminum Cut



	Aluminum Cut						
USCTI Number	order #	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

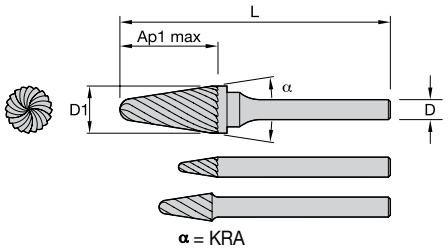


α = KRA

USCTI Number	Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length 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

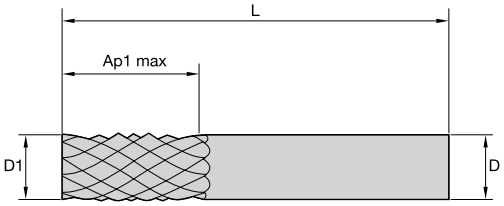


α = KRA

USCTI Number	Aluminum Cut order #	Aluminum Cut catalog #	D1	D	Ap1 max	length 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

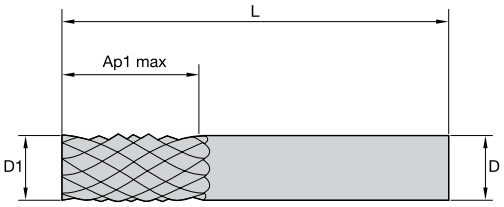
Master Cut



Master Cut order #	Master Cut catalog #	D1	D	Ap1 max	length 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

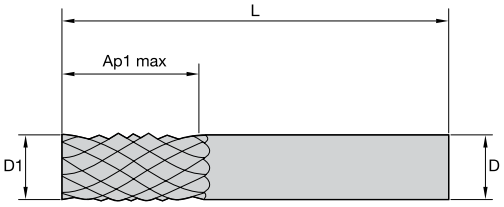
Master Cut



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

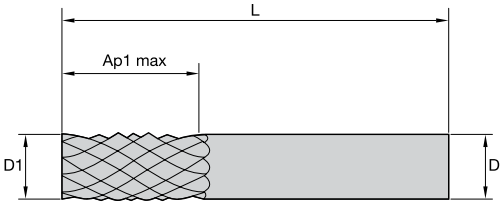
Master Cut



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

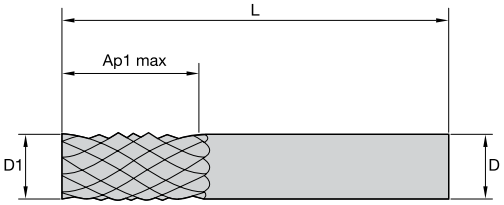

Master Cut



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

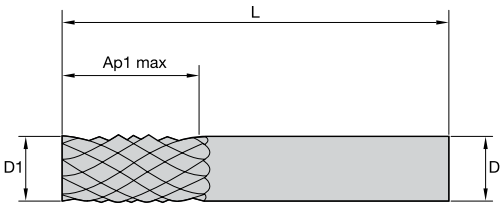

Master Cut



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 • 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							

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● 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	●	●	●	●	●	●	●

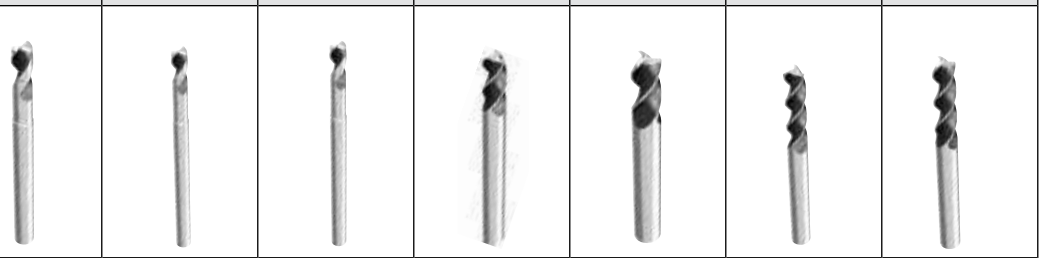
Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Inch

