

# HIGH PERFORMANCE TOOL CATALOG

AEROSPACE • MEDICAL • DIE & MOLD • ENGINEERING



## MELIN HIGH PERFORMANCE CATALOG

- » Aluminum Alloys
- » Titanium Alloys
- » Stainless & Steel Alloys
- » Nickel & Cobalt Based Alloys
- » Hardened Material > 45 HRC
- » Graphite & Composite Materials





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# ALUMINUM ALLOYS








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90		5 Flute Corner Radius Variable Helix for Roughing & Finishing in Inconel	MNi5
93		5 Flute Ball Variable Helix for Roughing & Finishing in Inconel	MNi5


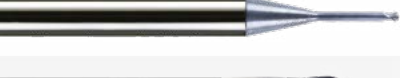


# TITANIUM & INCONEL ALLOYS

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# FERROUS MATERIALS

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Page	Description			Series	
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# GRAPHITES & COMPOSITES

Page	Description			Series	
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# VARIOUS MATERIAL

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155			Double Angle Cutter 60° and 90° Double Angle Cutter	DA
158		3 Flute	Chamfer Mill 60°, 90°, 120° Chamfer Mill	CMG3H
159		5 Flute	Chamfer Mill 60°, 90°, 120° Chamfer Mill	CMG5H
160		2 Flute	Square High Feed Carbide End Mill	HXMG2
161		4 Flute	Corner Radius High Feed Carbide End Mill	HXMG4
162		4 Flute	Corner Radius High Feed Carbide End Mill (hard milling)	HXMG4
163		2 Flute	Drill Point 142° NC Carbide Spotting Drill	HDRNC
164		2 Flute	Drill Point 140° Point Carbide Coolant Hole Drill	CDR
169		2 Flute	Drill Point 140° Point Carbide Drill <u>Without</u> Coolant Hole	MDR
172		Multi Flute	Thread Mill 60° Straight Flute, UN Thread	TM
173		Multi Flute	Thread Mill 60° Helical Flute, UN Thread	TM
175		Multi Flute	Thread Mill Single Form Thread	TM
176		Multi Flute	Thread Mill NPT Thread, Straight & Helical FL	TM
177		Multi Flute	Thread Mill NPTF Thread, Straight & Helical FL	TM

## SPEED & FEED INFORMATION PAGE 178

# TOOL CHARACTERISTICS

**SUBSTRATE** CARBIDE HSSCo PM HSSCo M42 HSS - Tool substrate for each tool series

**FLUTES** - # of flutes for each series.

**HELIX** - Helix angle for each series.

**TOLERANCE**  $+0.000$   $-0.002$   $+0.0005$   $-0.0005$   $<1/8$   $+0.000$   $-0.002$   $\geq 1/8$   $+0.000$   $-0.050\text{mm}$   $+0.013$   $-0.013$   $<3\text{mm}$   $+0.000$   $-0.05$   $\geq 3\text{mm}$  h6 - Cutting diameter tolerance

**CORNER** - Corner style for each series.

**PROFILE** - Profile of cutting edge

**MISC.**

# COATINGS

**COATING TYPES** ALL4 AITiN CVD Diamond DLC Diamond TiB2 TiCN TiXCo nACo nACRo ZnN

- Coated icon when series comes coated as standard
- Coated icon when series comes standard bright/or coated with a recommended preferred coating or additional stocked coating option

# TARGETED WORKPIECE HARDNESS

**HRC** - Range of work piece material hardness

# ISO MATERIAL GROUP

ISO	CODE	MATERIAL GROUP	MATERIAL SELECTION	CODE	MATERIAL GROUP	MATERIAL SELECTION
	<b>P</b>	Steels	Carbon Steel, Alloy Steels, Die Steels 1018, 1045, 4140,D-2	<b>K</b>	Cast Iron	Grey-Cast Iron & Ductile Iron Class-20, (60-40-18)
	<b>M</b>	Stainless	Martensitic & Austenitic 304, 316, 312, 316L, 421, 420, 17-4PH	<b>S</b>	Special Alloys	Inconel, Hastelloy,Titanium,etc Inconel 718, Hastello B, 6Al-4V
	<b>H</b>	Hardened Steels	D-2, 4340, H-13	<b>N</b>	Non-Ferrous	Aluminum-6060-T6, 7075, Plastics, Delron, Graphite, Fiberglass

# MACHINING OPERATIONS

SLOT PROFILE PLUNGING RAMPING DRILLING CHAMFER UNDERCUT RADIUS  
HELICAL INTERPOLATION DEEP CAVITY PROFILE CUTTING TROCHOIDAL MILLING THREAD MILLING SLOT WITH RADIUS FACE MILLING 3D PROFILE MILLING



Save money and make an environmental difference by getting your tools reconditioned. Melin reconditions tools so they are "almost as good as new". Visit [www.melintool.com](http://www.melintool.com) or call customer service for more details.

## Reconditioning Services are now available for:

### Ultra High Performance

Series **MTi4, MTi5 & MTi7**

Variable Helix Carbide End Mills

Series **MNi4 & MNi5**

Variable Helix Carbide End Mills for Inconel

### High Performance Drills

Series **CDR** (2 flute, 140° point, coolant hole style)

Series **MDR** (2 Flute Job Shop Style)

### High Performance End Mills

Series **VXMG3T & VXMG6T** - Variable Flute 3 and 6 Flute

Series **VXMG7 & VXMG9** - Variable Flute 7 and 9 Flute

Series **EMG35** - 35° End Mill for Stainless Steel 3 Flute

Series **GMG** - 45° for Stainless Steel/Nickel 5 Flute

Series **VXMG4, VXMG5, VXMG7, & VXMG9**

Variable Flute Carbide End Mills

### All Melin Custom Designed Tools

When we provide a quote on a special tool, if tool can be reconditioned, we provide a price for doing so and hold that price throughout the life of the tool.

### Program Details:

- MINIMUM QUANTITY REQUIREMENT (FLAT SET UP CHARGE PER TOOL FOR ANY ORDER BELOW 20 PIECES)
- NO SET UP FEE ON TOOLS OVER 20 PCS. (SAME TOOL)
- TOOLS SENT BACK TO MELIN MUST BE MARKED WITH THE FOLLOWING

### SHIPPING INFO REQUIRED:

- COMPANY NAME AND SHIPPING ADDRESS
- RETURN ADDRESS AND DETAILS
- CONTACT
- QTY
- EMAIL
- PHONE



#### ▪ ORIGINAL GEOMETRIES

Melin Ultra High Performance tooling is extremely complex. Our talented and seasoned engineering department can return these tools to their original condition.

#### ▪ ORIGINAL COATINGS

With our tool coating process done in house, coating a Melin tool with its original coating is easy and fast.

#### ▪ ORIGINAL TOLERANCES

The value of quality can be seen in the attention to detail we put in when reconditioning a Melin Tool. We have advanced inspection and measuring equipment to achieve a superior reconditioned tool.



Benefit from reduced costs, reliable production processes and consistent tool life. You can find out more information at [www.melintool.com](http://www.melintool.com)

All Melin Specials are manufactured in our Cleveland, Ohio manufacturing facility. We offer several levels of service for custom tooling. Submit your quote today at [www.melintool.com](http://www.melintool.com)

### FAST DELIVERY ON MELIN SPECIALS

Quoting Form available at [www.melintool.com](http://www.melintool.com)

Get your special QUICKLY! Getting the MOST from your tooling & maximizing performance, requires completely aligned tooling & set up process' tailored to the specific application at hand. Many times, that requires customizing the cutting tool geometry and coating to provide the least amount of machining time. Melin Tool is set up to deliver what you need... FAST!

- QUICK AND EASY QUOTE FORM AVAILABLE 24/7 ONLINE AT [WWW.MELINTOOL.COM](http://WWW.MELINTOOL.COM)
- EXPEDITED DELIVERY OPTION ON SPECIALS AVAILABLE BY REQUEST
- SIMPLE, COMPLEX & CUSTOM DESIGN INCLUDED
- 24 HOUR TURN AROUND IS AVAILABLE ON CERTAIN SERIES

### NEED A SECOND LOOK?

Sometimes the job can't wait. We understand... we can take care of you. Our manufacturing processes are highly FLEXIBLE to enable FAST priority adjustments just for this purpose. We're a large manufacturer, with small business maneuverability. If our quoted lead time isn't good enough.. Call us. We'll surprise you at how often we can help!

*Call Customer Service to get your quote with expedited lead times: 216-362-4200 or email us at [specials@melintool.com](mailto:specials@melintool.com)*



### CUSTOMIZATION OPTIONS

Melin Tool provides a variety of additional CUSTOMIZATION OPTIONS, enabling a user to get faster deliveries, when he needs a customization to maximize the performance our tools can provide in his spindles. Some features can be provided within a few days, (with base tool in stock.) Others are simply "added features" that are easily and quickly within our standard manufacturing processes, requiring no extra time. Listed below are the customization options our customer service personnel are prepared to quote.



COOLANT-THRU SINGLE HOLE  
COOLANT-THRU DOUBLE HOLE  
COOLANT GROOVES  
WHISTLE NOTCH  
COMBINATION SHANK

All Carbide Melin Tools come standard with our cylindrically ground shanks with H6 fit specifications, unless stated as different on an individual series basis.

## How To ORDER SHANK CUSTOMIZATION

Melin Tool makes it easy to order tools with these options. Simply send us an order or quotation request for the base tool you want and add the appropriate characters at the end of the part name or EDP# of that standard tool. You also can simply write a specific note identifying the desired option. Our customer service will advise the price and fastest delivery time for your request - usually within a couple of hours.

### How To ORDER SHANK CUSTOMIZATION:

**Example: STANDARD: VXMG7-1616**

- 1 WELDON FLAT - add **-WF** to end of part name or EDP  
VXMG7-1616-**WF**
- 2 ROUGH GRIP- add **-RG** to end of part name or EDP  
VXMG7-1616-**RG**
- 3 HAIMER SAFE LOCK- add **-SL** to end of part name or EDP  
VXMG7-1616-**SL**



## SHANK OPTIONS

Our options for shank styles are listed below



### STANDARD

A plain shank with a matted finish and H6 tolerance specifications, particular to the tool diameter



### WELDON FLAT

A flat ground into the shank for locking methods of tool holders, that fully complies with industry specifications of the dimensions and positioning location



### ROUGH GRIP

Blasted shank aids in further assisting in the prevention of slippage inside the tool holder while still maintaining H6 tolerance, some customers prefer to have the shank sand-blasted, which reduces the surface finish of the tool's shank and helps to reduce pull out.



### HAIMER SAFE LOCK™

This licensed system offers the pull out protection for your round shank tools! The shanks have helical grooves ground into our shanks. Combined with the proper tool holding system, this technology prevents the tool from pulling out or spinning while undergoing extreme machining applications. The advantages are that it offers positive form locking mechanism, a NON-SLIP holding solution, a VIBRATION-FREE machining process and extended tool life. Ideal for cutting costly material found in the AEROSPACE, ENERGY, and AUTOMOTIVE markets.

We currently house several **PLATIT** machines, including the n411, which has more than 4 times the chamber capacity of our other units. We now have the ability to do next generation high performance triple coatings. Our equipment enables us to coat more tools, provide more coating types and to do so with shorter setups and changeover time. Equally important, we can provide our customers with unique coatings for their specific application to truly maximize the performance achievable with Melin cutting tools.

## COATING PROPERTIES

		Hardness	Coefficient of Friction	Thermal Stability	1st Digit of Coated EDP
TiN	Titanium Nitride	24GPa	0.40	1112F (600C)	2
TiCN	Titanium Carbonitride	37GPa	0.25	752F (400C)	4
AlTiN	Aluminum Titanium Nitride	38GPa	0.60	1472F (800C)	5
nACo	Aluminum Titanium Nitride + Silicon Nitride	45GPa	0.40	2192F (1200C)	8
nACRo	Aluminum Chrome Nitride + Silicon Nitride	40GPa	0.45	2012F (1100C)	3
ZrN	Zirconium Nitride	25GPa	0.40	1049F (565C)	6
TiXCo	Titanium Silicon Nitride + nACo	45GPa	0.35	1832F (1000C)	-
TiB <sub>2</sub>	Titanium DiBoride	39GPa	0.45	1562F (850C)	-
ALL4	AlCrTiN	38GPa	0.50	1652F (900C)	-
DIA	CVD Diamond	80-100GPa	0.10	1094F (590C)	-
DLC	DLC Amorphous Diamond	50GPa	0.10	932F (500C)	7

### ALL4

ALL4 is an AlCrTiN universal coating. This coating provides use in a wide range of applications and workpiece material. It is wear-resistant at high temperatures. All4 is used on the Melin Ultra High Performance series because it is particularly suitable for difficult to machine materials.

### AlTiN

Aluminum Titanium Nitride is ideal for high temperature cutting operation in many materials such as Titanium & Nickel Alloys, Co-Cr-Mo, Stainless Steel, Alloy Steels & Cast Iron. When exposed to higher temperatures, it forms a HARD aluminum oxide layer and, as temperatures increase, the coating insulates the tool transferring heat into the chips. It is an EXTREMELY TOUGH coating that will hold up in heavy and interrupted cuts. Contains a higher aluminum content than the similar TiAlN coating which makes it harder & smoother than TiAlN. AlTiN is ideal for smaller depths of cut and excels in high speed and dry machining applications and when machining hardened steel.

### CVD Diamond

CVD diamond coating takes place in a vacuum chamber using a hot-filament, chemical vapor deposition (CVD) process. Carbon gases are introduced into the vacuum chamber where high temperatures cause carbon atoms to re-bond into a 100% pure crystalline diamond structure. The crystalline diamond slowly grows on the surface of cutting tools, forming a continuous coating of up to 20 microns in thickness. CVD diamond coated end mills are a standard choice among Mold and Die shops for Machining Graphite, and among manufacturers machining component parts made of Hard Carbon, High-Silicon Aluminum and other Non-Ferrous materials.





## DLC Diamond

DLC amorphous diamond coating is a less expensive alternative to CVD Diamond. This PVD process of applying DLC coating produces hard, smooth, hydrogen free diamond like carbon (DLC) film. This coating can be applied to any uncoated carbide tool (CVD Diamond requires a special carbide substrate).

## nACo

Aluminum Titanium Nitride + Silicon Nitride coating is extremely well suited for high performance DRILLING and MILLING applications. It has a great ability to resist high heat up to 1200°C before it starts to oxidize and break down. It has a tough core with HIGH wear and heat resistance. A top layer with extreme high Nanohardness. A very low coefficient of friction for less resistance. Up to (1-7) μm thickness in coating layers for the most protection against heat and tool breakdown.

## nACRo

Aluminum Chrome Nitride + Silicon Nitride coating is an excellent coating for high ABRASIVE wear and HEAT resistance. A top layer with high hardness and toughness. Heat resistance of up to 1100°C before it starts to oxidize and break down. It has a wide application range and is good in Super Alloys applications. It has a very low coefficient of friction for less resistance (0.35). Best in very tough operations. Up to (1-7) μm thickness in coating layers. A premium coating for those difficult applications.

## TiB<sub>2</sub>

Titanium DiBoride is well suited for high performance drilling and milling. It is a tough coating with a high hardness that works well in Titanium, Magnesium Alloys and Aluminum (>10% Si). It is a very smooth coating with a very low affinity to aluminum which prevents edge build up.

## TiCN

Titanium Carbonitride has an exceptional high hardness & low coefficient of friction coating which provides excellent wear resistance. TiCN performs well cutting Alloy Steels, Stainless Steels, and in high speed cutting where moderate temperatures are generated at the cutting edge. High lubricity facilitates chip flow, prevents build up and reduces cutting forces & temperature. Provides excellent surface quality on machined components. Also, excellent in applications which require high feed & speed rates.

## TiXCo

TiXCo is a nACo based coating with a top layer of Titanium Silicon Nitride. It is a very hard coating with a low coefficient of friction. It is best suited for Super Hard Drilling and milling of Die and Mold Steels. It can also be used in Graphite and some Composites.

## ZrN

Zirconium Nitride coating is a coating developed specifically for machining ALUMINUM, yet excellent when machining all Non-Ferrous materials. ZrN is also highly recommended for machining Fiberglass, Nylon and most Polymer materials. The Maximum working temperature = 600°C/1110°F. It has a coating thickness of 1 to 2 microns. The coefficient of friction against steel (dry) is 0.55 and the micro hardness (HV 0.05) is equal to 3000.

Connecting to Melin Tool and all its resources.



## Technical Support

Contact the Melin Technical team to discuss options for technical training classes and seminars. You benefit from customized service for your team. In order to provide you with the best service, we consider all aspects of your manufacturing process and people. Providing a service that works for you.



## Engineering Support

Expert engineers are available to discuss your tooling solutions. Optimize manufacturing operations throughout the entire life cycle of your tools. This may involve planning new manufacturing process or custom designing a new tooling solution. Maximize your productivity with engineering support.



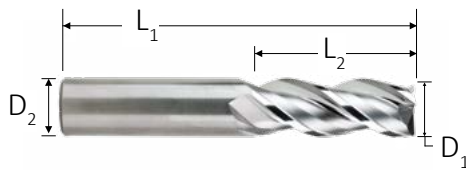
## Digital Solutions

Finding what you need has never been so easy at [www.melintool.com](http://www.melintool.com). Visit us on your smartphone, tablet or PC.

- Search for Tool
  - Advanced Filters to help you find what you need FAST!*
- Pricing & Availability Information
- Latest news, product or promotion
- Digital resources
  - Brochures & Catalogs
  - Terms & Conditions
  - Speed & Feeds
  - Request Forms

**visit our website:- [www.melintool.com](http://www.melintool.com)**





**3 FLUTE • 39° FOR ROUGHING & FINISHING**

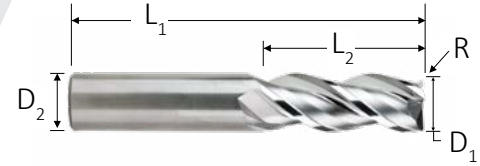
- › End geometry designed for aggressive ramping
- › Polish grinds produce superior surface finishes on both walls and floor
- › Polished flute face optimizes chip evacuation and avoids chip nesting
- › h6 Tolerance on DIA & SHK

Carbide	3	Center Cutting	39°	Bright ZrN	h6	Square										HRC <40	N
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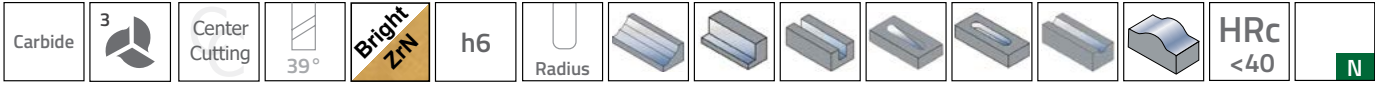
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	BRIGHT EDP	ZRN EDP
1/8	1/8	1/4	1-1/2	SQ	MAL3-S-0125-SQ	100500	600500
1/8	1/8	3/8	2	SQ	MAL3-SR-0125-SQ	100660	600660
1/8	1/8	1/2	2	SQ	MAL3-R-0125-SQ	100820	600820
3/16	3/16	5/16	2	SQ	MAL3-S-0187-SQ	100980	600980
3/16	3/16	3/4	2-1/2	SQ	MAL3-M-0187-SQ	101300	601300
1/4	1/4	3/8	2	SQ	MAL3-S-0250-SQ	101460	601460
1/4	1/4	1/2	2-1/2	SQ	MAL3-SR-0250-SQ	101620	601620
1/4	1/4	5/8	2-1/2	SQ	MAL3-RS-0250-SQ	101780	601780
1/4	1/4	3/4	2-1/2	SQ	MAL3-R-0250-SQ	101940	601940
1/4	1/4	1	3	SQ	MAL3-M-0250-SQ	102100	602100
5/16	5/16	13/16	2-1/2	SQ	MAL3-R-0312-SQ	102580	602580
5/16	5/16	1	3	SQ	MAL3-M-0312-SQ	102740	602740
3/8	3/8	1/2	2	SQ	MAL3-S-0375-SQ	102900	602900
3/8	3/8	1	3	SQ	MAL3-R-0375-SQ	103060	603060
3/8	3/8	1-1/4	3	SQ	MAL3-M-0375-SQ	103220	603220
3/8	3/8	1-1/2	3-1/2	SQ	MAL3-L-0375-SQ	103380	603380
3/8	3/8	2	4	SQ	MAL3-LX-0375-SQ	103540	603540
1/2	1/2	5/8	2-1/2	SQ	MAL3-S-0500-SQ	103700	603700
1/2	1/2	1	3	SQ	MAL3-SR-0500-SQ	103860	603860
1/2	1/2	1-1/4	3	SQ	MAL3-R-0500-SQ	104020	604020
1/2	1/2	1-5/8	4	SQ	MAL3-M-0500-SQ	104180	604180
1/2	1/2	2	4	SQ	MAL3-L-0500-SQ	104340	604340
1/2	1/2	2-1/2	5	SQ	MAL3-LX-0500-SQ	104500	604500
5/8	5/8	3/4	3	SQ	MAL3-S-0625-SQ	104820	604820
5/8	5/8	1-1/4	3-1/2	SQ	MAL3-SR-0625-SQ	104980	604980
5/8	5/8	1-5/8	3-1/2	SQ	MAL3-R-0625-SQ	105140	605140
3/4	3/4	1	4	SQ	MAL3-S-0750-SQ	105780	605780
3/4	3/4	1-5/8	4	SQ	MAL3-R-0750-SQ	105940	605940
3/4	3/4	2-1/4	5	SQ	MAL3-M-0750-SQ	106100	606100
3/4	3/4	3-1/4	6	SQ	MAL3-L-0750-SQ	106260	606260
1	1	1-1/4	4	SQ	MAL3-S-1000-SQ	107060	607060
1	1	2	5	SQ	MAL3-R-1000-SQ	107220	607220
1	1	3-1/4	6	SQ	MAL3-L-1000-SQ	107380	607380

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## 3 FLUTE • 39° FOR ROUGHING & FINISHING



- > End geometry designed for aggressive ramping
- > Polish grinds produce superior surface finishes on both walls and floor
- > Polished flute face optimizes chip evacuation and avoids chip nesting



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP
1/8	1/8	1/4	1-1/2	0.010	MAL3-S-0125-R010	100510	600510
1/8	1/8	1/4	1-1/2	0.015	MAL3-S-0125-R015	100520	600520
1/8	1/8	1/4	1-1/2	0.020	MAL3-S-0125-R020	100530	600530
1/8	1/8	1/4	1-1/2	0.030	MAL3-S-0125-R030	100540	600540
1/8	1/8	3/8	2	0.010	MAL3-SR-0125-R010	100670	600670
1/8	1/8	3/8	2	0.015	MAL3-SR-0125-R015	100680	600680
1/8	1/8	3/8	2	0.020	MAL3-SR-0125-R020	100690	600690
1/8	1/8	3/8	2	0.030	MAL3-SR-0125-R030	100700	600700
1/8	1/8	1/2	2	0.010	MAL3-R-0125-R010	100830	600830
1/8	1/8	1/2	2	0.015	MAL3-R-0125-R015	100840	600840
1/8	1/8	1/2	2	0.020	MAL3-R-0125-R020	100850	600850
1/8	1/8	1/2	2	0.030	MAL3-R-0125-R030	100860	600860
3/16	3/16	5/16	2	0.010	MAL3-S-0187-R010	100990	600990
3/16	3/16	5/16	2	0.015	MAL3-S-0187-R015	101000	601000
3/16	3/16	5/16	2	0.020	MAL3-S-0187-R020	101010	601010
3/16	3/16	5/16	2	0.030	MAL3-S-0187-R030	101020	601020
3/16	3/16	3/4	2-1/2	0.010	MAL3-M-0187-R010	101310	601310
3/16	3/16	3/4	2-1/2	0.015	MAL3-M-0187-R015	101320	601320
3/16	3/16	3/4	2-1/2	0.020	MAL3-M-0187-R020	101330	601330
3/16	3/16	3/4	2-1/2	0.030	MAL3-M-0187-R030	101340	601340
1/4	1/4	3/8	2	0.010	MAL3-S-0250-R010	101470	601470
1/4	1/4	3/8	2	0.015	MAL3-S-0250-R015	101480	601480
1/4	1/4	3/8	2	0.020	MAL3-S-0250-R020	101490	601490
1/4	1/4	3/8	2	0.030	MAL3-S-0250-R030	101500	601500
1/4	1/4	3/8	2	0.060	MAL3-S-0250-R060	101510	601510
1/4	1/4	1/2	2-1/2	0.010	MAL3-SR-0250-R010	101630	601630
1/4	1/4	1/2	2-1/2	0.015	MAL3-SR-0250-R015	101640	601640
1/4	1/4	1/2	2-1/2	0.020	MAL3-SR-0250-R020	101650	601650
1/4	1/4	1/2	2-1/2	0.030	MAL3-SR-0250-R030	101660	601660
1/4	1/4	1/2	2-1/2	0.060	MAL3-SR-0250-R060	101670	601670
1/4	1/4	5/8	2-1/2	0.010	MAL3-RS-0250-R010	101790	601790
1/4	1/4	5/8	2-1/2	0.015	MAL3-RS-0250-R015	101800	601800
1/4	1/4	5/8	2-1/2	0.020	MAL3-RS-0250-R020	101810	601810
1/4	1/4	5/8	2-1/2	0.030	MAL3-RS-0250-R030	101820	601820
1/4	1/4	5/8	2-1/2	0.060	MAL3-RS-0250-R060	101830	601830
1/4	1/4	3/4	2-1/2	0.010	MAL3-R-0250-R010	101950	601950
1/4	1/4	3/4	2-1/2	0.015	MAL3-R-0250-R015	101960	601960
1/4	1/4	3/4	2-1/2	0.020	MAL3-R-0250-R020	101970	601970
1/4	1/4	3/4	2-1/2	0.030	MAL3-R-0250-R030	101980	601980
1/4	1/4	3/4	2-1/2	0.060	MAL3-R-0250-R060	101990	601990
1/4	1/4	1	3	0.010	MAL3-M-0250-R010	102110	602110
1/4	1/4	1	3	0.015	MAL3-M-0250-R015	102120	602120
1/4	1/4	1	3	0.020	MAL3-M-0250-R020	102130	602130

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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP
1/4	1/4	1	3	0.030	MAL3-M-0250-R030	102140	602140
1/4	1/4	1	3	0.060	MAL3-M-0250-R060	102150	602150
5/16	5/16	13/16	2-1/2	0.010	MAL3-R-0312-R010	102590	602590
5/16	5/16	13/16	2-1/2	0.015	MAL3-R-0312-R015	102600	602600
5/16	5/16	13/16	2-1/2	0.020	MAL3-R-0312-R020	102610	602610
5/16	5/16	13/16	2-1/2	0.030	MAL3-R-0312-R030	102620	602620
5/16	5/16	13/16	2-1/2	0.060	MAL3-R-0312-R060	102630	602630
5/16	5/16	1	3	0.010	MAL3-M-0312-R010	102750	602750
5/16	5/16	1	3	0.015	MAL3-M-0312-R015	102760	602760
5/16	5/16	1	3	0.020	MAL3-M-0312-R020	102770	602770
5/16	5/16	1	3	0.030	MAL3-M-0312-R030	102780	602780
5/16	5/16	1	3	0.060	MAL3-M-0312-R060	102790	602790
3/8	3/8	1/2	2	0.010	MAL3-S-0375-R010	102910	602910
3/8	3/8	1/2	2	0.015	MAL3-S-0375-R015	102920	602920
3/8	3/8	1/2	2	0.020	MAL3-S-0375-R020	102930	602930
3/8	3/8	1/2	2	0.030	MAL3-S-0375-R030	102940	602940
3/8	3/8	1/2	2	0.060	MAL3-S-0375-R060	102950	602950
3/8	3/8	1/2	2	0.120	MAL3-S-0375-R120	102970	602970
3/8	3/8	1	3	0.010	MAL3-R-0375-R010	103070	603070
3/8	3/8	1	3	0.015	MAL3-R-0375-R015	103080	603080
3/8	3/8	1	3	0.020	MAL3-R-0375-R020	103090	603090
3/8	3/8	1	3	0.030	MAL3-R-0375-R030	103100	603100
3/8	3/8	1	3	0.060	MAL3-R-0375-R060	103110	603110
3/8	3/8	1	3	0.120	MAL3-R-0375-R120	103130	603130
3/8	3/8	1-1/4	3	0.010	MAL3-M-0375-R010	103230	603230
3/8	3/8	1-1/4	3	0.015	MAL3-M-0375-R015	103240	603240
3/8	3/8	1-1/4	3	0.020	MAL3-M-0375-R020	103250	603250
3/8	3/8	1-1/4	3	0.030	MAL3-M-0375-R030	103260	603260
3/8	3/8	1-1/4	3	0.060	MAL3-M-0375-R060	103270	603270
3/8	3/8	1-1/4	3	0.120	MAL3-M-0375-R120	103290	603290
3/8	3/8	1-1/2	3-1/2	0.010	MAL3-L-0375-R010	103390	603390
3/8	3/8	1-1/2	3-1/2	0.015	MAL3-L-0375-R015	103400	603400
3/8	3/8	1-1/2	3-1/2	0.020	MAL3-L-0375-R020	103410	603410
3/8	3/8	1-1/2	3-1/2	0.030	MAL3-L-0375-R030	103420	603420
3/8	3/8	1-1/2	3-1/2	0.060	MAL3-L-0375-R060	103430	603430
3/8	3/8	1-1/2	3-1/2	0.120	MAL3-L-0375-R120	103450	603450
3/8	3/8	2	4	0.010	MAL3-LX-0375-R010	103550	603550
3/8	3/8	2	4	0.015	MAL3-LX-0375-R015	103560	603560
3/8	3/8	2	4	0.020	MAL3-LX-0375-R020	103570	603570
3/8	3/8	2	4	0.030	MAL3-LX-0375-R030	103580	603580
3/8	3/8	2	4	0.060	MAL3-LX-0375-R060	103590	603590
3/8	3/8	2	4	0.120	MAL3-LX-0375-R120	103610	603610
1/2	1/2	5/8	2-1/2	0.010	MAL3-S-0500-R010	103710	603710
1/2	1/2	5/8	2-1/2	0.015	MAL3-S-0500-R015	103720	603720
1/2	1/2	5/8	2-1/2	0.020	MAL3-S-0500-R020	103730	603730
1/2	1/2	5/8	2-1/2	0.030	MAL3-S-0500-R030	103740	603740
1/2	1/2	5/8	2-1/2	0.060	MAL3-S-0500-R060	103750	603750
1/2	1/2	5/8	2-1/2	0.090	MAL3-S-0500-R090	103760	603760
1/2	1/2	5/8	2-1/2	0.120	MAL3-S-0500-R120	103770	603770
1/2	1/2	1	3	0.010	MAL3-SR-0500-R010	103870	603870

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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP
1/2	1/2	1	3	0.015	MAL3-SR-0500-R015	103880	603880
1/2	1/2	1	3	0.020	MAL3-SR-0500-R020	103890	603890
1/2	1/2	1	3	0.030	MAL3-SR-0500-R030	103900	603900
1/2	1/2	1	3	0.060	MAL3-SR-0500-R060	103910	603910
1/2	1/2	1	3	0.090	MAL3-SR-0500-R090	103920	603920
1/2	1/2	1	3	0.120	MAL3-SR-0500-R120	103930	603930
1/2	1/2	1-1/4	3	0.010	MAL3-R-0500-R010	104030	604030
1/2	1/2	1-1/4	3	0.015	MAL3-R-0500-R015	104040	604040
1/2	1/2	1-1/4	3	0.020	MAL3-R-0500-R020	104050	604050
1/2	1/2	1-1/4	3	0.030	MAL3-R-0500-R030	104060	604060
1/2	1/2	1-1/4	3	0.060	MAL3-R-0500-R060	104070	604070
1/2	1/2	1-1/4	3	0.090	MAL3-R-0500-R090	104080	604080
1/2	1/2	1-1/4	3	0.120	MAL3-R-0500-R120	104090	604090
1/2	1/2	1-5/8	4	0.010	MAL3-M-0500-R010	104190	604190
1/2	1/2	1-5/8	4	0.015	MAL3-M-0500-R015	104200	604200
1/2	1/2	1-5/8	4	0.020	MAL3-M-0500-R020	104210	604210
1/2	1/2	1-5/8	4	0.030	MAL3-M-0500-R030	104220	604220
1/2	1/2	1-5/8	4	0.060	MAL3-M-0500-R060	104230	604230
1/2	1/2	1-5/8	4	0.090	MAL3-M-0500-R090	104240	604240
1/2	1/2	1-5/8	4	0.120	MAL3-M-0500-R120	104250	604250
1/2	1/2	2	4	0.010	MAL3-L-0500-R010	104350	604350
1/2	1/2	2	4	0.015	MAL3-L-0500-R015	104360	604360
1/2	1/2	2	4	0.020	MAL3-L-0500-R020	104370	604370
1/2	1/2	2	4	0.030	MAL3-L-0500-R030	104380	604380
1/2	1/2	2	4	0.060	MAL3-L-0500-R060	104390	604390
1/2	1/2	2	4	0.090	MAL3-L-0500-R090	104400	604400
1/2	1/2	2	4	0.120	MAL3-L-0500-R120	104410	604410
1/2	1/2	2-1/2	5	0.010	MAL3-LX-0500-R010	104510	604510
1/2	1/2	2-1/2	5	0.015	MAL3-LX-0500-R015	104520	604520
1/2	1/2	2-1/2	5	0.020	MAL3-LX-0500-R020	104530	604530
1/2	1/2	2-1/2	5	0.030	MAL3-LX-0500-R030	104540	604540
1/2	1/2	2-1/2	5	0.060	MAL3-LX-0500-R060	104550	604550
1/2	1/2	2-1/2	5	0.090	MAL3-LX-0500-R090	104560	604560
1/2	1/2	2-1/2	5	0.120	MAL3-LX-0500-R120	104570	604570
5/8	5/8	3/4	3	0.015	MAL3-S-0625-R015	104830	604830
5/8	5/8	3/4	3	0.030	MAL3-S-0625-R030	104840	604840
5/8	5/8	3/4	3	0.060	MAL3-S-0625-R060	104850	604850
5/8	5/8	3/4	3	0.090	MAL3-S-0625-R090	104860	604860
5/8	5/8	3/4	3	0.120	MAL3-S-0625-R120	104870	604870
5/8	5/8	1-1/4	3-1/2	0.015	MAL3-SR-0625-R015	104990	604990
5/8	5/8	1-1/4	3-1/2	0.030	MAL3-SR-0625-R030	105000	605000
5/8	5/8	1-1/4	3-1/2	0.060	MAL3-SR-0625-R060	105010	605010
5/8	5/8	1-1/4	3-1/2	0.090	MAL3-SR-0625-R090	105020	605020
5/8	5/8	1-1/4	3-1/2	0.120	MAL3-SR-0625-R120	105030	605030
5/8	5/8	1-5/8	3-1/2	0.015	MAL3-R-0625-R015	105150	605150
5/8	5/8	1-5/8	3-1/2	0.030	MAL3-R-0625-R030	105170	605170

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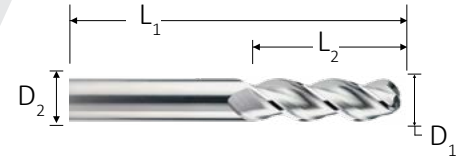
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP
5/8	5/8	1-5/8	3-1/2	0.060	MAL3-R-0625-R060	105180	605180
5/8	5/8	1-5/8	3-1/2	0.090	MAL3-R-0625-R090	105190	605190
5/8	5/8	1-5/8	3-1/2	0.120	MAL3-R-0625-R120	105200	605200
3/4	3/4	1	4	0.015	MAL3-S-0750-R015	105790	605790
3/4	3/4	1	4	0.030	MAL3-S-0750-R030	105800	605800
3/4	3/4	1	4	0.060	MAL3-S-0750-R060	105810	605810
3/4	3/4	1	4	0.090	MAL3-S-0750-R090	105820	605820
3/4	3/4	1	4	0.120	MAL3-S-0750-R120	105830	605830
3/4	3/4	1	4	0.190	MAL3-S-0750-R190	105840	605840
3/4	3/4	1	4	0.250	MAL3-S-0750-R250	105850	605850
3/4	3/4	1-5/8	4	0.015	MAL3-R-0750-R015	105950	605950
3/4	3/4	1-5/8	4	0.030	MAL3-R-0750-R030	105960	605960
3/4	3/4	1-5/8	4	0.060	MAL3-R-0750-R060	105970	605970
3/4	3/4	1-5/8	4	0.090	MAL3-R-0750-R090	105980	605980
3/4	3/4	1-5/8	4	0.120	MAL3-R-0750-R120	105990	605990
3/4	3/4	1-5/8	4	0.190	MAL3-R-0750-R190	106000	606000
3/4	3/4	1-5/8	4	0.250	MAL3-R-0750-R250	106010	606010
3/4	3/4	2-1/4	5	0.015	MAL3-M-0750-R015	106110	606110
3/4	3/4	2-1/4	5	0.030	MAL3-M-0750-R030	106115	606115
3/4	3/4	2-1/4	5	0.060	MAL3-M-0750-R060	106120	606120
3/4	3/4	2-1/4	5	0.090	MAL3-M-0750-R090	106130	606130
3/4	3/4	2-1/4	5	0.120	MAL3-M-0750-R120	106140	606140
3/4	3/4	2-1/4	5	0.190	MAL3-M-0750-R190	106150	606150
3/4	3/4	2-1/4	5	0.250	MAL3-M-0750-R250	106160	606160
3/4	3/4	3-1/4	6	0.015	MAL3-L-0750-R015	106270	606270
3/4	3/4	3-1/4	6	0.030	MAL3-L-0750-R030	106280	606280
3/4	3/4	3-1/4	6	0.060	MAL3-L-0750-R060	106290	606290
3/4	3/4	3-1/4	6	0.090	MAL3-L-0750-R090	106300	606300
3/4	3/4	3-1/4	6	0.120	MAL3-L-0750-R120	106310	606310
3/4	3/4	3-1/4	6	0.190	MAL3-L-0750-R190	106320	606320
3/4	3/4	3-1/4	6	0.250	MAL3-L-0750-R250	106330	606330
1	1	1-1/4	4	0.030	MAL3-S-1000-R030	107080	607080
1	1	1-1/4	4	0.060	MAL3-S-1000-R060	107090	607090
1	1	1-1/4	4	0.090	MAL3-S-1000-R090	107100	607100
1	1	1-1/4	4	0.120	MAL3-S-1000-R120	107110	607110
1	1	1-1/4	4	0.190	MAL3-S-1000-R190	107120	607120
1	1	1-1/4	4	0.250	MAL3-S-1000-R250	107130	607130
1	1	2	5	0.030	MAL3-R-1000-R030	107240	607240
1	1	2	5	0.060	MAL3-R-1000-R060	107250	607250
1	1	2	5	0.090	MAL3-R-1000-R090	107260	607260
1	1	2	5	0.120	MAL3-R-1000-R120	107270	607270
1	1	2	5	0.190	MAL3-R-1000-R190	107280	607280
1	1	2	5	0.250	MAL3-R-1000-R250	107290	607290
1	1	3-1/4	6	0.030	MAL3-L-1000-R030	107400	607400
1	1	3-1/4	6	0.060	MAL3-L-1000-R060	107410	607410
1	1	3-1/4	6	0.090	MAL3-L-1000-R090	107420	607420
1	1	3-1/4	6	0.120	MAL3-L-1000-R120	107430	607430
1	1	3-1/4	6	0.190	MAL3-L-1000-R190	107440	607440
1	1	3-1/4	6	0.250	MAL3-L-1000-R250	107450	607450

Speed &amp; Feed: page 178

# ALUMINUM ALLOYS

Series: **MAL3**

## 3 FLUTE • 39° BALL NOSE 3D PROFILING FOR ROUGHING & FINISHING



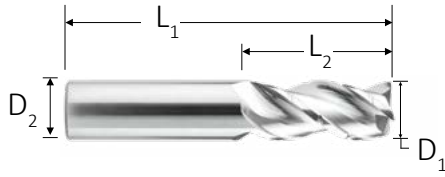
- > Designed for aggressive machining
- > Unique geometry reduces cutting pressures and vibration at high feed rates
- > Highly polished OD and flute face prevents chip build-up