● 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							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● 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							

Hanita™ High-Performance Solid Carbide End Mills • Selection Guide • Metric

● 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							

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● 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							●

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● 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	•	•	•	•	•	•	•

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● 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

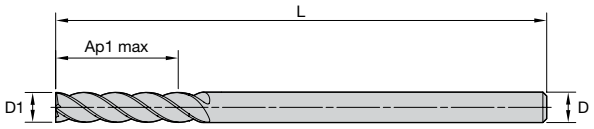

RAMPING

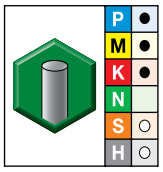

DYNAMIC MILLING


PLUNGING


DRILLING

VariMill XTREME • Series 4X0E • Square End • 4 Flute • Cylindrical Shank • Inch



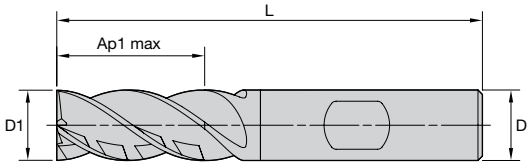


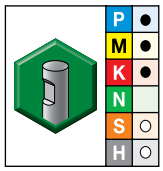
● first choice
○ alternate choice

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



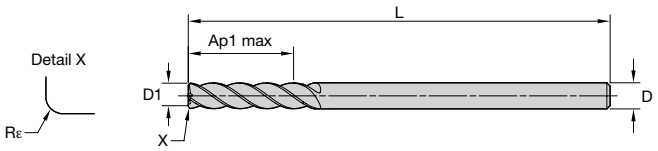


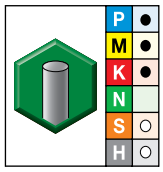
● first choice
○ alternate choice

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



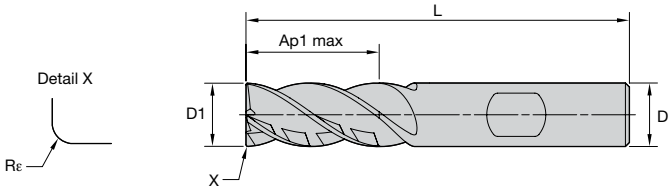


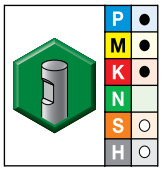
● first choice
○ alternate choice

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



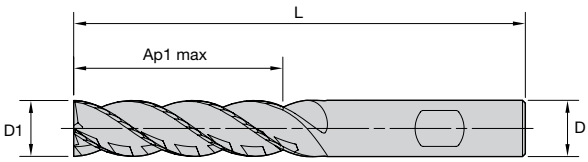


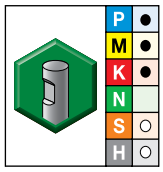
● first choice
○ alternate choice

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



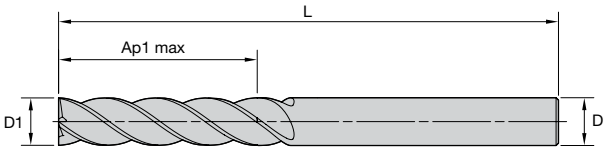


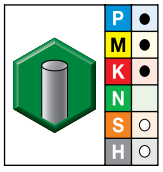
● first choice
○ alternate choice