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	Corner	PART NAME	BRIGHT EDP	ZRN EDP
1/8	1/8	1/4	1-1/2	Ball	MAL3-S-0125-BN	100600	600600
1/8	1/8	3/8	2	Ball	MAL3-SR-0125-BN	100760	600760
1/8	1/8	1/2	2	Ball	MAL3-R-0125-BN	100920	600920
3/16	3/16	5/16	2	Ball	MAL3-S-0187-BN	101080	601080
3/16	3/16	3/4	2-1/2	Ball	MAL3-M-0187-BN	101400	601400
1/4	1/4	3/8	2	Ball	MAL3-S-0250-BN	101560	601560
1/4	1/4	1/2	2-1/2	Ball	MAL3-SR-0250-BN	101720	601720
1/4	1/4	5/8	2-1/2	Ball	MAL3-RS-0250-BN	101880	601880
1/4	1/4	3/4	2-1/2	Ball	MAL3-R-0250-BN	102040	602040
1/4	1/4	1	3	Ball	MAL3-M-0250-BN	102200	602200
5/16	5/16	13/16	2-1/2	Ball	MAL3-R-0312-BN	102680	602680
5/16	5/16	1	3	Ball	MAL3-M-0312-BN	102840	602840
3/8	3/8	1/2	2	Ball	MAL3-S-0375-BN	103000	603000
3/8	3/8	1	3	Ball	MAL3-R-0375-BN	103160	603160
3/8	3/8	1-1/4	3	Ball	MAL3-M-0375-BN	103320	603320
3/8	3/8	1-1/2	3-1/2	Ball	MAL3-L-0375-BN	103480	603480
3/8	3/8	2	4	Ball	MAL3-LX-0375-BN	103640	603640
1/2	1/2	5/8	2-1/2	Ball	MAL3-S-0500-BN	103800	603800
1/2	1/2	1	3	Ball	MAL3-SR-0500-BN	103960	603960
1/2	1/2	1-1/4	3	Ball	MAL3-R-0500-BN	104120	604120
1/2	1/2	1-5/8	4	Ball	MAL3-M-0500-BN	104280	604280
1/2	1/2	2	4	Ball	MAL3-L-0500-BN	104440	604440
1/2	1/2	2-1/2	5	Ball	MAL3-LX-0500-BN	104600	604600
5/8	5/8	3/4	3	Ball	MAL3-S-0625-BN	104920	604920
5/8	5/8	1-1/4	3-1/2	Ball	MAL3-SR-0625-BN	105080	605080
5/8	5/8	1-5/8	3-1/2	Ball	MAL3-R-0625-BN	105240	605240
3/4	3/4	1	4	Ball	MAL3-S-0750-BN	105880	605880
3/4	3/4	1-5/8	4	Ball	MAL3-R-0750-BN	106040	606040
3/4	3/4	2-1/4	5	Ball	MAL3-M-0750-BN	106200	606200
3/4	3/4	3-1/4	6	Ball	MAL3-L-0750-BN	106360	606360
1	1	1-1/4	4	Ball	MAL3-S-1000-BN	107160	607160
1	1	2	5	Ball	MAL3-R-1000-BN	107320	607320
1	1	3-1/4	6	Ball	MAL3-L-1000-BN	107480	607480

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**3 FLUTE • 39° ROUGHING & FINISHING - CHIPBREAKER**

- > Designed for aggressive machining
- > Unique geometry reduces cutting pressures and vibration at high feed rates
- > Chipbreakers added for reduced tool pressure, also aids in chip evacuation
- > Highly polished OD and flute face prevents chip build-up



CHIP BREAKER

Carbide	3	Center Cutting	39°	Bright ZrN	h6	Square		HRC <40	N
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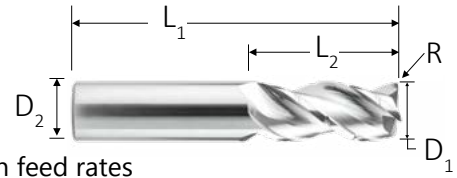
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	Corner	PART NAME	BRIGHT EDP	ZRN EDP
1/4	1/4	3/8	2	SQ	MAL3CB-S-0250-SQ	101460B	601460B
1/4	1/4	1/2	2-1/2	SQ	MAL3CB-SR-0250-SQ	101620B	601620B
1/4	1/4	5/8	2-1/2	SQ	MAL3CB-RS-0250-SQ	101780B	601780B
1/4	1/4	3/4	2-1/2	SQ	MAL3CB-R-0250-SQ	101940B	601940B
1/4	1/4	1	3	SQ	MAL3CB-M-0250-SQ	102100B	602100B
5/16	5/16	13/16	2-1/2	SQ	MAL3CB-R-0312-SQ	102580B	602580B
5/16	5/16	1	3	SQ	MAL3CB-M-0312-SQ	102740B	602740B
3/8	3/8	1/2	2	SQ	MAL3CB-S-0375-SQ	102900B	602900B
3/8	3/8	1	3	SQ	MAL3CB-R-0375-SQ	103060B	603060B
3/8	3/8	1-1/4	3	SQ	MAL3CB-M-0375-SQ	103220B	603220B
3/8	3/8	1-1/2	3-1/2	SQ	MAL3CB-L-0375-SQ	103380B	603380B
3/8	3/8	2	4	SQ	MAL3CB-LX-0375-SQ	103540B	603540B
1/2	1/2	5/8	2-1/2	SQ	MAL3CB-S-0500-SQ	103700B	603700B
1/2	1/2	1	3	SQ	MAL3CB-SR-0500-SQ	103860B	603860B
1/2	1/2	1-1/4	3	SQ	MAL3CB-R-0500-SQ	104020B	604020B
1/2	1/2	1-5/8	4	SQ	MAL3CB-M-0500-SQ	104180B	604180B
1/2	1/2	2	4	SQ	MAL3CB-L-0500-SQ	104340B	604340B
1/2	1/2	2-1/2	5	SQ	MAL3CB-LX-0500-SQ	104500B	604500B
5/8	5/8	3/4	3	SQ	MAL3CB-S-0625-SQ	104820B	604820B
5/8	5/8	1-1/4	3-1/2	SQ	MAL3CB-SR-0625-SQ	104980B	604980B
5/8	5/8	1-5/8	3-1/2	SQ	MAL3CB-R-0625-SQ	105140B	605140B
3/4	3/4	1	4	SQ	MAL3CB-S-0750-SQ	105780B	605780B
3/4	3/4	1-5/8	4	SQ	MAL3CB-R-0750-SQ	105940B	605940B
3/4	3/4	2-1/4	5	SQ	MAL3CB-M-0750-SQ	106100B	606100B
3/4	3/4	3-1/4	6	SQ	MAL3CB-L-0750-SQ	106260B	606260B
1	1	1-1/4	4	SQ	MAL3CB-S-1000-SQ	107060B	607060B
1	1	2	5	SQ	MAL3CB-R-1000-SQ	107220B	607220B
1	1	3-1/4	6	SQ	MAL3CB-L-1000-SQ	107380B	607380B

Speed & Feed: page 178

# ALUMINUM ALLOYS

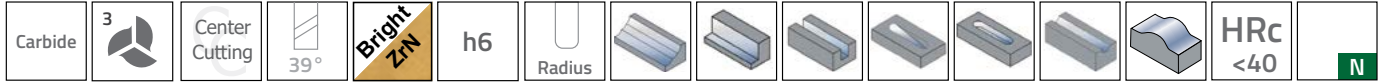
Series: **MAL3CB**

## 3 FLUTE • 39° ROUGHING & FINISHING - CHIPBREAKER



- ▶ Designed for aggressive machining
- ▶ Unique geometry reduces cutting pressures and vibration at high feed rates
- ▶ Chipbreakers added for reduced tool pressure, also aids in chip evacuation
- ▶ Highly polished OD and flute face prevents chip build-up

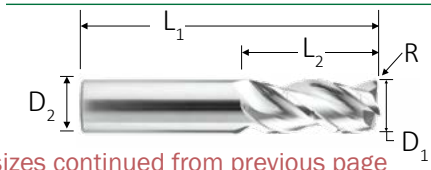
CHIP BREAKER



DIA $D_1$	SHK $D_2$	LOC $L_2$	OAL $L_1$	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
1/4	1/4	3/8	2	0.010	MAL3CB-S-0250-R010	101470B	601470B
1/4	1/4	3/8	2	0.015	MAL3CB-S-0250-R015	101480B	601480B
1/4	1/4	3/8	2	0.020	MAL3CB-S-0250-R020	101490B	601490B
1/4	1/4	3/8	2	0.030	MAL3CB-S-0250-R030	101500B	601500B
1/4	1/4	3/8	2	0.060	MAL3CB-S-0250-R060	101510B	601510B
1/4	1/4	1/2	2-1/2	0.010	MAL3CB-SR-0250-R010	101630B	601630B
1/4	1/4	1/2	2-1/2	0.015	MAL3CB-SR-0250-R015	101640B	601640B
1/4	1/4	1/2	2-1/2	0.020	MAL3CB-SR-0250-R020	101650B	601650B
1/4	1/4	1/2	2-1/2	0.030	MAL3CB-SR-0250-R030	101660B	601660B
1/4	1/4	1/2	2-1/2	0.060	MAL3CB-SR-0250-R060	101670B	601670B
1/4	1/4	5/8	2-1/2	0.010	MAL3CB-RS-0250-R010	101790B	601790B
1/4	1/4	5/8	2-1/2	0.015	MAL3CB-RS-0250-R015	101800B	601800B
1/4	1/4	5/8	2-1/2	0.020	MAL3CB-RS-0250-R020	101810B	601810B
1/4	1/4	5/8	2-1/2	0.030	MAL3CB-RS-0250-R030	101820B	601820B
1/4	1/4	5/8	2-1/2	0.060	MAL3CB-RS-0250-R060	101830B	601830B
1/4	1/4	3/4	2-1/2	0.010	MAL3CB-R-0250-R010	101950B	601950B
1/4	1/4	3/4	2-1/2	0.015	MAL3CB-R-0250-R015	101960B	601960B
1/4	1/4	3/4	2-1/2	0.020	MAL3CB-R-0250-R020	101970B	601970B
1/4	1/4	3/4	2-1/2	0.030	MAL3CB-R-0250-R030	101980B	601980B
1/4	1/4	3/4	2-1/2	0.060	MAL3CB-R-0250-R060	101990B	601990B
1/4	1/4	1	3	0.010	MAL3CB-M-0250-R010	102110B	602110B
1/4	1/4	1	3	0.015	MAL3CB-M-0250-R015	102120B	602120B
1/4	1/4	1	3	0.020	MAL3CB-M-0250-R020	102130B	602130B
1/4	1/4	1	3	0.030	MAL3CB-M-0250-R030	102140B	602140B
1/4	1/4	1	3	0.060	MAL3CB-M-0250-R060	102150B	602150B
5/16	5/16	13/16	2-1/2	0.010	MAL3CB-R-0312-R010	102590B	602590B
5/16	5/16	13/16	2-1/2	0.015	MAL3CB-R-0312-R015	102600B	602600B
5/16	5/16	13/16	2-1/2	0.020	MAL3CB-R-0312-R020	102610B	602610B
5/16	5/16	13/16	2-1/2	0.030	MAL3CB-R-0312-R030	102620B	602620B
5/16	5/16	13/16	2-1/2	0.060	MAL3CB-R-0312-R060	102630B	602630B
5/16	5/16	1	3	0.010	MAL3CB-M-0312-R010	102750B	602750B
5/16	5/16	1	3	0.015	MAL3CB-M-0312-R015	102760B	602760B
5/16	5/16	1	3	0.020	MAL3CB-M-0312-R020	102770B	602770B
5/16	5/16	1	3	0.030	MAL3CB-M-0312-R030	102780B	602780B
5/16	5/16	1	3	0.060	MAL3CB-M-0312-R060	102790B	602790B
3/8	3/8	1/2	2	0.010	MAL3CB-S-0375-R010	102910B	602910B
3/8	3/8	1/2	2	0.015	MAL3CB-S-0375-R015	102920B	602920B
3/8	3/8	1/2	2	0.020	MAL3CB-S-0375-R020	102930B	602930B

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**3 FLUTE • 39° ROUGHING & FINISHING - CHIPBREAKER**

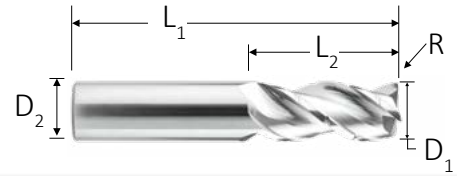
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
3/8	3/8	1/2	2	0.030	MAL3CB-S-0375-R030	102940B	602940B
3/8	3/8	1/2	2	0.060	MAL3CB-S-0375-R060	102950B	602950B
3/8	3/8	1/2	2	0.120	MAL3CB-S-0375-R120	102970B	602970B
3/8	3/8	1	3	0.010	MAL3CB-R-0375-R010	103070B	603070B
3/8	3/8	1	3	0.015	MAL3CB-R-0375-R015	103080B	603080B
3/8	3/8	1	3	0.020	MAL3CB-R-0375-R020	103090B	603090B
3/8	3/8	1	3	0.030	MAL3CB-R-0375-R030	103100B	603100B
3/8	3/8	1	3	0.060	MAL3CB-R-0375-R060	103110B	603110B
3/8	3/8	1	3	0.120	MAL3CB-R-0375-R120	103130B	603130B
3/8	3/8	1-1/4	3	0.010	MAL3CB-M-0375-R010	103230B	603230B
3/8	3/8	1-1/4	3	0.015	MAL3CB-M-0375-R015	103240B	603240B
3/8	3/8	1-1/4	3	0.020	MAL3CB-M-0375-R020	103250B	603250B
3/8	3/8	1-1/4	3	0.030	MAL3CB-M-0375-R030	103260B	603260B
3/8	3/8	1-1/4	3	0.060	MAL3CB-M-0375-R060	103270B	603270B
3/8	3/8	1-1/4	3	0.120	MAL3CB-M-0375-R120	103290B	603290B
3/8	3/8	1-1/2	3-1/2	0.010	MAL3CB-L-0375-R010	103390B	603390B
3/8	3/8	1-1/2	3-1/2	0.015	MAL3CB-L-0375-R015	103400B	603400B
3/8	3/8	1-1/2	3-1/2	0.020	MAL3CB-L-0375-R020	103410B	603410B
3/8	3/8	1-1/2	3-1/2	0.030	MAL3CB-L-0375-R030	103420B	603420B
3/8	3/8	1-1/2	3-1/2	0.060	MAL3CB-L-0375-R060	103430B	603430B
3/8	3/8	1-1/2	3-1/2	0.120	MAL3CB-L-0375-R120	103450B	603450B
3/8	3/8	2	4	0.010	MAL3CB-LX-0375-R010	103550B	603550B
3/8	3/8	2	4	0.015	MAL3CB-LX-0375-R015	103560B	603560B
3/8	3/8	2	4	0.020	MAL3CB-LX-0375-R020	103570B	603570B
3/8	3/8	2	4	0.030	MAL3CB-LX-0375-R030	103580B	603580B
3/8	3/8	2	4	0.060	MAL3CB-LX-0375-R060	103590B	603590B
3/8	3/8	2	4	0.120	MAL3CB-LX-0375-R120	103610B	603610B
1/2	1/2	5/8	2-1/2	0.010	MAL3CB-S-0500-R010	103710B	603710B
1/2	1/2	5/8	2-1/2	0.015	MAL3CB-S-0500-R015	103720B	603720B
1/2	1/2	5/8	2-1/2	0.020	MAL3CB-S-0500-R020	103730B	603730B
1/2	1/2	5/8	2-1/2	0.030	MAL3CB-S-0500-R030	103740B	603740B
1/2	1/2	5/8	2-1/2	0.060	MAL3CB-S-0500-R060	103750B	603750B
1/2	1/2	5/8	2-1/2	0.090	MAL3CB-S-0500-R090	103760B	603760B
1/2	1/2	5/8	2-1/2	0.120	MAL3CB-S-0500-R120	103770B	603770B
1/2	1/2	1	3	0.010	MAL3CB-SR-0500-R010	103870B	603870B
1/2	1/2	1	3	0.015	MAL3CB-SR-0500-R015	103880B	603880B
1/2	1/2	1	3	0.020	MAL3CB-SR-0500-R020	103890B	603890B
1/2	1/2	1	3	0.030	MAL3CB-SR-0500-R030	103900B	603900B
1/2	1/2	1	3	0.060	MAL3CB-SR-0500-R060	103910B	603910B
1/2	1/2	1	3	0.090	MAL3CB-SR-0500-R090	103920B	603920B
1/2	1/2	1	3	0.120	MAL3CB-SR-0500-R120	103930B	603930B
1/2	1/2	1-1/4	3	0.010	MAL3CB-R-0500-R010	104030B	604030B
1/2	1/2	1-1/4	3	0.015	MAL3CB-R-0500-R015	104040B	604040B
1/2	1/2	1-1/4	3	0.020	MAL3CB-R-0500-R020	104050B	604050B
1/2	1/2	1-1/4	3	0.030	MAL3CB-R-0500-R030	104060B	604060B
1/2	1/2	1-1/4	3	0.060	MAL3CB-R-0500-R060	104070B	604070B

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## 3 FLUTE • 39° ROUGHING & FINISHING - CHIPBREAKER

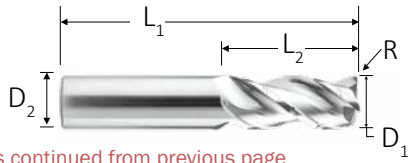


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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
1/2	1/2	1-1/4	3	0.090	MAL3CB-R-0500-R090	104080B	604080B
1/2	1/2	1-1/4	3	0.120	MAL3CB-R-0500-R120	104090B	604090B
1/2	1/2	1-5/8	4	0.010	MAL3CB-M-0500-R010	104190B	604190B
1/2	1/2	1-5/8	4	0.015	MAL3CB-M-0500-R015	104200B	604200B
1/2	1/2	1-5/8	4	0.020	MAL3CB-M-0500-R020	104210B	604210B
1/2	1/2	1-5/8	4	0.030	MAL3CB-M-0500-R030	104220B	604220B
1/2	1/2	1-5/8	4	0.060	MAL3CB-M-0500-R060	104230B	604230B
1/2	1/2	1-5/8	4	0.090	MAL3CB-M-0500-R090	104240B	604240B
1/2	1/2	1-5/8	4	0.120	MAL3CB-M-0500-R120	104250B	604250B
1/2	1/2	2	4	0.010	MAL3CB-L-0500-R010	104350B	604350B
1/2	1/2	2	4	0.015	MAL3CB-L-0500-R015	104360B	604360B
1/2	1/2	2	4	0.020	MAL3CB-L-0500-R020	104370B	604370B
1/2	1/2	2	4	0.030	MAL3CB-L-0500-R030	104380B	604380B
1/2	1/2	2	4	0.060	MAL3CB-L-0500-R060	104390B	604390B
1/2	1/2	2	4	0.090	MAL3CB-L-0500-R090	104400B	604400B
1/2	1/2	2	4	0.120	MAL3CB-L-0500-R120	104410B	604410B
1/2	1/2	2-1/2	5	0.010	MAL3CB-LX-0500-R010	104510B	604510B
1/2	1/2	2-1/2	5	0.015	MAL3CB-LX-0500-R015	104520B	604520B
1/2	1/2	2-1/2	5	0.020	MAL3CB-LX-0500-R020	104530B	604530B
1/2	1/2	2-1/2	5	0.030	MAL3CB-LX-0500-R030	104540B	604540B
1/2	1/2	2-1/2	5	0.060	MAL3CB-LX-0500-R060	104550B	604550B
1/2	1/2	2-1/2	5	0.090	MAL3CB-LX-0500-R090	104560B	604560B
1/2	1/2	2-1/2	5	0.120	MAL3CB-LX-0500-R120	104570B	604570B
5/8	5/8	3/4	3	0.015	MAL3CB-S-0625-R015	104830B	604830B
5/8	5/8	3/4	3	0.030	MAL3CB-S-0625-R030	104840B	604840B
5/8	5/8	3/4	3	0.060	MAL3CB-S-0625-R060	104850B	604850B
5/8	5/8	3/4	3	0.090	MAL3CB-S-0625-R090	104860B	604860B
5/8	5/8	3/4	3	0.120	MAL3CB-S-0625-R120	104870B	604870B
5/8	5/8	1-1/4	3-1/2	0.015	MAL3CB-SR-0625-R015	104990B	604990B
5/8	5/8	1-1/4	3-1/2	0.030	MAL3CB-SR-0625-R030	105000B	605000B
5/8	5/8	1-1/4	3-1/2	0.060	MAL3CB-SR-0625-R060	105010B	605010B
5/8	5/8	1-1/4	3-1/2	0.090	MAL3CB-SR-0625-R090	105020B	605020B
5/8	5/8	1-1/4	3-1/2	0.120	MAL3CB-SR-0625-R120	105030B	605030B
5/8	5/8	1-5/8	3-1/2	0.015	MAL3CB-R-0625-R015	105150B	605150B
5/8	5/8	1-5/8	3-1/2	0.030	MAL3CB-R-0625-R030	105170B	605170B
5/8	5/8	1-5/8	3-1/2	0.060	MAL3CB-R-0625-R060	105180B	605180B
5/8	5/8	1-5/8	3-1/2	0.090	MAL3CB-R-0625-R090	105190B	605190B
5/8	5/8	1-5/8	3-1/2	0.120	MAL3CB-R-0625-R120	105200B	605200B
3/4	3/4	1	4	0.015	MAL3CB-S-0750-R015	105790B	605790B
3/4	3/4	1	4	0.030	MAL3CB-S-0750-R030	105800B	605800B
3/4	3/4	1	4	0.060	MAL3CB-S-0750-R060	105810B	605810B
3/4	3/4	1	4	0.090	MAL3CB-S-0750-R090	105820B	605820B
3/4	3/4	1	4	0.120	MAL3CB-S-0750-R120	105830B	605830B
3/4	3/4	1	4	0.190	MAL3CB-S-0750-R190	105840B	605840B
3/4	3/4	1	4	0.250	MAL3CB-S-0750-R250	105850B	605850B

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sizes continued on next page

**3 FLUTE • 39° ROUGHING & FINISHING - CHIPBREAKER**

sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
3/4	3/4	1-5/8	4	0.015	MAL3CB-R-0750-R015	105950B	605950B
3/4	3/4	1-5/8	4	0.030	MAL3CB-R-0750-R030	105960B	605960B
3/4	3/4	1-5/8	4	0.060	MAL3CB-R-0750-R060	105970B	605970B
3/4	3/4	1-5/8	4	0.090	MAL3CB-R-0750-R090	105980B	605980B
3/4	3/4	1-5/8	4	0.120	MAL3CB-R-0750-R120	105990B	605990B
3/4	3/4	1-5/8	4	0.190	MAL3CB-R-0750-R190	106000B	606000B
3/4	3/4	1-5/8	4	0.250	MAL3CB-R-0750-R250	106010B	606010B
3/4	3/4	2-1/4	5	0.015	MAL3CB-M-0750-R015	106110B	606110B
3/4	3/4	2-1/4	5	0.030	MAL3CB-M-0750-R030	106115B	606115B
3/4	3/4	2-1/4	5	0.060	MAL3CB-M-0750-R060	106120B	606120B
3/4	3/4	2-1/4	5	0.090	MAL3CB-M-0750-R090	106130B	606130B
3/4	3/4	2-1/4	5	0.120	MAL3CB-M-0750-R120	106140B	606140B
3/4	3/4	2-1/4	5	0.190	MAL3CB-M-0750-R190	106150B	606150B
3/4	3/4	2-1/4	5	0.250	MAL3CB-M-0750-R250	106160B	606160B
3/4	3/4	3-1/4	6	0.015	MAL3CB-L-0750-R015	106270B	606270B
3/4	3/4	3-1/4	6	0.030	MAL3CB-L-0750-R030	106280B	606280B
3/4	3/4	3-1/4	6	0.060	MAL3CB-L-0750-R060	106290B	606290B
3/4	3/4	3-1/4	6	0.090	MAL3CB-L-0750-R090	106300B	606300B
3/4	3/4	3-1/4	6	0.120	MAL3CB-L-0750-R120	106310B	606310B
3/4	3/4	3-1/4	6	0.190	MAL3CB-L-0750-R190	106320B	606320B
3/4	3/4	3-1/4	6	0.250	MAL3CB-L-0750-R250	106330B	606330B
1	1	1-1/4	4	0.030	MAL3CB-S-1000-R030	107080B	607080B
1	1	1-1/4	4	0.060	MAL3CB-S-1000-R060	107090B	607090B
1	1	1-1/4	4	0.090	MAL3CB-S-1000-R090	107100B	607100B
1	1	1-1/4	4	0.120	MAL3CB-S-1000-R120	107110B	607110B
1	1	1-1/4	4	0.190	MAL3CB-S-1000-R190	107120B	607120B
1	1	1-1/4	4	0.250	MAL3CB-S-1000-R250	107130B	607130B
1	1	2	5	0.030	MAL3CB-R-1000-R030	107240B	607240B
1	1	2	5	0.060	MAL3CB-R-1000-R060	107250B	607250B
1	1	2	5	0.090	MAL3CB-R-1000-R090	107260B	607260B
1	1	2	5	0.120	MAL3CB-R-1000-R120	107270B	607270B
1	1	2	5	0.190	MAL3CB-R-1000-R190	107280B	607280B
1	1	2	5	0.250	MAL3CB-R-1000-R250	107290B	607290B
1	1	3-1/4	6	0.030	MAL3CB-L-1000-R030	107400B	607400B
1	1	3-1/4	6	0.060	MAL3CB-L-1000-R060	107410B	607410B
1	1	3-1/4	6	0.090	MAL3CB-L-1000-R090	107420B	607420B
1	1	3-1/4	6	0.120	MAL3CB-L-1000-R120	107430B	607430B
1	1	3-1/4	6	0.190	MAL3CB-L-1000-R190	107440B	607440B
1	1	3-1/4	6	0.250	MAL3CB-L-1000-R250	107450B	607450B

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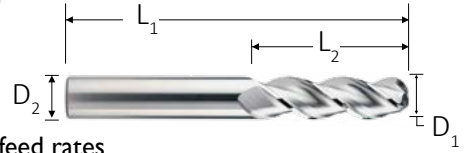
# ALUMINUM ALLOYS

Series: **MAL3CB**

## 3 FLUTE • 39° BALL NOSE 3D PROFILING FOR ROUGHING & FINISHING



- › Designed for aggressive machining
- › Unique geometry reduces cutting pressures and vibration at high feed rates
- › Added Chipbreaker for reduced chip nesting



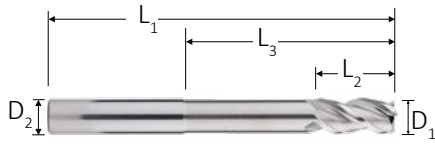
CHIP BREAKER

Carbide	3	Center Cutting	39°	Bright ZrN	h6	Ball		HRC <40	N
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	BRIGHT EDP	ZRN EDP
1/4	1/4	3/8	2	Ball	MAL3CB-S-0250-BN	101560B	601560B
1/4	1/4	1/2	2-1/2	Ball	MAL3CB-SR-0250-BN	101720B	601720B
1/4	1/4	5/8	2-1/2	Ball	MAL3CB-RS-0250-BN	101880B	601880B
1/4	1/4	3/4	2-1/2	Ball	MAL3CB-R-0250-BN	102040B	602040B
1/4	1/4	1	3	Ball	MAL3CB-M-0250-BN	102200B	602200B
5/16	5/16	13/16	2-1/2	Ball	MAL3CB-R-0312-BN	102680B	602680B
5/16	5/16	1	3	Ball	MAL3CB-M-0312-BN	102840B	602840B
3/8	3/8	1/2	2	Ball	MAL3CB-S-0375-BN	103000B	603000B
3/8	3/8	1	3	Ball	MAL3CB-R-0375-BN	103160B	603160B
3/8	3/8	1-1/4	3	Ball	MAL3CB-M-0375-BN	103320B	603320B
3/8	3/8	1-1/2	3-1/2	Ball	MAL3CB-L-0375-BN	103480B	603480B
3/8	3/8	2	4	Ball	MAL3CB-LX-0375-BN	103640B	603640B
1/2	1/2	5/8	2-1/2	Ball	MAL3CB-S-0500-BN	103800B	603800B
1/2	1/2	1	3	Ball	MAL3CB-SR-0500-BN	103960B	603960B
1/2	1/2	1-1/4	3	Ball	MAL3CB-R-0500-BN	104120B	604120B
1/2	1/2	1-5/8	4	Ball	MAL3CB-M-0500-BN	104280B	604280B
1/2	1/2	2	4	Ball	MAL3CB-L-0500-BN	104440B	604440B
1/2	1/2	2-1/2	5	Ball	MAL3CB-LX-0500-BN	104600B	604600B
5/8	5/8	3/4	3	Ball	MAL3CB-S-0625-BN	104920B	604920B
5/8	5/8	1-1/4	3-1/2	Ball	MAL3CB-SR-0625-BN	105080B	605080B
5/8	5/8	1-5/8	3-1/2	Ball	MAL3CB-R-0625-BN	105240B	605240B
3/4	3/4	1	4	Ball	MAL3CB-S-0750-BN	105880B	605880B
3/4	3/4	1-5/8	4	Ball	MAL3CB-R-0750-BN	106040B	606040B
3/4	3/4	2-1/4	5	Ball	MAL3CB-M-0750-BN	106200B	606200B
3/4	3/4	3-1/4	6	Ball	MAL3CB-L-0750-BN	106360B	606360B
1	1	1-1/4	4	Ball	MAL3CB-S-1000-BN	107160B	607160B
1	1	2	5	Ball	MAL3CB-R-1000-BN	107320B	607320B
1	1	3-1/4	6	Ball	MAL3CB-L-1000-BN	107480B	607480B

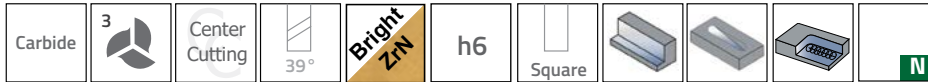
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**3 FLUTE • 39° HELIX - REDUCED NECK**

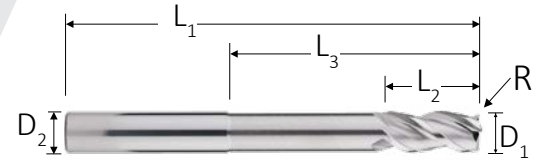
- › End geometry designed for aggressive ramping
- › Polish grinds produce superior surface finishes on both walls and floor
- › Reduced Neck designed for deep pocketing and long reach applications
- › Polished flute face optimizes chip evacuation and avoids chip nesting
- › h6 Tolerance on DIA & SHK



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	Corner	PART NAME	BRIGHT EDP	ZRN EDP
1/8	1/8	1/4	3/4	3	SQ	MAL3-RN-S-0125-SQ	110800	610800
1/8	1/8	1/4	1	3	SQ	MAL3-RN-R-0125-SQ	110830	610830
3/16	3/16	5/16	3/4	3	SQ	MAL3-RN-S-0187-SQ	110860	610860
3/16	3/16	5/16	1	3	SQ	MAL3-RN-R-0187-SQ	110900	610900
1/4	1/4	1/2	1	3	SQ	MAL3-RN-S-0250-SQ	110930	610930
1/4	1/4	1/2	1-1/2	3	SQ	MAL3-RN-R-0250-SQ	110970	610970
1/4	1/4	1/2	2	4	SQ	MAL3-RN-M-0250-SQ	111010	611010
1/4	1/4	1/2		4	SQ	MAL3-LS-M-0250-SQ	111050	611050
3/8	3/8	3/4	1-1/4	3	SQ	MAL3-RN-S-0375-SQ	111090	611090
3/8	3/8	3/4	1-1/2	4	SQ	MAL3-RN-R-0375-SQ	111140	611140
3/8	3/8	3/4	2	4	SQ	MAL3-RN-M-0375-SQ	111190	611190
3/8	3/8	3/4	3	5	SQ	MAL3-RN-L-0375-SQ	111240	611240
3/8	3/8	3/4		5	SQ	MAL3-LS-L-0375-SQ	111290	611290
1/2	1/2	1	1-1/2	4	SQ	MAL3-RN-S-0500-SQ	111340	611340
1/2	1/2	1	2	4	SQ	MAL3-RN-R-0500-SQ	111380	611380
1/2	1/2	1	3	5	SQ	MAL3-RN-M-0500-SQ	111420	611420
1/2	1/2	1	4	6	SQ	MAL3-RN-L-0500-SQ	111460	611460
1/2	1/2	1		6	SQ	MAL3-LS-L-0500-SQ	111500	611500
5/8	5/8	1-1/4	2	4	SQ	MAL3-RN-S-0625-SQ	111540	611540
5/8	5/8	1-1/4	3	5	SQ	MAL3-RN-R-0625-SQ	111580	611580
5/8	5/8	1-1/4	4	6	SQ	MAL3-RN-M-0625-SQ	111620	611620
5/8	5/8	1-1/4		6	SQ	MAL3-LS-S-0625-SQ	111660	611660
3/4	3/4	1-3/8	2	4	SQ	MAL3-RN-S-0750-SQ	111700	611700
3/4	3/4	1-3/8	3	5	SQ	MAL3-RN-R-0750-SQ	111740	611740
3/4	3/4	1-3/8	4	6	SQ	MAL3-RN-M-0750-SQ	111780	611780
3/4	3/4	1-3/8		6	SQ	MAL3-LS-M-0750-SQ	111820	611820
1	1	1-1/2	2	4	SQ	MAL3-RN-S-1000-SQ	111860	611860
1	1	1-1/2	3	5	SQ	MAL3-RN-R-1000-SQ	111900	611900
1	1	1-1/2	4	6	SQ	MAL3-RN-M-1000-SQ	111940	611940
1	1	1-1/2		6	SQ	MAL3-LS-M-1000-SQ	111980	611980

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## 3 FLUTE • 39° HELIX - REDUCED NECK



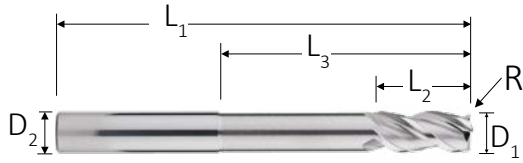
- ▶ End geometry designed for aggressive ramping
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- ▶ Reduced Neck designed for deep pocketing and long reach applications
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- ▶ h6 Tolerance on DIA & SHK



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
1/8	1/8	1/4	3/4	3	0.015	MAL3-RN-S-0125-R015	110810	610810
1/8	1/8	1/4	3/4	3	0.030	MAL3-RN-S-0125-R030	110820	610820
1/8	1/8	1/4	1	3	0.015	MAL3-RN-R-0125-R015	110840	610840
1/8	1/8	1/4	1	3	0.030	MAL3-RN-R-0125-R030	110850	610850
3/16	3/16	5/16	3/4	3	0.015	MAL3-RN-S-0187-R015	110870	610870
3/16	3/16	5/16	3/4	3	0.030	MAL3-RN-S-0187-R030	110880	610880
3/16	3/16	5/16	1	3	0.015	MAL3-RN-R-0187-R015	110910	610910
3/16	3/16	5/16	1	3	0.030	MAL3-RN-R-0187-R030	110920	610920
1/4	1/4	1/2	1	3	0.015	MAL3-RN-S-0250-R015	110940	610940
1/4	1/4	1/2	1	3	0.030	MAL3-RN-S-0250-R030	110950	610950
1/4	1/4	1/2	1	3	0.060	MAL3-RN-S-0250-R060	110960	610960
1/4	1/4	1/2	1-1/2	3	0.015	MAL3-RN-R-0250-R015	110980	610980
1/4	1/4	1/2	1-1/2	3	0.030	MAL3-RN-R-0250-R030	110990	610990
1/4	1/4	1/2	1-1/2	3	0.060	MAL3-RN-R-0250-R060	111000	611000
1/4	1/4	1/2	2	4	0.015	MAL3-RN-M-0250-R015	111020	611020
1/4	1/4	1/2	2	4	0.030	MAL3-RN-M-0250-R030	111030	611030
1/4	1/4	1/2	2	4	0.060	MAL3-RN-M-0250-R060	111040	611040
1/4	1/4	1/2		4	0.015	MAL3-LS-M-0250-R015	111060	611060
1/4	1/4	1/2		4	0.030	MAL3-LS-M-0250-R030	111070	611070
1/4	1/4	1/2		4	0.060	MAL3-LS-M-0250-R060	111080	611080
3/8	3/8	3/4	1-1/4	3	0.015	MAL3-RN-S-0375-R015	111100	611100
3/8	3/8	3/4	1-1/4	3	0.030	MAL3-RN-S-0375-R030	111110	611110
3/8	3/8	3/4	1-1/4	3	0.060	MAL3-RN-S-0375-R060	111120	611120
3/8	3/8	3/4	1-1/4	3	0.120	MAL3-RN-S-0375-R120	111130	611130
3/8	3/8	3/4	1-1/2	4	0.015	MAL3-RN-R-0375-R015	111150	611150
3/8	3/8	3/4	1-1/2	4	0.030	MAL3-RN-R-0375-R030	111160	611160
3/8	3/8	3/4	1-1/2	4	0.060	MAL3-RN-R-0375-R060	111170	611170
3/8	3/8	3/4	1-1/2	4	0.120	MAL3-RN-R-0375-R120	111180	611180
3/8	3/8	3/4	2	4	0.015	MAL3-RN-M-0375-R015	111200	611200
3/8	3/8	3/4	2	4	0.030	MAL3-RN-M-0375-R030	111210	611210
3/8	3/8	3/4	2	4	0.060	MAL3-RN-M-0375-R060	111220	611220
3/8	3/8	3/4	2	4	0.120	MAL3-RN-M-0375-R120	111230	611230
3/8	3/8	3/4	3	5	0.015	MAL3-RN-L-0375-R015	111250	611250
3/8	3/8	3/4	3	5	0.030	MAL3-RN-L-0375-R030	111260	611260
3/8	3/8	3/4	3	5	0.060	MAL3-RN-L-0375-R060	111270	611270
3/8	3/8	3/4	3	5	0.120	MAL3-RN-L-0375-R120	111280	611280

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sizes continued on next page