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



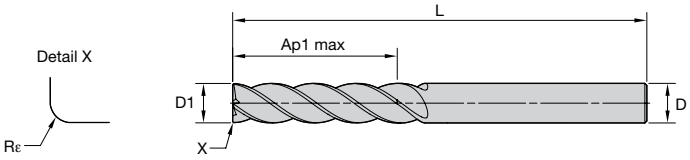


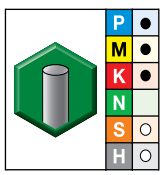
● first choice
○ alternate choice

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



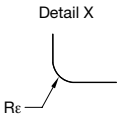


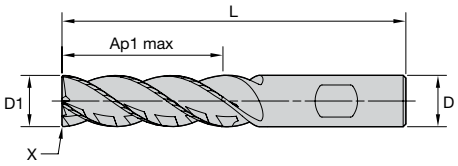
● first choice
○ alternate choice

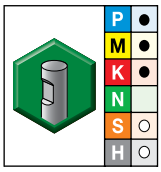
WS15PE

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





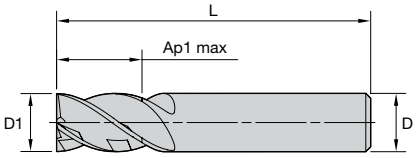


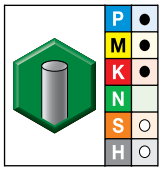
● first choice
○ alternate choice

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



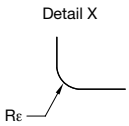


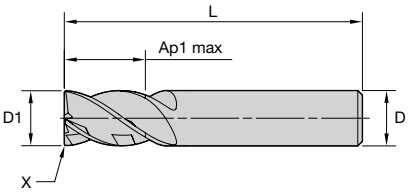
● first choice
○ alternate choice

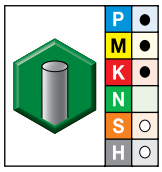
WS15PE

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





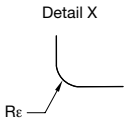


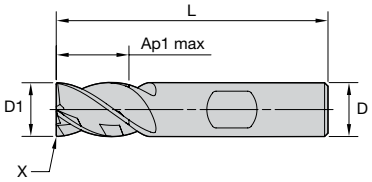
● first choice
○ alternate choice

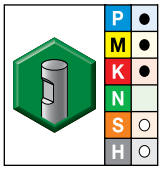
WS15PE

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





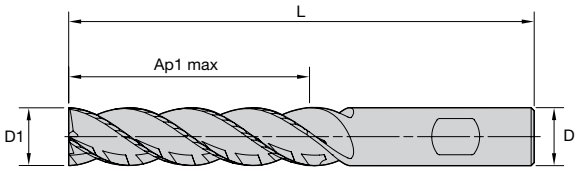


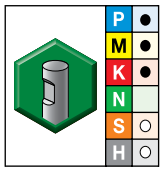
● first choice
○ alternate choice

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



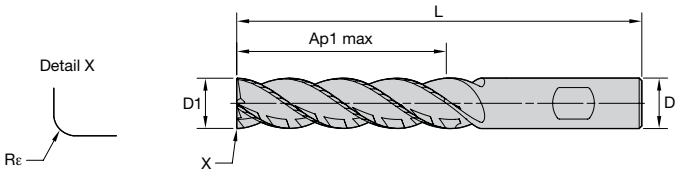


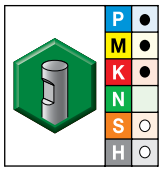
● first choice
○ alternate choice

WS15PE

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



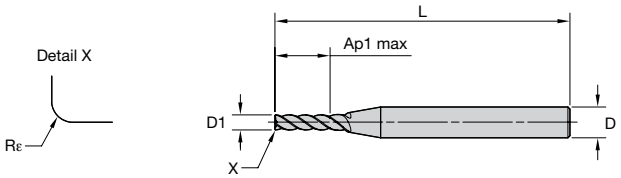


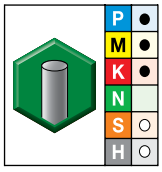
● first choice
○ alternate choice

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



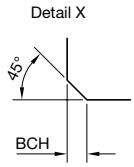


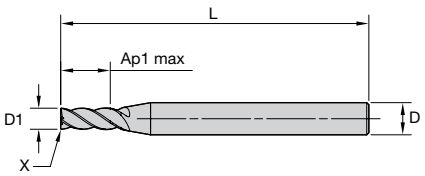
● first choice
○ alternate choice

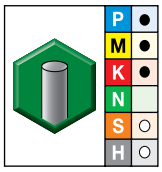
WS15PE

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





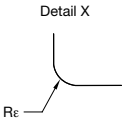


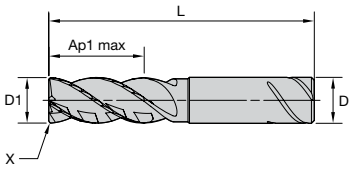
● first choice
○ alternate choice

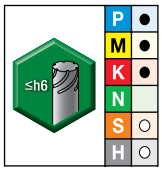
WS15PE

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





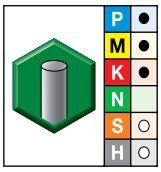


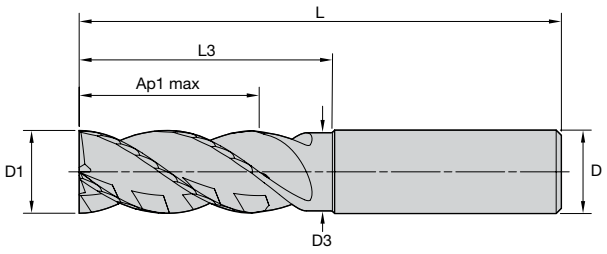
● first choice
○ alternate choice

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



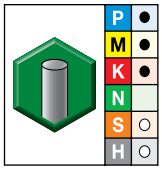


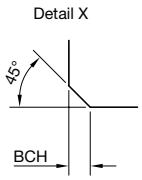
● first choice
○ alternate choice

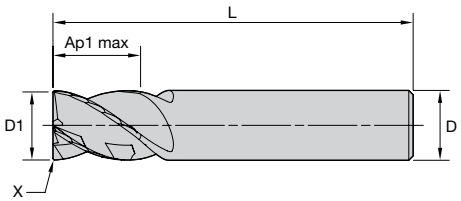
WS15PE

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





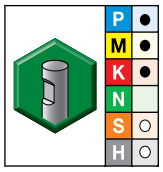


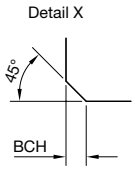
● first choice
○ alternate choice

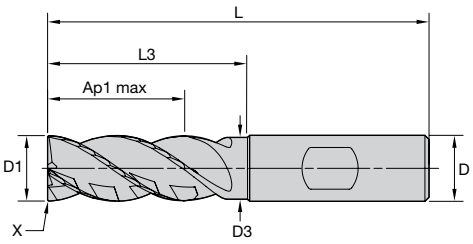
WS15PE

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





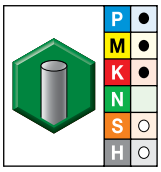


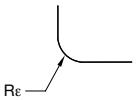
● first choice
○ alternate choice

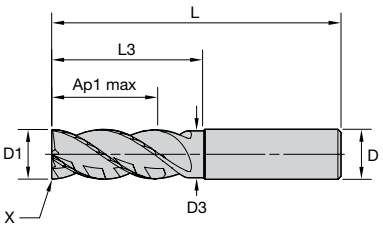
WS15PE

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





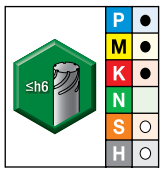


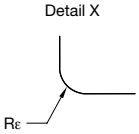
● first choice
○ alternate choice

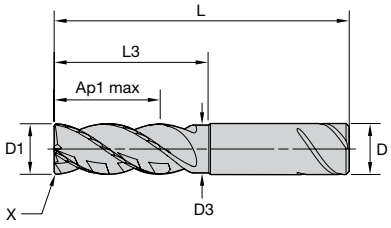
WS15PE

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





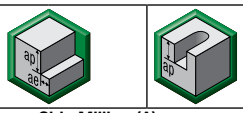


● first choice
○ alternate choice

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

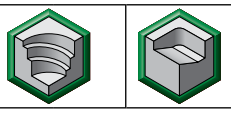
VariMill XTREME • Side Milling and Slotting • Application Data • WS15PE • Inch