**3 FLUTE • 39° HELIX - REDUCED NECK**

sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
3/8	3/8	3/4		5	0.015	MAL3-LS-L-0375-R015	111300	611300
3/8	3/8	3/4		5	0.030	MAL3-LS-L-0375-R030	111310	611310
3/8	3/8	3/4		5	0.060	MAL3-LS-L-0375-R060	111320	611320
3/8	3/8	3/4		5	0.120	MAL3-LS-L-0375-R120	111330	611330
1/2	1/2	1	1-1/2	4	0.030	MAL3-RN-S-0500-R030	111350	611350
1/2	1/2	1	1-1/2	4	0.060	MAL3-RN-S-0500-R060	111360	611360
1/2	1/2	1	1-1/2	4	0.120	MAL3-RN-S-0500-R120	111370	611370
1/2	1/2	1	2	4	0.030	MAL3-RN-R-0500-R030	111390	611390
1/2	1/2	1	2	4	0.060	MAL3-RN-R-0500-R060	111400	611400
1/2	1/2	1	2	4	0.120	MAL3-RN-R-0500-R120	111410	611410
1/2	1/2	1	3	5	0.030	MAL3-RN-M-0500-R030	111430	611430
1/2	1/2	1	3	5	0.060	MAL3-RN-M-0500-R060	111440	611440
1/2	1/2	1	3	5	0.120	MAL3-RN-M-0500-R120	111450	611450
1/2	1/2	1	4	6	0.030	MAL3-RN-L-0500-R030	111470	611470
1/2	1/2	1	4	6	0.060	MAL3-RN-L-0500-R060	111480	611480
1/2	1/2	1	4	6	0.120	MAL3-RN-L-0500-R120	111490	611490
1/2	1/2	1		6	0.030	MAL3-LS-L-0500-R030	111510	611510
1/2	1/2	1		6	0.060	MAL3-LS-L-0500-R060	111520	611520
1/2	1/2	1		6	0.120	MAL3-LS-L-0500-R120	111530	611530
5/8	5/8	1-1/4	2	4	0.030	MAL3-RN-S-0625-R030	111550	611550
5/8	5/8	1-1/4	2	4	0.060	MAL3-RN-S-0625-R060	111560	611560
5/8	5/8	1-1/4	2	4	0.120	MAL3-RN-S-0625-R120	111570	611570
5/8	5/8	1-1/4	3	5	0.030	MAL3-RN-R-0625-R030	111590	611590
5/8	5/8	1-1/4	3	5	0.060	MAL3-RN-R-0625-R060	111600	611600
5/8	5/8	1-1/4	3	5	0.120	MAL3-RN-R-0625-R120	111610	611610
5/8	5/8	1-1/4	4	6	0.030	MAL3-RN-M-0625-R030	111630	611630
5/8	5/8	1-1/4	4	6	0.060	MAL3-RN-M-0625-R060	111640	611640
5/8	5/8	1-1/4	4	6	0.120	MAL3-RN-M-0625-R120	111650	611650
5/8	5/8	1-1/4		6	0.030	MAL3-LS-M-0625-R030	111670	611670
5/8	5/8	1-1/4		6	0.060	MAL3-LS-M-0625-R060	111680	611680
5/8	5/8	1-1/4		6	0.120	MAL3-LS-M-0625-R120	111690	611690
3/4	3/4	1-3/8	2	4	0.030	MAL3-RN-S-0750-R030	111710	611710
3/4	3/4	1-3/8	2	4	0.060	MAL3-RN-S-0750-R060	111720	611720
3/4	3/4	1-3/8	2	4	0.120	MAL3-RN-S-0750-R120	111730	611730
3/4	3/4	1-3/8	3	5	0.030	MAL3-RN-R-0750-R030	111750	611750
3/4	3/4	1-3/8	3	5	0.060	MAL3-RN-R-0750-R060	111760	611760
3/4	3/4	1-3/8	3	5	0.120	MAL3-RN-R-0750-R120	111770	611770
3/4	3/4	1-3/8	4	6	0.030	MAL3-RN-M-0750-R030	111790	611790
3/4	3/4	1-3/8	4	6	0.060	MAL3-RN-M-0750-R060	111800	611800
3/4	3/4	1-3/8	4	6	0.120	MAL3-RN-M-0750-R120	111810	611810

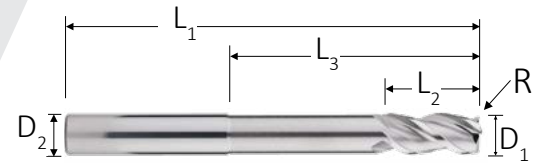
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sizes continued on next page

# ALUMINUM ALLOYS

## 3 FLUTE • 39° HELIX - REDUCED NECK

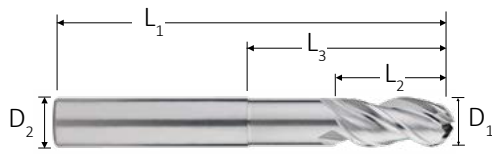
Series: **MAL3-RN**



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
3/4	3/4	1-3/8		6	0.030	MAL3-LS-M-0750-R030	111830	611830
3/4	3/4	1-3/8		6	0.060	MAL3-LS-M-0750-R060	111840	611840
3/4	3/4	1-3/8		6	0.120	MAL3-LS-M-0750-R120	111850	611850
1	1	1-1/2	2	4	0.030	MAL3-RN-S-1000-R030	111870	611870
1	1	1-1/2	2	4	0.060	MAL3-RN-S-1000-R060	111880	611880
1	1	1-1/2	2	4	0.120	MAL3-RN-S-1000-R120	111890	611890
1	1	1-1/2	3	5	0.030	MAL3-RN-R-1000-R030	111910	611910
1	1	1-1/2	3	5	0.060	MAL3-RN-R-1000-R060	111920	611920
1	1	1-1/2	3	5	0.120	MAL3-RN-R-1000-R120	111930	611930
1	1	1-1/2	4	6	0.030	MAL3-RN-M-1000-R030	111950	611950
1	1	1-1/2	4	6	0.060	MAL3-RN-M-1000-R060	111960	611960
1	1	1-1/2	4	6	0.120	MAL3-RN-M-1000-R120	111970	611970
1	1	1-1/2		6	0.030	MAL3-LS-M-1000-R030	111990	611990
1	1	1-1/2		6	0.060	MAL3-LS-M-1000-R060	112000	612000
1	1	1-1/2		6	0.120	MAL3-LS-M-1000-R120	112010	612010

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**3 FLUTE • 39° HELIX - REDUCED NECK - BALL NOSE**

- End geometry designed for aggressive ramping
- Polish grinds produce superior surface finishes on both walls and floor
- Reduced Neck designed for deep pocketing and long reach applications
- Polished flute face optimizes chip evacuation and avoids chip nesting
- h6 Tolerance shank for use in shrink fit holders

Carbide	3	Center Cutting	39°	Bright ZrN	h6	Ball						HRC <40	N
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	Corner	PART NAME	BRIGHT EDP	ZRN EDP
1/8	1/8	1/4	3/4	3	Ball	MAL3-RN-S-0125-BN	110825	610825
1/8	1/8	1/4	1	3	Ball	MAL3-RN-R-0125-BN	110855	610855
3/16	3/16	5/16	3/4	3	Ball	MAL3-RN-S-0187-BN	110885	610885
3/16	3/16	5/16	1	3	Ball	MAL3-RN-R-0187-BN	110925	610925
1/4	1/4	1/2	1	3	Ball	MAL3-RN-S-0250-BN	110965	610965
1/4	1/4	1/2	1-1/2	3	Ball	MAL3-RN-R-0250-BN	111005	611005
1/4	1/4	1/2	2	4	Ball	MAL3-RN-M-0250-BN	111045	611045
1/4	1/4	1/2		4	Ball	MAL3-LS-M-0250-BN	111085	611085
3/8	3/8	3/4	1-1/4	3	Ball	MAL3-RN-S-0375-BN	111135	611135
3/8	3/8	3/4	1-1/2	4	Ball	MAL3-RN-R-0375-BN	111185	611185
3/8	3/8	3/4	2	4	Ball	MAL3-RN-M-0375-BN	111235	611235
3/8	3/8	3/4	3	5	Ball	MAL3-RN-L-0375-BN	111285	611285
3/8	3/8	3/4		5	Ball	MAL3-LS-L-0375-BN	111335	611335
1/2	1/2	1	1-1/2	4	Ball	MAL3-RN-S-0500-BN	111375	611375
1/2	1/2	1	2	4	Ball	MAL3-RN-R-0500-BN	111415	611415
1/2	1/2	1	3	5	Ball	MAL3-RN-M-0500-BN	111455	611455
1/2	1/2	1	4	6	Ball	MAL3-RN-L-0500-BN	111495	611495
1/2	1/2	1		6	Ball	MAL3-LS-L-0500-BN	111535	611535
5/8	5/8	1-1/4	2	4	Ball	MAL3-RN-S-0625-BN	111575	611575
5/8	5/8	1-1/4	3	5	Ball	MAL3-RN-R-0625-BN	111615	611615
5/8	5/8	1-1/4	4	6	Ball	MAL3-RN-M-0625-BN	111655	611655
5/8	5/8	1-1/4		6	Ball	MAL3-LS-M-0625-BN	111695	611695
3/4	3/4	1-3/8	2	4	Ball	MAL3-RN-S-0750-BN	111735	611735
3/4	3/4	1-3/8	3	5	Ball	MAL3-RN-R-0750-BN	111775	611775
3/4	3/4	1-3/8	4	6	Ball	MAL3-RN-M-0750-BN	111815	611815
3/4	3/4	1-3/8		6	Ball	MAL3-LS-M-0750-BN	111855	611855
1	1	1-1/2	2	4	Ball	MAL3-RN-S-1000-BN	111895	611895
1	1	1-1/2	3	5	Ball	MAL3-RN-R-1000-BN	111935	611935
1	1	1-1/2	4	6	Ball	MAL3-RN-M-1000-BN	111975	611975
1	1	1-1/2		6	Ball	MAL3-LS-M-1000-BN	112015	612015

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# ALUMINUM ALLOYS

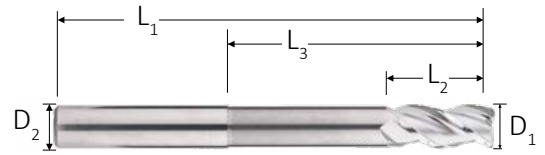
## 3 FLUTE • 39° HELIX - REDUCED NECK - CHIPBREAKER

Series: **MAL3CB-RN**



CHIP BREAKER

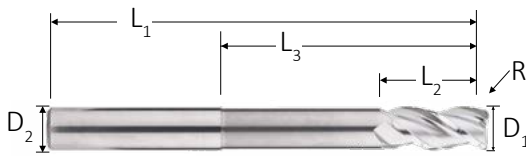
- ▶ End geometry designed for aggressive ramping
- ▶ Polish grinds produce superior surface finishes on both walls & floor
- ▶ Reduced Neck designed for deep pocketing and long reach applications
- ▶ Polished flute face optimizes chip evacuation and avoids chip nesting
- ▶ h6 Tolerance shank for use in shrink fit holders



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	Corner	PART NAME	BRIGHT EDP	ZRN EDP
1/4	1/4	1/2	1	3	SQ	MAL3CB-RN-S-0250-SQ	110930B	610930B
1/4	1/4	1/2	1-1/2	3	SQ	MAL3CB-RN-R-0250-SQ	110970B	610970B
1/4	1/4	1/2	2	4	SQ	MAL3CB-RN-M-0250-SQ	111010B	611010B
1/4	1/4	1/2		4	SQ	MAL3CB-LS-M-0250-SQ	111050B	611050B
3/8	3/8	3/4	1-1/4	3	SQ	MAL3CB-RN-S-0375-SQ	111090B	611090B
3/8	3/8	3/4	1-1/2	4	SQ	MAL3CB-RN-R-0375-SQ	111140B	611140B
3/8	3/8	3/4	2	4	SQ	MAL3CB-RN-M-0375-SQ	111190B	611190B
3/8	3/8	3/4	3	5	SQ	MAL3CB-RN-L-0375-SQ	111240B	611240B
3/8	3/8	3/4		5	SQ	MAL3CB-LS-L-0375-SQ	111290B	611290B
1/2	1/2	1	1-1/2	4	SQ	MAL3CB-RN-S-0500-SQ	111340B	611340B
1/2	1/2	1	2	4	SQ	MAL3CB-RN-R-0500-SQ	111380B	611380B
1/2	1/2	1	3	5	SQ	MAL3CB-RN-M-0500-SQ	111420B	611420B
1/2	1/2	1	4	6	SQ	MAL3CB-RN-L-0500-SQ	111460B	611460B
1/2	1/2	1		6	SQ	MAL3CB-LS-L-0500-SQ	111500B	611500B
5/8	5/8	1-1/4	2	4	SQ	MAL3CB-RN-S-0625-SQ	111540B	611540B
5/8	5/8	1-1/4	3	5	SQ	MAL3CB-RN-R-0625-SQ	111580B	611580B
5/8	5/8	1-1/4	4	6	SQ	MAL3CB-RN-M-0625-SQ	111620B	611620B
5/8	5/8	1-1/4		6	SQ	MAL3CB-LS-M-0625-SQ	111660B	611660B
3/4	3/4	1-3/8	2	4	SQ	MAL3CB-RN-S-0750-SQ	111700B	611700B
3/4	3/4	1-3/8	3	5	SQ	MAL3CB-RN-R-0750-SQ	111740B	611740B
3/4	3/4	1-3/8	4	6	SQ	MAL3CB-RN-M-0750-SQ	111780B	611780B
3/4	3/4	1-3/8		6	SQ	MAL3CB-LS-M-0750-SQ	111820B	611820B
1	1	1-1/2	2	4	SQ	MAL3CB-RN-S-1000-SQ	111860B	611860B
1	1	1-1/2	3	5	SQ	MAL3CB-RN-R-1000-SQ	111900B	611900B
1	1	1-1/2	4	6	SQ	MAL3CB-RN-M-1000-SQ	111940B	611940B
1	1	1-1/2		6	SQ	MAL3CB-LS-M-1000-SQ	111980B	611980B

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**3 FLUTE • 39° HELIX - REDUCED NECK - CHIPBREAKER**

- ▶ End geometry designed for aggressive ramping
- ▶ Polish grinds produce superior surface finishes on both walls & floor
- ▶ Reduced Neck designed for deep pocketing and long reach applications
- ▶ Polished flute face optimizes chip evacuation and avoids chip nesting
- ▶ h6 Tolerance shank for use in shrink fit holders



CHIP BREAKER

Carbide

3

Center Cutting

39°

Bright ZrN

h6

Radius

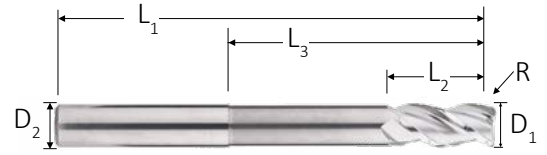
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
1/4	1/4	1/2	1	3	0.015	MAL3CB-RN-S-0250-R015	110940B	610940B
1/4	1/4	1/2	1	3	0.030	MAL3CB-RN-S-0250-R030	110950B	610950B
1/4	1/4	1/2	1	3	0.060	MAL3CB-RN-S-0250-R060	110960B	610960B
1/4	1/4	1/2	1-1/2	3	0.015	MAL3CB-RN-R-0250-R015	110980B	610980B
1/4	1/4	1/2	1-1/2	3	0.030	MAL3CB-RN-R-0250-R030	110990B	610990B
1/4	1/4	1/2	1-1/2	3	0.060	MAL3CB-RN-R-0250-R060	111000B	611000B
1/4	1/4	1/2	2	4	0.015	MAL3CB-RN-M-0250-R015	111020B	611020B
1/4	1/4	1/2	2	4	0.030	MAL3CB-RN-M-0250-R030	111030B	611030B
1/4	1/4	1/2	2	4	0.060	MAL3CB-RN-M-0250-R060	111040B	611040B
1/4	1/4	1/2		4	0.015	MAL3CB-LS-M-0250-R015	111060B	611060B
1/4	1/4	1/2		4	0.030	MAL3CB-LS-M-0250-R030	111070B	611070B
1/4	1/4	1/2		4	0.060	MAL3CB-LS-M-0250-R060	111080B	611080B
3/8	3/8	3/4	1-1/4	3	0.015	MAL3CB-RN-S-0375-R015	111100B	611100B
3/8	3/8	3/4	1-1/4	3	0.030	MAL3CB-RN-S-0375-R030	111110B	611110B
3/8	3/8	3/4	1-1/4	3	0.060	MAL3CB-RN-S-0375-R060	111120B	611120B
3/8	3/8	3/4	1-1/4	3	0.120	MAL3CB-RN-S-0375-R120	111130B	611130B
3/8	3/8	3/4	1-1/2	4	0.015	MAL3CB-RN-R-0375-R015	111150B	611150B
3/8	3/8	3/4	1-1/2	4	0.030	MAL3CB-RN-R-0375-R030	111160B	611160B
3/8	3/8	3/4	1-1/2	4	0.060	MAL3CB-RN-R-0375-R060	111170B	611170B
3/8	3/8	3/4	1-1/2	4	0.120	MAL3CB-RN-R-0375-R120	111180B	611180B
3/8	3/8	3/4	2	4	0.015	MAL3CB-RN-M-0375-R015	111200B	611200B
3/8	3/8	3/4	2	4	0.030	MAL3CB-RN-M-0375-R030	111210B	611210B
3/8	3/8	3/4	2	4	0.060	MAL3CB-RN-M-0375-R060	111220B	611220B
3/8	3/8	3/4	2	4	0.120	MAL3CB-RN-M-0375-R120	111230B	611230B
3/8	3/8	3/4	3	5	0.015	MAL3CB-RN-L-0375-R015	111250B	611250B
3/8	3/8	3/4	3	5	0.030	MAL3CB-RN-L-0375-R030	111260B	611260B
3/8	3/8	3/4	3	5	0.060	MAL3CB-RN-L-0375-R060	111270B	611270B
3/8	3/8	3/4	3	5	0.120	MAL3CB-RN-L-0375-R120	111280B	611280B
3/8	3/8	3/4		5	0.015	MAL3CB-LS-L-0375-R015	111300B	611300B
3/8	3/8	3/4		5	0.030	MAL3CB-LS-L-0375-R030	111310B	611310B
3/8	3/8	3/4		5	0.060	MAL3CB-LS-L-0375-R060	111320B	611320B
3/8	3/8	3/4		5	0.120	MAL3CB-LS-L-0375-R120	111330B	611330B
1/2	1/2	1	1-1/2	4	0.030	MAL3CB-RN-S-0500-R030	111350B	611350B
1/2	1/2	1	1-1/2	4	0.060	MAL3CB-RN-S-0500-R060	111360B	611360B
1/2	1/2	1	1-1/2	4	0.120	MAL3CB-RN-S-0500-R120	111370B	611370B
1/2	1/2	1	2	4	0.030	MAL3CB-RN-R-0500-R030	111390B	611390B
1/2	1/2	1	2	4	0.060	MAL3CB-RN-R-0500-R060	111400B	611400B
1/2	1/2	1	2	4	0.120	MAL3CB-RN-R-0500-R120	111410B	611410B
1/2	1/2	1	3	5	0.030	MAL3CB-RN-M-0500-R030	111430B	611430B

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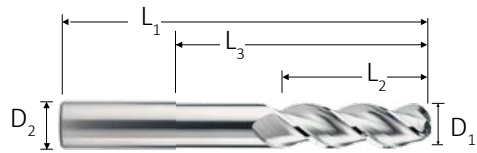
## 3 FLUTE • 39° HELIX - REDUCED NECK - CHIPBREAKER



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
1/2	1/2	1	3	5	0.060	MAL3CB-RN-M-0500-R060	111440B	611440B
1/2	1/2	1	3	5	0.120	MAL3CB-RN-M-0500-R120	111450B	611450B
1/2	1/2	1	4	6	0.030	MAL3CB-RN-L-0500-R030	111470B	611470B
1/2	1/2	1	4	6	0.060	MAL3CB-RN-L-0500-R060	111480B	611480B
1/2	1/2	1	4	6	0.120	MAL3CB-RN-L-0500-R120	111490B	611490B
1/2	1/2	1		6	0.030	MAL3CB-LS-L-0500-R030	111510B	611510B
1/2	1/2	1		6	0.060	MAL3CB-LS-L-0500-R060	111520B	611520B
1/2	1/2	1		6	0.120	MAL3CB-LS-L-0500-R120	111530B	611530B
5/8	5/8	1-1/4	2	4	0.030	MAL3CB-RN-S-0625-R030	111550B	611550B
5/8	5/8	1-1/4	2	4	0.060	MAL3CB-RN-S-0625-R060	111560B	611560B
5/8	5/8	1-1/4	2	4	0.120	MAL3CB-RN-S-0625-R120	111570B	611570B
5/8	5/8	1-1/4	3	5	0.030	MAL3CB-RN-R-0625-R030	111590B	611590B
5/8	5/8	1-1/4	3	5	0.060	MAL3CB-RN-R-0625-R060	111600B	611600B
5/8	5/8	1-1/4	3	5	0.120	MAL3CB-RN-R-0625-R120	111610B	611610B
5/8	5/8	1-1/4	4	6	0.030	MAL3CB-RN-M-0625-R030	111630B	611630B
5/8	5/8	1-1/4	4	6	0.060	MAL3CB-RN-M-0625-R060	111640B	611640B
5/8	5/8	1-1/4	4	6	0.120	MAL3CB-RN-M-0625-R120	111650B	611650B
5/8	5/8	1-1/4		6	0.030	MAL3CB-LS-M-0625-R030	111670B	611670B
5/8	5/8	1-1/4		6	0.060	MAL3CB-LS-M-0625-R060	111680B	611680B
5/8	5/8	1-1/4		6	0.120	MAL3CB-LS-M-0625-R120	111690B	611690B
3/4	3/4	1-3/8	2	4	0.030	MAL3CB-RN-S-0750-R030	111710B	611710B
3/4	3/4	1-3/8	2	4	0.060	MAL3CB-RN-S-0750-R060	111720B	611720B
3/4	3/4	1-3/8	2	4	0.120	MAL3CB-RN-S-0750-R120	111730B	611730B
3/4	3/4	1-3/8	3	5	0.030	MAL3CB-RN-R-0750-R030	111750B	611750B
3/4	3/4	1-3/8	3	5	0.060	MAL3CB-RN-R-0750-R060	111760B	611760B
3/4	3/4	1-3/8	3	5	0.120	MAL3CB-RN-R-0750-R120	111770B	611770B
3/4	3/4	1-3/8	4	6	0.030	MAL3CB-RN-M-0750-R030	111790B	611790B
3/4	3/4	1-3/8	4	6	0.060	MAL3CB-RN-M-0750-R060	111800B	611800B
3/4	3/4	1-3/8	4	6	0.120	MAL3CB-RN-M-0750-R120	111810B	611810B
3/4	3/4	1-3/8		6	0.030	MAL3CB-LS-M-0750-R030	111830B	611830B
3/4	3/4	1-3/8		6	0.060	MAL3CB-LS-M-0750-R060	111840B	611840B
3/4	3/4	1-3/8		6	0.120	MAL3CB-LS-M-0750-R120	111850B	611850B
1	1	1-1/2	2	4	0.030	MAL3CB-RN-S-1000-R030	111870B	611870B
1	1	1-1/2	2	4	0.060	MAL3CB-RN-S-1000-R060	111880B	611880B
1	1	1-1/2	2	4	0.120	MAL3CB-RN-S-1000-R120	111890B	611890B
1	1	1-1/2	3	5	0.030	MAL3CB-RN-R-1000-R030	111910B	611910B
1	1	1-1/2	3	5	0.060	MAL3CB-RN-R-1000-R060	111920B	611920B
1	1	1-1/2	3	5	0.120	MAL3CB-RN-R-1000-R120	111930B	611930B
1	1	1-1/2	4	6	0.030	MAL3CB-RN-M-1000-R030	111950B	611950B
1	1	1-1/2	4	6	0.060	MAL3CB-RN-M-1000-R060	111960B	611960B
1	1	1-1/2	4	6	0.120	MAL3CB-RN-M-1000-R120	111970B	611970B
1	1	1-1/2		6	0.030	MAL3CB-LS-M-1000-R030	111990B	611990B
1	1	1-1/2		6	0.060	MAL3CB-LS-M-1000-R060	112000B	612000B
1	1	1-1/2		6	0.120	MAL3CB-LS-M-1000-R120	112010B	612010B