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

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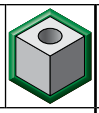


Material Group		Plunging/Drilling			WS15PE Cutting Speed — vc m/min			Recommended feed per revolution (fn =mm/rev) for plunging and drilling — D1 — Diameter											
		Max Depth	Applicable	Coolant	min	Start	max	in	1/8	5/32	3/16	1/4	9/32	5/16	3/8	1/2	5/8	3/4	1
P	0	1.5 x D	●	Preferred	420	450	495	IPR	.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

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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	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–max	3,5–5.7	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
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	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–max	3,5–5.7	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
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			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	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			Recommended feed per revolution (fn =mm/rev) for plunging and drilling											
					Cutting Speed — vc m/min			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

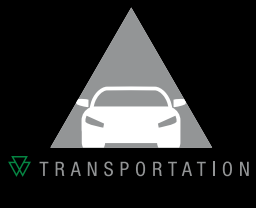
SOLID CARBIDE END MILL

GRADE	FLUTE
WP15PE WS15PE TiAlN	4

DIAMETER RANGE

INCH	METRIC
1/8–1-1/4"	4–25mm

INDUSTRY



APPLICATIONS

MATERIALS

SIDE MILLING

RAMPING

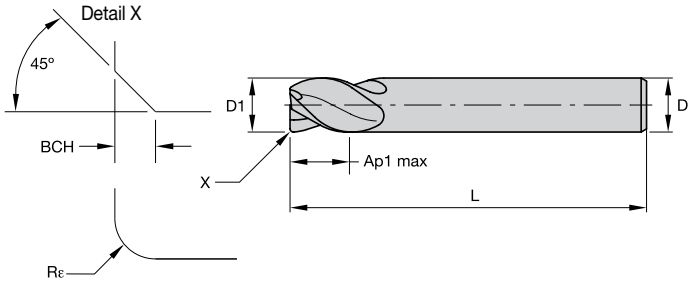
HELICAL INTERPOLATION

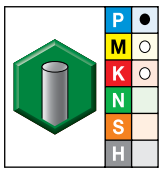
SLOTTING

DYNAMIC MILLING

PLUNGING

VariMill I • Series 4V05 • Square End • 4 Flute • Inch





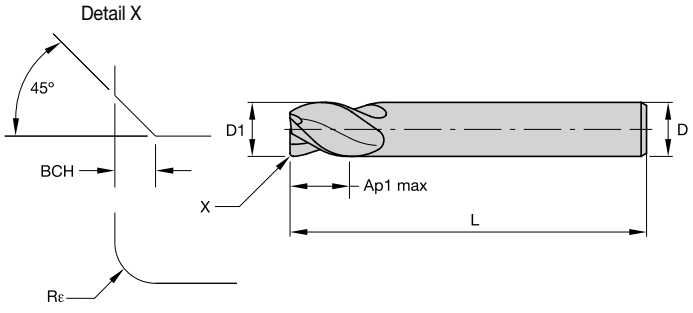
WP15PE

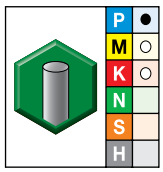
● first choice
○ alternate choice

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)





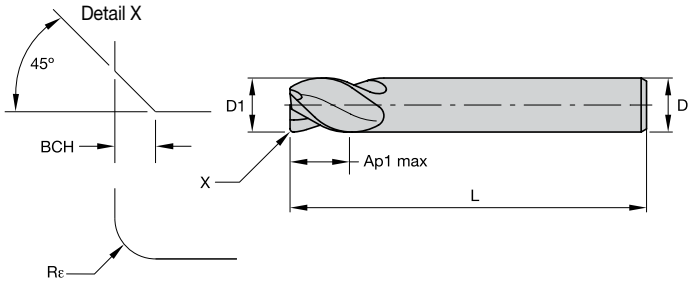
WP15PE

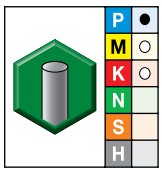
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH	ZU
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)



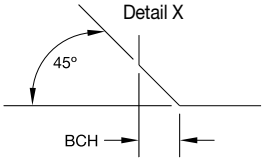


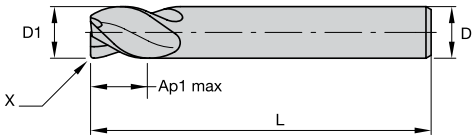
WP15PE

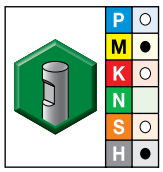
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH	ZU
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





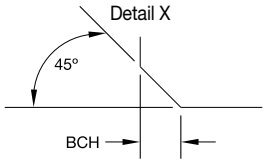


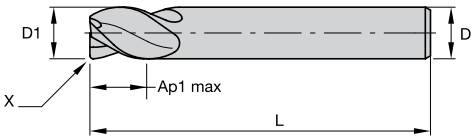
WS15PE

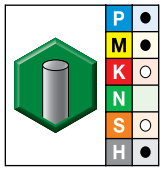
● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
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





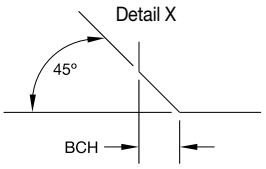


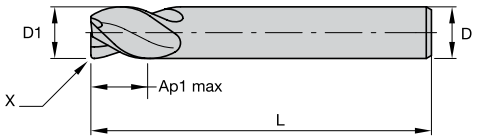
TiAlN-LT

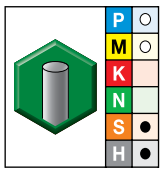
● first choice
○ alternate choice

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





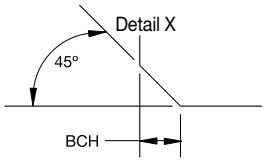


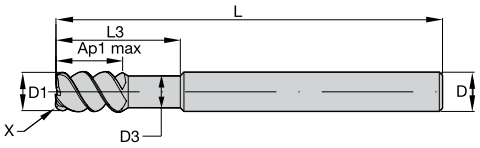
WS15PE

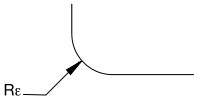
● first choice
○ alternate choice

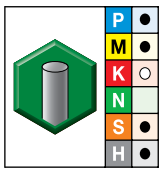
order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
2831913	TM4VPT13005S	1/2	1/2	5/8	5	–	4
2831918	TM4VPT13005	1/2	1/2	5/8	5	.020	4
2831901	TM4VPT13015S	1/2	1/2	5/8	6	–	4
2831907	TM4VPT13015	1/2	1/2	5/8	6	.020	4
2831865	TM4VPT19017	3/4	3/4	1	6	.020	4
2988603	TM4VPT19027S	3/4	3/4	1	7	–	4

VariMill I • Series 4VN5 • Square End • Extended Reach and Neck • 4 Flute • Inch

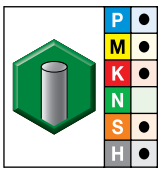








TiAlN-LT

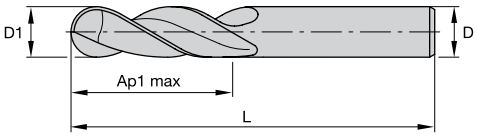


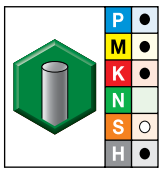
TiAlN-LW

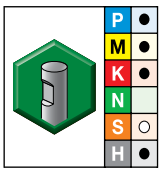
● first choice
○ alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length 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