Speed & Feed: page 178



**3 FLUTE • 39° HELIX - REDUCED NECK - CHIP BREAKER**

- ▶ End geometry designed for aggressive ramping
- ▶ Polish grinds produce superior surface finishes on both walls & floor
- ▶ Reduced Neck designed for deep pocketing and long reach applications
- ▶ Polished flute face optimizes chip evacuation and avoids chip nesting
- ▶ h6 Tolerance shank for use in shrink fit holders



CHIP BREAKER

Carbide	3	Center Cutting	39°	Bright ZrN	h6	Ball					HRC <40	N
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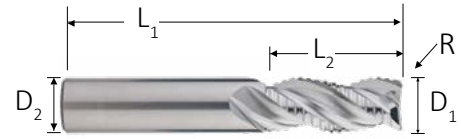
DIA $D_1$	SHK $D_2$	LOC $L_2$	LBS $L_3$	OAL $L_1$	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
1/4	1/4	1/2	1	3	Ball	MAL3CB-RN-S-0250-BN	110965B	610965B
1/4	1/4	1/2	1-1/2	3	Ball	MAL3CB-RN-R-0250-BN	111005B	611005B
1/4	1/4	1/2	2	4	Ball	MAL3CB-RN-M-0250-BN	111045B	611045B
1/4	1/4	1/2		4	Ball	MAL3CB-LS-M-0250-BN	111085B	611085B
3/8	3/8	3/4	1-1/4	3	Ball	MAL3CB-RN-S-0375-BN	111135B	611135B
3/8	3/8	3/4	1-1/2	4	Ball	MAL3CB-RN-R-0375-BN	111185B	611185B
3/8	3/8	3/4	2	4	Ball	MAL3CB-RN-M-0375-BN	111235B	611235B
3/8	3/8	3/4	3	5	Ball	MAL3CB-RN-L-0375-BN	111285B	611285B
3/8	3/8	3/4		5	Ball	MAL3CB-LS-L-0375-BN	111335B	611335B
1/2	1/2	1	1-1/2	4	Ball	MAL3CB-RN-S-0500-BN	111375B	611375B
1/2	1/2	1	2	4	Ball	MAL3CB-RN-R-0500-BN	111415B	611415B
1/2	1/2	1	3	5	Ball	MAL3CB-RN-M-0500-BN	111455B	611455B
1/2	1/2	1	4	6	Ball	MAL3CB-RN-L-0500-BN	111495B	611495B
1/2	1/2	1		6	Ball	MAL3CB-LS-L-0500-BN	111535B	611535B
5/8	5/8	1-1/4	2	4	Ball	MAL3CB-RN-S-0625-BN	111575B	611575B
5/8	5/8	1-1/4	3	5	Ball	MAL3CB-RN-R-0625-BN	111615B	611615B
5/8	5/8	1-1/4	4	6	Ball	MAL3CB-RN-M-0625-BN	111655B	611655B
5/8	5/8	1-1/4		6	Ball	MAL3CB-LS-M-0625-BN	111695B	611695B
3/4	3/4	1-3/8	2	4	Ball	MAL3CB-RN-S-0750-BN	111735B	611735B
3/4	3/4	1-3/8	3	5	Ball	MAL3CB-RN-R-0750-BN	111775B	611775B
3/4	3/4	1-3/8	4	6	Ball	MAL3CB-RN-M-0750-BN	111815B	611815B
3/4	3/4	1-3/8		6	Ball	MAL3CB-LS-M-0750-BN	111855B	611855B
1	1	1-1/2	2	4	Ball	MAL3CB-RN-S-1000-BN	111895B	611895B
1	1	1-1/2	3	5	Ball	MAL3CB-RN-R-1000-BN	111935B	611935B
1	1	1-1/2	4	6	Ball	MAL3CB-RN-M-1000-BN	111975B	611975B
1	1	1-1/2		6	Ball	MAL3CB-LS-M-1000-BN	112015B	612015B

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## 3 FLUTE • 39° ROUGHER FOR HIGH VELOCITY MACHINING



- ▶ For roughing operations
- ▶ Unique geometry reduces cutting pressures and vibration at high feed rates
- ▶ Highly polished OD and flute face prevents chip build-up
- ▶ Knuckles shorten chip length aiding in chip evacuation, reduces tool pressure

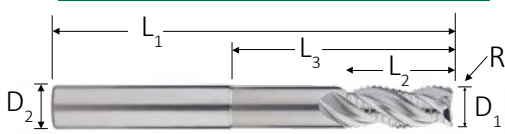


ROUGHER

Carbide	3	Center Cutting	39°	Bright ZrN	+0.000 -0.003	Radius	Rougher									HRC <40	N
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP
1/4	1/4	3/4	2-1/2	0.030	MAL3R-R-0250-R030	110000	610000
1/4	1/4	1	3	0.030	MAL3R-M-0250-R030	110050	610050
3/8	3/8	1/2	2	0.030	MAL3R-S-0375-R030	110100	610100
3/8	3/8	1	3	0.030	MAL3R-R-0375-R030	110150	610150
1/2	1/2	5/8	2-1/2	0.030	MAL3R-S-0500-R030	110200	610200
1/2	1/2	5/8	2-1/2	0.060	MAL3R-S-0500-R060	110210	610210
1/2	1/2	5/8	2-1/2	0.120	MAL3R-S-0500-R120	110220	610220
1/2	1/2	1	3	0.030	MAL3R-SR-0500-R030	110250	610250
1/2	1/2	1	3	0.060	MAL3R-SR-0500-R060	110260	610260
1/2	1/2	1	3	0.120	MAL3R-SR-0500-R120	110270	610270
1/2	1/2	1-1/4	3	0.030	MAL3R-R-0500-R030	110300	610300
1/2	1/2	1-1/4	3	0.060	MAL3R-R-0500-R060	110310	610310
1/2	1/2	1-1/4	3	0.120	MAL3R-R-0500-R120	110320	610320
1/2	1/2	2	4	0.030	MAL3R-L-0500-R030	110350	610350
1/2	1/2	2	4	0.060	MAL3R-L-0500-R060	110360	610360
1/2	1/2	2	4	0.120	MAL3R-L-0500-R120	110370	610370
5/8	5/8	3/4	3	0.030	MAL3R-S-0625-R030	110400	610400
5/8	5/8	3/4	3	0.060	MAL3R-S-0625-R060	110410	610410
5/8	5/8	3/4	3	0.120	MAL3R-S-0625-R120	110420	610420
5/8	5/8	1-1/4	3-1/2	0.030	MAL3R-SR-0625-R030	110450	610450
5/8	5/8	1-1/4	3-1/2	0.060	MAL3R-SR-0625-R060	110460	610460
5/8	5/8	1-1/4	3-1/2	0.120	MAL3R-SR-0625-R120	110470	610470
3/4	3/4	1-5/8	4	0.030	MAL3R-R-0750-R030	110500	610500
3/4	3/4	1-5/8	4	0.060	MAL3R-R-0750-R060	110510	610510
3/4	3/4	1-5/8	4	0.120	MAL3R-R-0750-R120	110520	610520
3/4	3/4	2-1/4	5	0.030	MAL3R-M-0750-R030	110550	610550
3/4	3/4	2-1/4	5	0.060	MAL3R-M-0750-R060	110560	610560
3/4	3/4	2-1/4	5	0.120	MAL3R-M-0750-R120	110570	610570
1	1	1-1/4	4	0.030	MAL3R-S-1000-R030	110600	610600
1	1	1-1/4	4	0.060	MAL3R-S-1000-R060	110610	610610
1	1	1-1/4	4	0.120	MAL3R-S-1000-R120	110620	610620
1	1	2	5	0.030	MAL3R-R-1000-R030	110650	610650
1	1	2	5	0.060	MAL3R-R-1000-R060	110660	610660
1	1	2	5	0.120	MAL3R-R-1000-R120	110670	610670

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**3 FLUTE • 39° REDUCED NECK ROUGHER FOR HIGH VELOCITY MACHINING**

- For roughing operations
- Unique geometry reduces cutting pressures and vibration at high feed rates
- Highly polished OD and flute face prevents chip build-up
- Knuckles shorten chip length aiding in chip evacuation, reduces tool pressure



ROUGHER

Carbide	3	Center Cutting	39°	Bright ZrN	+0.000 -0.003	Radius	Rougher		HRC <40	N
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	Corner R	PART NAME	BRIGHT EDP	ZRN EDP
1/2	1/2	1	2	4	0.030	MAL3R-RN-R-0500-R030	113390	613390
1/2	1/2	1	2	4	0.060	MAL3R-RN-R-0500-R060	113400	613400
1/2	1/2	1	2	4	0.120	MAL3R-RN-R-0500-R120	113410	613410
1/2	1/2	1	3	5	0.030	MAL3R-RN-M-0500-R030	113430	613430
1/2	1/2	1	3	5	0.060	MAL3R-RN-M-0500-R060	113440	613440
1/2	1/2	1	3	5	0.120	MAL3R-RN-M-0500-R120	113450	613450
1/2	1/2	1	4	6	0.030	MAL3R-RN-L-0500-R030	113470	613470
1/2	1/2	1	4	6	0.060	MAL3R-RN-L-0500-R060	113480	613480
1/2	1/2	1	4	6	0.120	MAL3R-RN-L-0500-R120	113490	613490
3/4	3/4	1-3/8	3	5	0.030	MAL3R-RN-R-0750-R030	113750	613750
3/4	3/4	1-3/8	3	5	0.060	MAL3R-RN-R-0750-R060	113760	613760
3/4	3/4	1-3/8	3	5	0.120	MAL3R-RN-R-0750-R120	113770	613770
3/4	3/4	1-3/8	4	6	0.030	MAL3R-RN-M-0750-R030	113790	613790
3/4	3/4	1-3/8	4	6	0.060	MAL3R-RN-M-0750-R060	113800	613800
3/4	3/4	1-3/8	4	6	0.120	MAL3R-RN-M-0750-R120	113810	613810
3/4	3/4	1-3/8		6	0.030	MAL3R-LS-M-0750-R030	113830	613830
3/4	3/4	1-3/8		6	0.060	MAL3R-LS-M-0750-R060	113840	613840
3/4	3/4	1-3/8		6	0.120	MAL3R-LS-M-0750-R120	113850	613850
1	1	1-1/2	3	5	0.030	MAL3R-RN-R-1000-R030	113910	613910
1	1	1-1/2	3	5	0.060	MAL3R-RN-R-1000-R060	113920	613920
1	1	1-1/2	3	5	0.120	MAL3R-RN-R-1000-R120	113930	613930
1	1	1-1/2	4	6	0.030	MAL3R-RN-M-1000-R030	113950	613950
1	1	1-1/2	4	6	0.060	MAL3R-RN-M-1000-R060	113960	613960
1	1	1-1/2	4	6	0.120	MAL3R-RN-M-1000-R120	113970	613970
1	1	1-1/2		6	0.030	MAL3R-LS-M-1000-R030	113990	613990
1	1	1-1/2		6	0.060	MAL3R-LS-M-1000-R060	114000	614000
1	1	1-1/2		6	0.120	MAL3R-LS-M-1000-R120	114010	614010

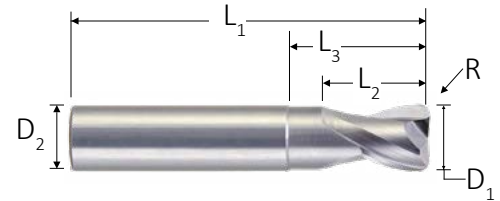
Speed & Feed: page 178

# ALUMINUM ALLOYS

Series: **HVMG2**

## 2 FLUTE • 30° FOR HIGH VELOCITY MACHINING

- > Designed for aggressive machining
- > Unique geometry reduces cutting pressures and vibration at high feed rates
- > Highly polished OD and flute face prevents chip build-up

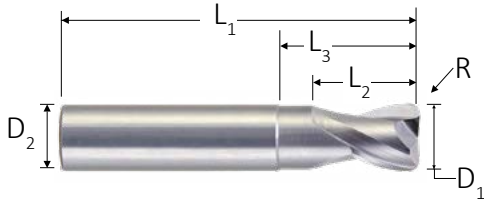


Carbide	2	Center Cutting	30°	Bright ZrN	+0.000 -0.002	Radius								Hrc <40	N
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP
3/8	3/8	1/2	1-1/4	3	0.030	HVMG2-1212-R030	15010	65010
3/8	3/8	1/2	1-1/4	3	0.060	HVMG2-1212-R060	12166	62166
3/8	3/8	1/2	2-1/8	4	0.030	HVMG2-1212-L1R030	15011	65011
3/8	3/8	1/2	2-1/8	4	0.060	HVMG2-1212-L1R060	12170	62170
3/8	3/8	1/2	no neck*	4	0.030	HVMG2-1212-NNR030	15009	65009
3/8	3/8	1/2	no neck*	4	0.060	HVMG2-1212-NNR060	12174	62174
1/2	1/2	5/8	1-1/4	3	0.030	HVMG2-1616-R030	15013	65013
1/2	1/2	5/8	1-1/4	3	0.060	HVMG2-1616-R060	12180	62180
1/2	1/2	5/8	1-1/4	3	0.090	HVMG2-1616-R090	12188	62188
1/2	1/2	5/8	2-1/8	4	0.030	HVMG2-1616-L1R030	15001	65001
1/2	1/2	5/8	2-1/8	4	0.060	HVMG2-1616-L1R060	15002	65002
1/2	1/2	5/8	2-1/8	4	0.090	HVMG2-1616-L1R090	12190	62190
1/2	1/2	5/8	2-1/8	4	0.120	HVMG2-1616-L1R120	12194	62194
1/2	1/2	5/8	3-1/8	5	0.030	HVMG2-1616-L2R030	12205	62205
1/2	1/2	5/8	3-1/8	5	0.060	HVMG2-1616-L2R060	12206	62206
1/2	1/2	5/8	3-1/8	5	0.090	HVMG2-1616-L2R090	12207	62207
1/2	1/2	5/8	3-1/8	5	0.120	HVMG2-1616-L2R120	12208	62208
1/2	1/2	5/8	no neck*	5	0.030	HVMG2-1616-NNR030	15012	65012
1/2	1/2	5/8	no neck*	5	0.060	HVMG2-1616-NNR060	12209	62209
1/2	1/2	5/8	no neck*	5	0.090	HVMG2-1616-NNR090	12210	62210
1/2	1/2	5/8	no neck*	5	0.120	HVMG2-1616-NNR120	12211	62211
5/8	5/8	3/4	3-1/8	5	0.030	HVMG2-2020-R030	14792	64792
5/8	5/8	3/4	3-1/8	5	0.060	HVMG2-2020-R060	12212	62212
5/8	5/8	3/4	3-1/8	5	0.090	HVMG2-2020-R090	15015	65015
5/8	5/8	3/4	3-1/8	5	0.120	HVMG2-2020-R120	12213	62213
5/8	5/8	3/4	no neck*	5	0.030	HVMG2-2020-NNR030	15014	65014
5/8	5/8	3/4	no neck*	5	0.060	HVMG2-2020-NNR060	12214	62214
5/8	5/8	3/4	no neck*	5	0.090	HVMG2-2020-NNR090	12215	62215
5/8	5/8	3/4	no neck*	5	0.120	HVMG2-2020-NNR120	12218	62218
3/4	3/4	3/4	2	4	0.030	HVMG2-2424-R030	15016	65016
3/4	3/4	3/4	2	4	0.060	HVMG2-2424-R060	15003	65003
3/4	3/4	3/4	2	4	0.090	HVMG2-2424-R090	12219	62219
3/4	3/4	3/4	2	4	0.120	HVMG2-2424-R120	15004	65004
3/4	3/4	1	3	5	0.030	HVMG2-2424-L1R030	14798	64798
3/4	3/4	1	3	5	0.060	HVMG2-2424-L1R060	15008	65008
3/4	3/4	1	3	5	0.090	HVMG2-2424-L1R090	12225	62225
3/4	3/4	1	3	5	0.120	HVMG2-2424-L1R120	12226	62226
3/4	3/4	1	no neck*	6	0.030	HVMG2-2424-NNR030	14543	64543
3/4	3/4	1	no neck*	6	0.060	HVMG2-2424-NNR060	14669	64669
3/4	3/4	1	no neck*	6	0.090	HVMG2-2424-NNR090	12227	62227
3/4	3/4	1	no neck*	6	0.120	HVMG2-2424-NNR120	12228	62228

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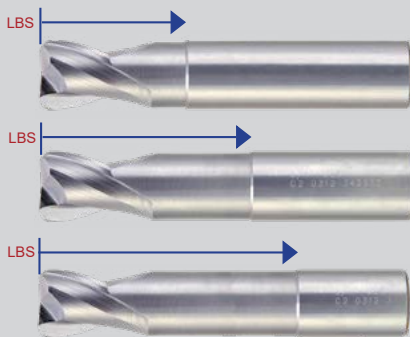
2 FLUTE • 30° FOR HIGH VELOCITY MACHINING

sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP
1	1	3/4	2	4	0.030	HVMG2-3232-R030	12229	62229
1	1	3/4	2	4	0.060	HVMG2-3232-R060	14797	64797
1	1	3/4	2	4	0.090	HVMG2-3232-R090	15201	65201
1	1	3/4	2	4	0.120	HVMG2-3232-R120	15005	65005
1	1	1-1/4	2-3/4	5	0.030	HVMG2-3232-L1R030	12234	62234
1	1	1-1/4	2-3/4	5	0.060	HVMG2-3232-L1R060	15018	65018
1	1	1-1/4	2-3/4	5	0.090	HVMG2-3232-L1R090	15203	65203
1	1	1-1/4	2-3/4	5	0.120	HVMG2-3232-L1R120	12237	62237
1	1	1-1/4	no neck*	6	0.030	HVMG2-3232-NNR030	15017	65017
1	1	1-1/4	no neck*	6	0.060	HVMG2-3232-NNR060	14840	64840
1	1	1-1/4	no neck*	6	0.090	HVMG2-3232-NNR090	12364	62364
1	1	1-1/4	no neck*	6	0.120	HVMG2-3232-NNR120	12367	62367

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no neck\* - Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck



## Long Overall Length Option

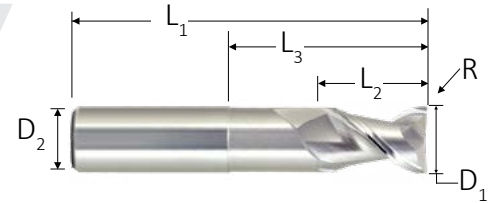
Allows You To  
Order the specific LBS Size You  
Need!

# ALUMINUM ALLOYS

Series: **AXMG45**

## 2 FLUTE • 45° END MILL

- ▶ For universal operations on Aluminum and Cast Aluminum Alloys
- ▶ Edge prep provides superior edge strength and faster chip flow
- ▶ Wiper Flats and polish grinding produce superior surface finishes on walls and floors
- ▶ Polished flute face and edge prep optimizes chip evacuation and avoids chip nesting
- ▶ h6 Tolerance shank for use in shrink fit holders

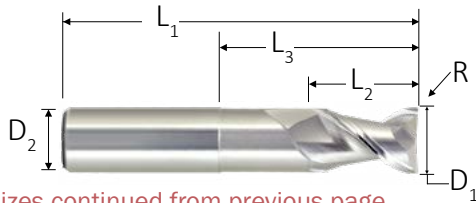


DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP
1/16	1/8	3/16		1-1/2	SQ*	0.005	AXMG45-402	65806
3/32	1/8	1/4		1-1/2	SQ*	0.005	AXMG45-403	65808
1/8	1/8	1/4		1-1/2	SQ*	0.005	AXMG45-404-L1	65267
1/8	1/8	1/4		1-1/2	radius	0.010	AXMG45-404-L1R010	65269
1/8	1/8	1/4		1-1/2	radius	0.020	AXMG45-404-L1R020	65271
1/8	1/8	1/4	1/2	1-1/2	SQ*	0.005	AXMG45-404-L2	65275
1/8	1/8	1/4	1/2	1-1/2	radius	0.010	AXMG45-404-L2R010	65277
1/8	1/8	1/4	1/2	1-1/2	radius	0.020	AXMG45-404-L2R020	65279
1/8	1/8	1/4		3	SQ*	0.005	AXMG45-404-L3	65281
1/8	1/8	1/2		1-1/2	SQ*	0.005	AXMG45-404-L5	65287
1/8	1/8	1/2		1-1/2	radius	0.010	AXMG45-404-L5R010	65288
1/8	1/8	1/2		1-1/2	radius	0.020	AXMG45-404-L5R020	65289
1/8	1/8	1/2		1-1/2	radius	0.030	AXMG45-404-L5R030	65290
5/32	3/16	5/16		2	SQ*	0.005	AXMG45-605-L1	65295
5/32	3/16	9/16		2	SQ*	0.005	AXMG45-605-L2	65296
3/16	3/16	1/4		2	SQ*	0.005	AXMG45-606-L1	65297
3/16	3/16	1/4		2	radius	0.010	AXMG45-606-L1R010	65298
3/16	3/16	1/4		2	radius	0.020	AXMG45-606-L1R020	65299
3/16	3/16	1/4	5/8	2	SQ*	0.005	AXMG45-606-L2	65303
3/16	3/16	1/4	5/8	2	radius	0.010	AXMG45-606-L2R010	65305
3/16	3/16	1/4	5/8	2	radius	0.020	AXMG45-606-L2R020	65307
3/16	3/16	1/4		3	SQ*	0.005	AXMG45-606-L3	65311
3/16	3/16	1/4	1-1/8	3	SQ*	0.005	AXMG45-606-L4	65313
3/16	3/16	5/8		2-1/2	SQ*	0.005	AXMG45-606-L6	65323
3/16	3/16	5/8		2-1/2	radius	0.010	AXMG45-606-L6R010	65325
3/16	3/16	5/8		2-1/2	radius	0.020	AXMG45-606-L6R020	65327
7/32	1/4	3/8		2	SQ*	0.007	AXMG45-807-L1	65331
7/32	1/4	3/4		2-1/2	SQ*	0.007	AXMG45-807-L2	65333
1/4	1/4	3/8		2-1/2	SQ*	0.007	AXMG45-808-L1	65335
1/4	1/4	3/8		2-1/2	radius	0.015	AXMG45-808-L1R015	65337
1/4	1/4	3/8		2-1/2	radius	0.030	AXMG45-808-L1R030	65339
1/4	1/4	3/8	1-1/8	2-1/2	SQ*	0.007	AXMG45-808-L2	65343
1/4	1/4	3/8	1-1/8	2-1/2	radius	0.015	AXMG45-808-L2R015	65345
1/4	1/4	3/8	1-1/8	2-1/2	radius	0.030	AXMG45-808-L2R030	65347
1/4	1/4	3/8		4	SQ*	0.007	AXMG45-808-L3	65351
1/4	1/4	3/4		2-1/2	SQ*	0.007	AXMG45-808-L6	65371
1/4	1/4	1-1/4		3-1/4	SQ*	0.007	AXMG45-808-L8	65381

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SQ\* = minimal radius for corner protection.



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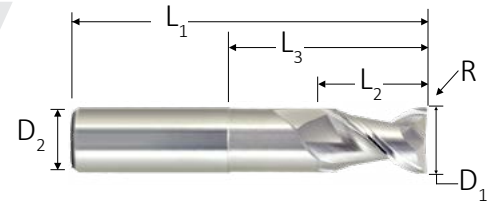
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP	
5/16	5/16	7/16		2-1/2	SQ*	0.007	AXMG45-1010-L1	15389	65389
5/16	5/16	7/16		2-1/2	radius	0.015	AXMG45-1010-L1R015	15391	65391
5/16	5/16	7/16		2-1/2	radius	0.030	AXMG45-1010-L1R030	15393	65393
5/16	5/16	7/16	1-1/8	2-1/2	SQ*	0.007	AXMG45-1010-L2	15397	65397
5/16	5/16	7/16	1-1/8	2-1/2	radius	0.015	AXMG45-1010-L2R015	15399	65399
5/16	5/16	7/16	1-1/8	2-1/2	radius	0.030	AXMG45-1010-L2R030	15401	65401
5/16	5/16	13/16		2-1/2	SQ*	0.007	AXMG45-1010-L5	15421	65421
5/16	5/16	13/16		2-1/2	radius	0.015	AXMG45-1010-L5R015	15423	65423
5/16	5/16	13/16		2-1/2	radius	0.030	AXMG45-1010-L5R030	15425	65425
3/8	3/8	1/2		2-1/2	SQ*	0.007	AXMG45-1212-L1	15437	65437
3/8	3/8	1/2		2-1/2	radius	0.015	AXMG45-1212-L1R015	15439	65439
3/8	3/8	1/2		2-1/2	radius	0.030	AXMG45-1212-L1R030	15441	65441
3/8	3/8	1/2	1-1/8	2-1/2	SQ*	0.007	AXMG45-1212-L2	15445	65445
3/8	3/8	1/2	1-1/8	2-1/2	radius	0.015	AXMG45-1212-L2R015	15447	65447
3/8	3/8	1/2	1-1/8	2-1/2	radius	0.030	AXMG45-1212-L2R030	15449	65449
3/8	3/8	1		2-1/2	SQ*	0.007	AXMG45-1212-L6	19330	69330
3/8	3/8	1		2-1/2	radius	0.015	AXMG45-1212-L6R015	15473	65473
3/8	3/8	1		2-1/2	radius	0.030	AXMG45-1212-L6R030	15475	65475
3/8	3/8	1		6	SQ*	0.007	AXMG45-1212-L10	15482	65482
3/8	3/8	1		6	radius	0.015	AXMG45-1212-L10R015	15483	65483
3/8	3/8	1		6	radius	0.030	AXMG45-1212-L10R030	15484	65484
3/8	3/8	1-1/4		3	SQ*	0.007	AXMG45-1212-L11	15487	65487
3/8	3/8	1-1/2		4	SQ*	0.007	AXMG45-1212-L12	15489	65489
1/2	1/2	5/8		2-1/2	SQ*	0.010	AXMG45-1616-L1	15527	65527
1/2	1/2	5/8		3	SQ*	0.010	AXMG45-1616-L2	15537	65537
1/2	1/2	5/8		3	radius	0.030	AXMG45-1616-L2R030	15539	65539
1/2	1/2	5/8		3	radius	0.060	AXMG45-1616-L2R060	15541	65541
1/2	1/2	5/8	1-1/4	3	SQ*	0.010	AXMG45-1616-L3	15553	65553
1/2	1/2	5/8	1-1/4	3	radius	0.030	AXMG45-1616-L3R030	15555	65555
1/2	1/2	5/8	1-1/4	3	radius	0.060	AXMG45-1616-L3R060	15557	65557
1/2	1/2	5/8		4	SQ*	0.010	AXMG45-1616-L4	19331	69331
1/2	1/2	1		3	SQ*	0.010	AXMG45-1616-L9	15595	65595
1/2	1/2	1		5	SQ*	0.010	AXMG45-1616-L11	15601	65601
1/2	1/2	1-1/4		3	SQ*	0.010	AXMG45-1616-L13	14219	64219
1/2	1/2	1-1/4		3	radius	0.030	AXMG45-1616-L13R030	15611	65611
1/2	1/2	1-1/4		3	radius	0.060	AXMG45-1616-L13R060	15613	65613
1/2	1/2	2		4	SQ*	0.010	AXMG45-1616-L17	15621	65621
1/2	1/2	2		4	radius	0.030	AXMG45-1616-L17R030	15623	65623
1/2	1/2	2		4	radius	0.060	AXMG45-1616-L17R060	15625	65625
1/2	1/2	3-1/8		6	SQ*	0.010	AXMG45-1616-L18	15631	65631
5/8	5/8	3/4		3-1/2	SQ*	0.010	AXMG45-2020-L1	15633	65633
5/8	5/8	3/4		3-1/2	radius	0.030	AXMG45-2020-L1R030	15635	65635
5/8	5/8	3/4		3-1/2	radius	0.060	AXMG45-2020-L1R060	15637	65637
5/8	5/8	3/4		3-1/2	radius	0.120	AXMG45-2020-L1R120	15641	65641

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SQ\* = minimal radius for corner protection.

## 2 FLUTE • 45° END MILL



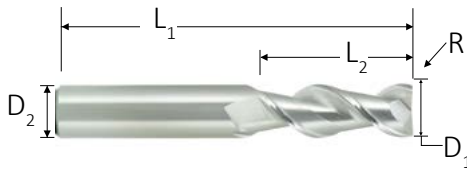
sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP	
5/8	5/8	3/4	1-1/2	3-1/2	SQ*	0.010	AXMG45-2020-L2	15643	65643
5/8	5/8	3/4	1-1/2	3-1/2	radius	0.030	AXMG45-2020-L2R030	15645	65645
5/8	5/8	3/4	1-1/2	3-1/2	radius	0.060	AXMG45-2020-L2R060	15647	65647
5/8	5/8	3/4	1-1/2	3-1/2	radius	0.120	AXMG45-2020-L2R120	15651	65651
5/8	5/8	3/4	3-3/8	6	SQ*	0.010	AXMG45-2020-L6	15703	65703
5/8	5/8	1-1/4		3-1/2	SQ*	0.010	AXMG45-2020-L7	15705	65705
5/8	5/8	1-5/8		6	SQ*	0.010	AXMG45-2020-L11	16866	66866
5/8	5/8	2-1/2		5	SQ*	0.010	AXMG45-2020-L12	16868	66868
3/4	3/4	1		3	SQ*	0.010	AXMG45-2424-L1	16887	66887
3/4	3/4	1		3	radius	0.030	AXMG45-2424-L1R030	16888	66888
3/4	3/4	1	2-1/2	5	SQ*	0.010	AXMG45-2424-L6	19332	69332
3/4	3/4	1	2-1/2	5	radius	0.030	AXMG45-2424-L6R030	19281	69281
3/4	3/4	1	2-1/2	5	radius	0.060	AXMG45-2424-L6R060	19282	69282
3/4	3/4	1	2-1/2	5	radius	0.120	AXMG45-2424-L6R120	19284	69284
3/4	3/4	1	4-3/8	7	SQ*	0.010	AXMG45-2424-L10	19289	69289
3/4	3/4	1-1/2		4	SQ*	0.010	AXMG45-2424-L11	19291	69291
3/4	3/4	1-1/2		4	radius	0.030	AXMG45-2424-L11R030	19292	69292
3/4	3/4	1-1/2		4	radius	0.060	AXMG45-2424-L11R060	19293	69293
3/4	3/4	1-1/2		4	radius	0.090	AXMG45-2424-L11R090	19295	69295
3/4	3/4	1-1/2		4	radius	0.120	AXMG45-2424-L11R120	19296	69296
3/4	3/4	1-1/2	2-1/4	5	SQ*	0.010	AXMG45-2424-L12	19297	69297
3/4	3/4	1-5/8		6	SQ*	0.010	AXMG45-2424-L15	19304	69304
3/4	3/4	2-1/4		5	SQ*	0.010	AXMG45-2424-L16	19305	69305
1	1	1-1/4		4	SQ*	0.015	AXMG45-3232-L1	19307	69307
1	1	1-1/2		4	SQ*	0.015	AXMG45-3232-L10	19582	69582
1	1	1-1/2		4	radius	0.030	AXMG45-3232-L10R030	19583	69583
1	1	1-1/2		4	radius	0.060	AXMG45-3232-L10R060	19732	69732
1	1	1-1/2		4	radius	0.120	AXMG45-3232-L10R120	19734	69734
1	1	1-1/2	2-1/4	5	SQ*	0.015	AXMG45-3232-L12	19736	69736
1	1	3-1/4		6	SQ*	0.015	AXMG45-3232-L18	19865	69865

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SQ\* = minimal radius for corner protection.

**2 FLUTE • 45° END MILL**



- For universal operations on Aluminum and Cast Aluminum Alloys
- Edge prep provides superior edge strength and faster chip flow
- Wiper Flats and polish grinding produce superior surface finishes on walls and floors
- Polished flute face and edge prep optimizes chip evacuation and avoids chip nesting
- h6 Tolerance shank for use in shrink fit holders

Carbide	2	Center Cutting	45°	Bright ZrN	+0.000mm -0.050mm	Square	Radius									HRC <40	N
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R		PART NAME	BRIGHT EDP	ZRN EDP
3mm	3mm	8mm	51mm	SQ*	0.10mm	AXMG45-M3M3-L1	13305	63305
4mm	4mm	11mm	63mm	SQ*	0.15mm	AXMG45-M4M4-L1	13306	63306
5mm	5mm	13mm	63mm	SQ*	0.15mm	AXMG45-M5M5-L1	13307	63307
6mm	6mm	13mm	63mm	SQ*	0.20mm	AXMG45-M6M6-L1	13308	63308
8mm	8mm	19mm	63mm	SQ*	0.20mm	AXMG45-M8M8-L1	13309	63309
10mm	10mm	22mm	70mm	SQ*	0.25mm	AXMG45-M10M10-L1	13310	63310
10mm	10mm	22mm	70mm	radius	0.50mm	AXMG45-M10M10-L1R0.5	13311	63311
10mm	10mm	22mm	70mm	radius	1.00mm	AXMG45-M10M10-L1R1.0	13312	63312
12mm	12mm	26mm	76mm	SQ*	0.25mm	AXMG45-M12M12-L1	13323	63323
12mm	12mm	26mm	76mm	radius	1.00mm	AXMG45-M12M12-L1R1.0	13324	63324
12mm	12mm	26mm	76mm	radius	1.50mm	AXMG45-M12M12-L1R1.5	13325	63325
12mm	12mm	26mm	76mm	radius	2.00mm	AXMG45-M12M12-L1R2.0	13326	63326

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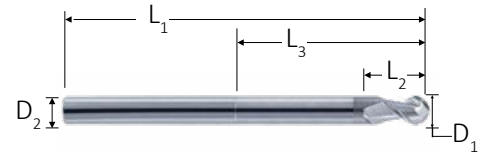
SQ\* = minimal radius for corner protection.



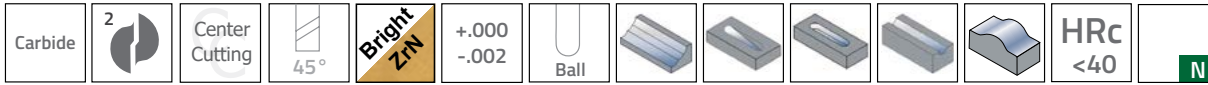
# ALUMINUM ALLOYS

Series: **AXMG45**

## 2 FLUTE • 45° BALL NOSE END MILL



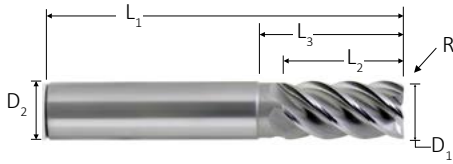
- > For universal operations on Aluminum and Cast Aluminum Alloys
- > Edge prep provides superior edge strength and faster chip flow
- > Polished Primary produces superior surface finishes on walls and floors
- > Polished flute face and edge prep optimizes chip evacuation and avoids chip nesting
- > h6 Tolerance shank for use in shrink fit holders



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ZRN EDP
1/8	1/8	1/4		1-1/2	Ball	AXMG45-404-L1-B	11890	61890
1/8	1/8	3/8		1-1/2	Ball	AXMG45-404-L2-B	11893	61893
1/4	1/4	3/8		2-1/2	Ball	AXMG45-808-L1-B	14605	64605
1/4	1/4	3/8	1-1/8	2-1/2	Ball	AXMG45-808-L2-B	14606	64606
1/4	1/4	3/8	no neck	6	Ball	AXMG45-808-NN-B	14607	64607
1/4	1/4	3/4		2-1/2	Ball	AXMG45-808-L3-B	14608	64608
3/8	3/8	1/2		2-1/2	Ball	AXMG45-1212-L1-B	14609	64609
3/8	3/8	1/2	2-1/8	4	Ball	AXMG45-1212-L2-B	14611	64611
3/8	3/8	1/2	no neck	6	Ball	AXMG45-1212-NN-B	14615	64615
3/8	3/8	1		2-1/2	Ball	AXMG45-1212-L3-B	14616	64616
3/8	3/8	1-1/2		4	Ball	AXMG45-1212-L4-B	14617	64617
1/2	1/2	5/8		2-1/2	Ball	AXMG45-1616-L1-B	14618	64618
1/2	1/2	5/8	2-1/4	4	Ball	AXMG45-1616-L2-B	14619	64619
1/2	1/2	5/8	no neck	6	Ball	AXMG45-1616-NN-B	14620	64620
1/2	1/2	1-1/4		3	Ball	AXMG45-1616-L3-B	14621	64621
1/2	1/2	2		4	Ball	AXMG45-1616-L4-B	14622	64622
3/4	3/4	1		3	Ball	AXMG45-2424-L1-B	14632	64632
3/4	3/4	1	2-1/2	5	Ball	AXMG45-2424-L2-B	14633	64633
3/4	3/4	1	no neck	6	Ball	AXMG45-2424-NN-B	14634	64634
3/4	3/4	2-1/4		5	Ball	AXMG45-2424-L4-B	14636	64636

Speed & Feed: page 181





**5 FLUTE • 45° FOR TROCHOIDAL TOOLPATHING**

- Outstanding performance for High Feed Finishing of Aerospace wing spars
- Effective on all CNC machines 5-35 HP
- Generates 50-60% higher metal removal rates over 3 flute HP tools
- Unique Edge Prep minimizes chatter, extends tool life
- Wiper flat and polish grinds produce superior surface finishes on both walls and floor