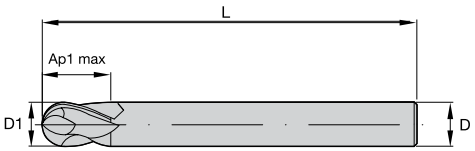


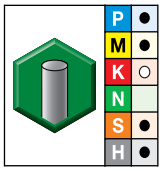


● first choice
○ alternate choice

WP15PE		WP15PE						
order #	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

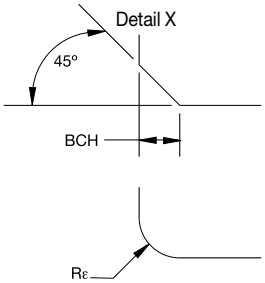


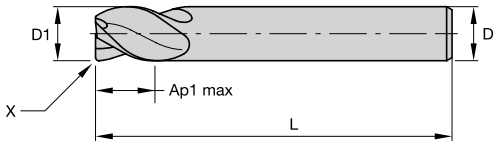


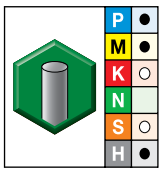
● first choice
○ alternate choice

TiAlN-LT						
order #	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







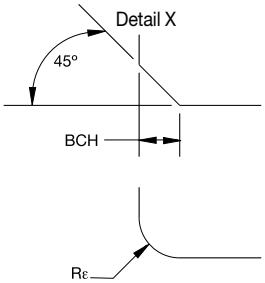
WP15PE

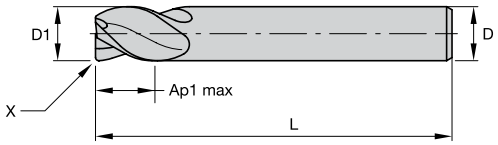
● first choice
○ alternate choice

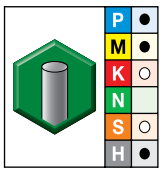
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH	ZU
5576753	477704001T	4,0	6	12,00	55	0,20	–	4
5576751	477704002T	4,0	6	12,00	55	–	0,40	4
5576754	4777040Z2T	4,0	6	12,00	55	–	–	4
5576755	477705002T	5,0	6	13,00	57	–	0,40	4
5576757	477705012T	5,0	6	13,00	57	0,20	–	4
5576758	4777050Z2T	5,0	6	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)





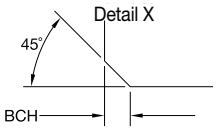


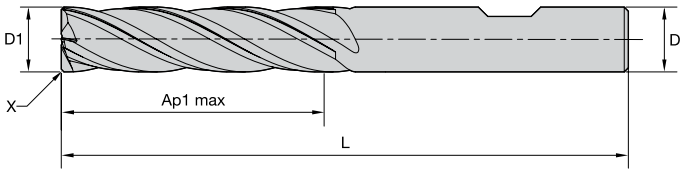
WP15PE

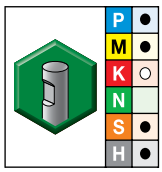
● first choice
○ alternate choice

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





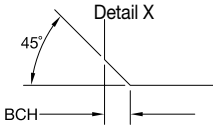


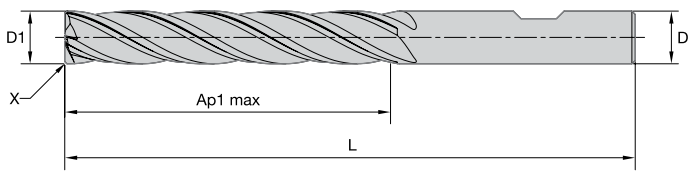
● first choice
○ alternate choice

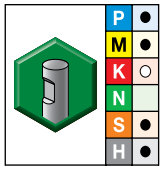
TiAlN-LW

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





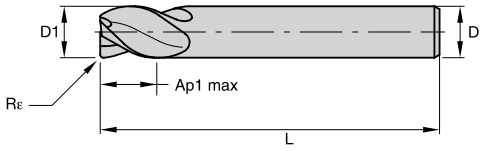


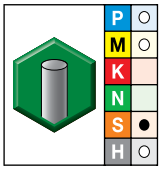
● first choice
○ alternate choice

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



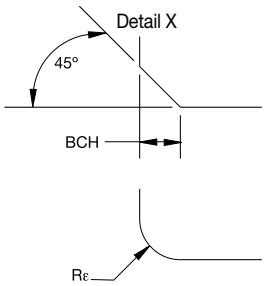


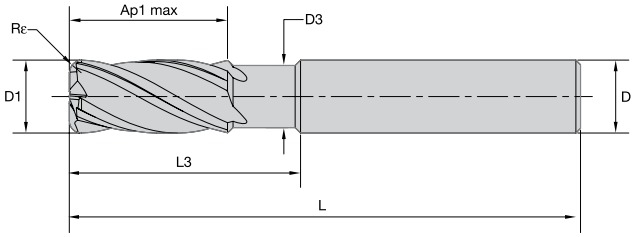
WS15PE

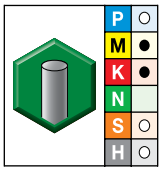
● first choice
○ alternate choice

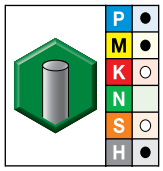
order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	ZU
2545563	477804002MT	4,0	6	12,00	55	0,20	4
2545564	477805002MT	5,0	6	13,00	57	0,20	4
2545565	477806002MT	6,0	6	13,00	57	0,20	4
2545570	477807003MT	7,0	8	16,00	63	0,20	4
2545603	477808003MT	8,0	8	16,00	63	0,20	4
2601245	477810004MT	10,0	10	22,00	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





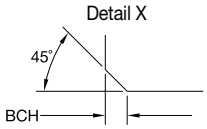


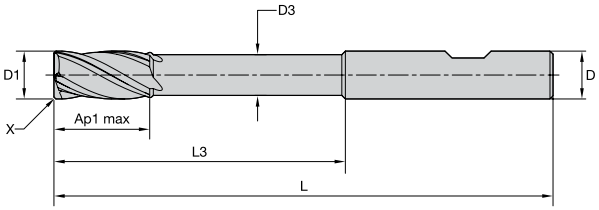


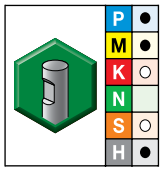
● first choice
○ alternate choice

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





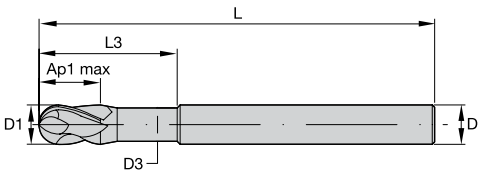


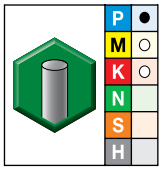
● first choice
○ alternate choice

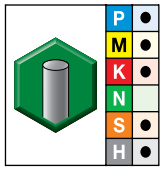
TiAlN-LW

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

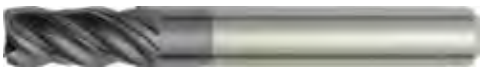


Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WP15PE Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac. / dec.	D1 — Diameter 1/8 .1250	3/16 .1875	1/4 .2500	5/16 .3125	3/8 .3750	7/16 .4375	1/2 .5000	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 ap 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
		ap	ae	ap	min		max	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
		ap	ae	ap	min		max	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%.

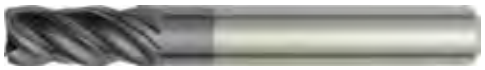
VariMill I • Series 4727 • Application Data • TiAlN-LW • Metric

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	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 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	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
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

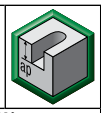
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For 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.