Carbide	5	Center Cutting	45°	Bright ZN	+0.000 -0.002	Square	Radius						Hrc <40	N
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R		PART NAME	BRIGHT EDP	ZRN EDP
1/4	1/4	3/8		2	SQ*	0.007	GXMG5-808-S	15065	65065
1/4	1/4	3/8		2	radius	0.015	GXMG5-808-R015S	15067	65067
1/4	1/4	3/8	1-1/8	3	SQ*	0.007	GXMG5-808-N	15069	65069
1/4	1/4	3/8	1-1/8	3	radius	0.015	GXMG5-808-R015N	15071	65071
1/4	1/4	1/2	3/4	2-1/2	SQ*	0.007	GXMG5-808	14247	64247
1/4	1/4	1/2	3/4	2-1/2	radius	0.015	GXMG5-808-R015	14990	64990
3/8	3/8	9/16		2	SQ*	0.007	GXMG5-1212-S	15085	65085
3/8	3/8	9/16		2	radius	0.020	GXMG5-1212-R020S	15087	65087
3/8	3/8	9/16	1-15/16	4	SQ*	0.007	GXMG5-1212-N	14799	64799
3/8	3/8	9/16	1-15/16	4	radius	0.020	GXMG5-1212-R020N	15089	65089
3/8	3/8	3/4	1	2-1/2	SQ*	0.007	GXMG5-1212	14249	64249
3/8	3/8	3/4	1	2-1/2	radius	0.020	GXMG5-1212-R020	14991	64991
3/8	3/8	1		2-1/2	SQ*	0.007	GXMG5-1212-M	15091	65091
3/8	3/8	1		2-1/2	radius	0.020	GXMG5-1212-R020M	15093	65093
1/2	1/2	5/8		2-1/2	SQ*	0.010	GXMG5-1616-S	15197	65197
1/2	1/2	5/8		2-1/2	radius	0.030	GXMG5-1616-R030S	15199	65199
1/2	1/2	5/8	2	4	SQ*	0.010	GXMG5-1616-N	15205	65205
1/2	1/2	5/8	2	4	radius	0.030	GXMG5-1616-R030N	15207	65207
1/2	1/2	1	1-1/4	3	SQ*	0.010	GXMG5-1616	14243	64243
1/2	1/2	1	1-1/4	3	radius	0.030	GXMG5-1616-R030	14992	64992
1/2	1/2	1-1/4		3	SQ*	0.010	GXMG5-1616-M	14796	64796
1/2	1/2	1-1/4		3	radius	0.030	GXMG5-1616-R030M	15209	65209
5/8	5/8	3/4		3	SQ*	0.010	GXMG5-2020-S	15211	65211
5/8	5/8	3/4		3	radius	0.030	GXMG5-2020-R030S	15213	65213
5/8	5/8	3/4	2-3/8	5	SQ*	0.010	GXMG5-2020-N	15215	65215
5/8	5/8	3/4	2-3/8	5	radius	0.030	GXMG5-2020-R030N	15217	65217
5/8	5/8	1-1/4	1-1/2	3-1/2	SQ*	0.010	GXMG5-2020	15219	65219
5/8	5/8	1-1/4	1-1/2	3-1/2	radius	0.030	GXMG5-2020-R030	14151	64151
3/4	3/4	7/8		3	SQ*	0.010	GXMG5-2424-S	15221	65221
3/4	3/4	7/8		3	radius	0.030	GXMG5-2424-R030S	15223	65223
3/4	3/4	7/8	2-1/2	5	SQ*	0.010	GXMG5-2424-N	14833	64833
3/4	3/4	7/8	2-1/2	5	radius	0.030	GXMG5-2424-R030N	15225	65225
3/4	3/4	1-1/2	1-3/4	4	SQ*	0.010	GXMG5-2424	14155	64155
3/4	3/4	1-1/2	1-3/4	4	radius	0.030	GXMG5-2424-R030	14993	64993
1	1	1-1/4	3-1/4	6	SQ*	0.015	GXMG5-3232-N	15231	65231
1	1	1-1/4	3-1/4	6	radius	0.030	GXMG5-3232-R030N	15233	65233
1	1	1-1/2	1-3/4	4	SQ*	0.015	GXMG5-3232	15235	65235
1	1	1-1/2	1-3/4	4	radius	0.030	GXMG5-3232-R030	15237	65237

**Speed & Feed:** page 182

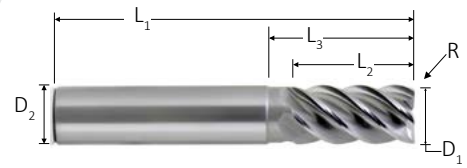
SQ\* = minimal radius for corner protection.

# ALUMINUM ALLOYS

Series: **GXMG5**

## 5 FLUTE • 45° FOR TROCHOIDAL TOOLPATHING

- > Outstanding performance for High Feed Finishing of Aerospace wing spars
- > Effective on all CNC machines 5-35 HP
- > Generates 50-60% higher metal removal rates over 3 flute HP tools
- > Unique Edge Prep minimizes chatter, extends tool life
- > Wiper flat and polish grinds produce superior surface finishes on both walls and floor



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP
6mm	6mm	20mm	63mm	SQ*	GXMG5-M6M6	H6701
6mm	6mm	20mm	63mm	radius	GXMG5-M6M6-R0.25	H6702
6mm	6mm	20mm	63mm	radius	GXMG5-M6M6-R0.5	H6703
8mm	8mm	20mm	63mm	SQ*	GXMG5-M8M8	H6704
8mm	8mm	20mm	63mm	radius	GXMG5-M8M8-R0.5	H6705
8mm	8mm	20mm	63mm	radius	GXMG5-M8M8-R1.0	H6706
10mm	10mm	24mm	70mm	SQ*	GXMG5-M10M10	H6709
10mm	10mm	24mm	70mm	radius	GXMG5-M10M10-R0.5	H6710
10mm	10mm	24mm	70mm	radius	GXMG5-M10M10-R1.0	H6711
12mm	12mm	25mm	76mm	SQ*	GXMG5-M12M12	H6714
12mm	12mm	25mm	76mm	radius	GXMG5-M12M12-R0.5	H6715
12mm	12mm	25mm	76mm	radius	GXMG5-M12M12-R1.0	H6716
16mm	16mm	32mm	100mm	SQ*	GXMG5-M16M16	H6720
16mm	16mm	32mm	100mm	radius	GXMG5-M16M16-R0.5	H6721
16mm	16mm	32mm	100mm	radius	GXMG5-M16M16-R1.0	H6722

**Speed & Feed:** page 182

SQ\* = minimal radius for corner protection.

## RECOMMENDED ALUMINUM COATINGS

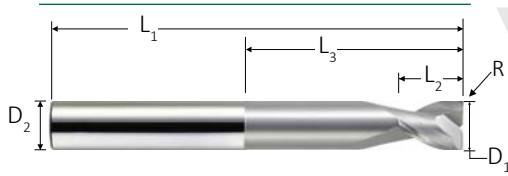
Melin provides SEVERAL coated options to fit your every need!

Order any of our tools with a Conventional or High Performance Coating

- > TiCN
- > ZrN
- > nACRo
- > DLC
- > TiB<sub>2</sub>

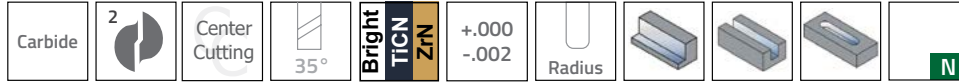


**CONVENTIONAL COATINGS & HIGH PERFORMANCE COATINGS**



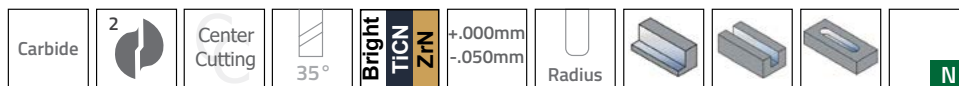
**2 FLUTE • 35° FOR LIGHT DUTY CNC MACHINES**

- For universal machining in non-ferrous materials
- Small corner radius for added strength and smoother cutting action
- Excellent value for small production runs



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	TICN EDP	ZRN EDP
1/8	1/8	3/8		1-1/2	0.010	ALMG-404	17737	47737	67737
3/16	3/16	1/4	9/16	2	0.010	ALMGN-606	12463	42463	62463
3/16	3/16	5/8		2	0.010	ALMG-606	17739	47739	67739
1/4	1/4	5/16	3/4	2-1/2	0.010	ALMGN-808	12465	42465	62465
1/4	1/4	1/2	7/8	2-1/2	0.010	ALMGS-808	10837	40837	60837
1/4	1/4	3/4		2-1/2	0.010	ALMG-808	17741	47741	67741
1/4	1/4	1-1/8		3	0.010	ALMG-808-L	17755	47755	67755
5/16	5/16	13/16		2-1/2	0.010	ALMG-1010	17743	47743	67743
5/16	5/16	1-1/8		3	0.010	ALMG-1010-L	17756	47756	67756
3/8	3/8	1/2	7/8	2-1/2	0.015	ALMGS-1212	10839	40839	60839
3/8	3/8	1/2	1-3/8	3	0.015	ALMGN-1212-1	12467	42467	62467
3/8	3/8	1/2	2-3/8	4	0.015	ALMGN-1212-2	12469	42469	62469
3/8	3/8	1		2-1/2	0.015	ALMG-1212	17745	47745	67745
3/8	3/8	1-1/8		3	0.015	ALMG-1212-L	17757	47757	67757
7/16	7/16	1		2-3/4	0.015	ALMG-1414	17747	47747	67747
1/2	1/2	5/8	1-1/8	3	0.020	ALMGS-1616	10841	40841	60841
1/2	1/2	5/8	2-1/8	4	0.020	ALMGN-1616-1	12471	42471	62471
1/2	1/2	5/8	3-1/8	5	0.020	ALMGN-1616-2	12473	42473	62473
1/2	1/2	1		3	0.020	ALMG-1616	17749	47749	67749
1/2	1/2	2		4	0.020	ALMG-1616-L	17759	47759	67759
5/8	5/8	1-1/4		3-1/2	0.020	ALMG-2020	17751	47751	67751
5/8	5/8	2-1/4		5	0.020	ALMG-2020-L	17760	47760	67760
3/4	3/4	1	1-7/8	4	0.030	ALMGS-2424	10843	40843	60843
3/4	3/4	1	2-7/8	5	0.030	ALMGN-2424-1	12475	42475	62475
3/4	3/4	1	3-7/8	6	0.030	ALMGN-2424-2	12477	42477	62477
3/4	3/4	1-1/2		4	0.030	ALMG-2424	17752	47752	67752
3/4	3/4	2-1/4		5	0.030	ALMG-2424-L	17761	47761	67761

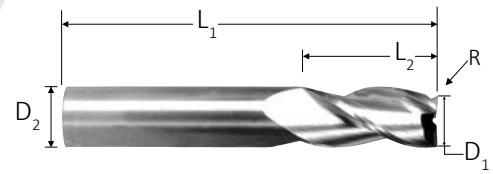
Speed & Feed: page 183



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	TICN EDP	ZRN EDP
6mm	6mm	20mm	63mm	0.3mm	ALMG-M6M6	11435	41435	61435
8mm	8mm	20mm	63mm	0.3mm	ALMG-M8M8	11437	41437	61437
10mm	10mm	25mm	70mm	0.4mm	ALMG-M10M10	11439	41439	61439
12mm	12mm	25mm	76mm	0.4mm	ALMG-M12M12	11443	41443	61443
14mm	14mm	32mm	89mm	0.5mm	ALMG-M14M14	11445	41445	61445
16mm	16mm	32mm	89mm	0.5mm	ALMG-M16M16	11447	41447	61447

Speed & Feed: page 183

## 3 FLUTE • 35° FOR LIGHT DUTY CNC MACHINES



- ▶ For universal machining in non-ferrous materials
- ▶ Small corner radius for added strength and smoother cutting action
- ▶ Excellent cost value for small production runs

Carbide Center Cutting Bright +.000  
-.002 Radius

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	TICN EDP	ZRN EDP
1/8	1/8	3/8	1-1/2	0.005	ELMG-404	17764	47764	67764
3/16	3/16	5/8	2	0.005	ELMG-606	17766	47766	67766
1/4	1/4	3/4	2-1/2	0.005	ELMG-808	17768	47768	67768
1/4	1/4	1-1/8	3	0.005	ELMG-808-L	17782	47782	67782
5/16	5/16	13/16	2-1/2	0.005	ELMG-1010	17770	47770	67770
5/16	5/16	1-1/8	3	0.005	ELMG-1010-L	17783	47783	67783
3/8	3/8	1	2-1/2	0.005	ELMG-1212	17772	47772	67772
3/8	3/8	1-1/8	3	0.005	ELMG-1212-L	17784	47784	67784
7/16	7/16	1	2-3/4	0.005	ELMG-1414	17774	47774	67774
1/2	1/2	1-1/4	3	0.005	ELMG-1616	17776	47776	67776
1/2	1/2	1-1/2	4	0.005	ELMG-1616-M	10811	40811	60811
1/2	1/2	2	4	0.005	ELMG-1616-L	17786	47786	67786
5/8	5/8	1-5/8	3-1/2	0.005	ELMG-2020	17778	47778	67778
5/8	5/8	2-1/4	5	0.005	ELMG-2020-L	17787	47787	67787
3/4	3/4	1-5/8	4	0.005	ELMG-2424	17779	47779	67779
3/4	3/4	2-1/4	5	0.005	ELMG-2424-L	17788	47788	67788
1	1	1-1/2	4	0.005	ELMG-3232	17781	47781	67781
1	1	2-1/4	5	0.005	ELMG-3232-L	17789	47789	67789

Speed & Feed: page 184

Carbide Center Cutting Bright +.000mm  
-.050mm Radius

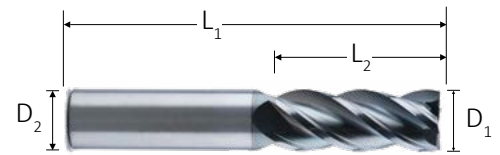
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	TICN EDP	ZRN EDP
3mm	6mm	12mm	63mm	0.125mm	ELMG-M6M3	11680	41680	61680
4mm	4mm	14mm	51mm	0.125mm	ELMG-M4M4	11455	41455	61455
4mm	6mm	14mm	63mm	0.125mm	ELMG-M6M4	11681	41681	61681
5mm	5mm	20mm	51mm	0.125mm	ELMG-M5M5	11457	41457	61457
6mm	6mm	20mm	63mm	0.125mm	ELMG-M6M6	11459	41459	61459
8mm	8mm	20mm	63mm	0.125mm	ELMG-M8M8	11461	41461	61461
10mm	10mm	25mm	70mm	0.125mm	ELMG-M10M10	11463	41463	61463
12mm	12mm	25mm	76mm	0.125mm	ELMG-M12M12	11465	41465	61465
14mm	14mm	32mm	89mm	0.125mm	ELMG-M14M14	11467	41467	61467
16mm	16mm	32mm	89mm	0.125mm	ELMG-M16M16	11469	41469	61469
20mm	20mm	38mm	100mm	0.125mm	ELMG-M20M20	11473	41473	61473

Speed & Feed: page 184

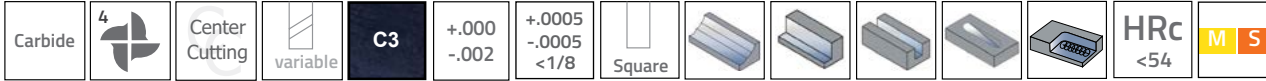




## 4 FLUTE • VARIABLE HELIX FOR ROUGHING & FINISHING



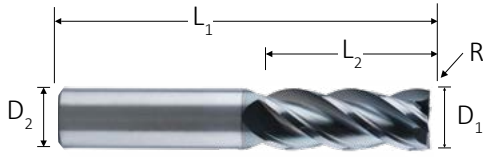
- > 4 Flute Variable Pitch for reduced chatter and increased productivity
- > Substrate, geometry & coating optimized for Titanium and Stainless Steels
- > For slotting, peripheral milling, trochoidal & high efficiency milling
- > Corner radii strengthens flute corners and increases tool life



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1/8	1/8	1/4	1-1/2	SQ	MTi4-S-0125-SQ-C3	320500
1/8	1/8	1/2	2	SQ	MTi4-R-0125-SQ-C3	320580
1/8	1/8	3/4	2-1/2	SQ	MTi4-M-0125-SQ-C3	320660
3/16	3/16	5/16	2	SQ	MTi4-S-0187-SQ-C3	320740
3/16	3/16	9/16	2-1/2	SQ	MTi4-R-0187-SQ-C3	320820
3/16	3/16	3/4	2-1/2	SQ	MTi4-M-0187-SQ-C3	320900
1/4	1/4	3/8	2	SQ	MTi4-S-0250-SQ-C3	320980
1/4	1/4	1/2	2-1/2	SQ	MTi4-SR-0250-SQ-C3	321100
1/4	1/4	3/4	2-1/2	SQ	MTi4-R-0250-SQ-C3	321220
1/4	1/4	1-1/4	3	SQ	MTi4-L-0250-SQ-C3	321340
5/16	5/16	7/16	2	SQ	MTi4-S-0312-SQ-C3	321460
5/16	5/16	13/16	2-1/2	SQ	MTi4-R-0312-SQ-C3	321560
5/16	5/16	1	3	SQ	MTi4-M-0312-SQ-C3	321660
3/8	3/8	1/2	2	SQ	MTi4-S-0375-SQ-C3	321760
3/8	3/8	1	2-1/2	SQ	MTi4-R-0375-SQ-C3	321900
3/8	3/8	1-1/4	3	SQ	MTi4-M-0375-SQ-C3	322040
3/8	3/8	1-3/4	4	SQ	MTi4-L-0375-SQ-C3	322180
1/2	1/2	5/8	2-1/2	SQ	MTi4-S-0500-SQ-C3	322320
1/2	1/2	1	3	SQ	MTi4-SR-0500-SQ-C3	322480
1/2	1/2	1-1/4	3	SQ	MTi4-R-0500-SQ-C3	322640
1/2	1/2	1-5/8	4	SQ	MTi4-M-0500-SQ-C3	322800
1/2	1/2	2	4	SQ	MTi4-L-0500-SQ-C3	322960
5/8	5/8	3/4	3	SQ	MTi4-S-0625-SQ-C3	323120
5/8	5/8	1-1/4	3-1/2	SQ	MTi4-SR-0625-SQ-C3	323280
5/8	5/8	1-5/8	3-1/2	SQ	MTi4-R-0625-SQ-C3	323440
5/8	5/8	2-1/8	4	SQ	MTi4-M-0625-SQ-C3	323600
5/8	5/8	2-1/2	5	SQ	MTi4-L-0625-SQ-C3	323760
3/4	3/4	1	3	SQ	MTi4-S-0750-SQ-C3	323920
3/4	3/4	1-5/8	4	SQ	MTi4-R-0750-SQ-C3	324100
3/4	3/4	2-1/4	5	SQ	MTi4-M-0750-SQ-C3	324280
3/4	3/4	2-3/4	5	SQ	MTi4-L-0750-SQ-C3	324460
3/4	3/4	3-1/4	6	SQ	MTi4-LX-0750-SQ-C3	324640
1	1	1-1/4	4	SQ	MTi4-S-1000-SQ-C3	324820
1	1	2	4-1/2	SQ	MTi4-R-1000-SQ-C3	325020
1	1	2-5/8	5	SQ	MTi4-M-1000-SQ-C3	325220
1	1	3-1/4	6	SQ	MTi4-L-1000-SQ-C3	325420
1	1	4-1/4	7	SQ	MTi4-X-1000-SQ-C3	325620

**Speed & Feed: 185-186**





## 4 FLUTE • VARIABLE HELIX FOR ROUGHING & FINISHING

- ▶ 4 Flute Variable Pitch for reduced chatter and increased productivity
- ▶ Substrate, geometry & coating optimized for Titanium and Stainless Steels
- ▶ For slotting, peripheral milling, trochoidal & high efficiency milling
- ▶ Corner radii strengthens flute corners and increases tool life

Carbide		Center Cutting		<b>C3</b>	+0.000 -0.002	+0.0005 -0.0005 <1/8							HRC <54	<b>M S</b>
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/8	1/8	1/4	1-1/2	0.010	MTI4-S-0125-R010-C3	320520
1/8	1/8	1/4	1-1/2	0.015	MTI4-S-0125-R015-C3	320540
1/8	1/8	1/4	1-1/2	0.030	MTI4-S-0125-R030-C3	320560
1/8	1/8	1/2	2	0.010	MTI4-R-0125-R010-C3	320600
1/8	1/8	1/2	2	0.015	MTI4-R-0125-R015-C3	320620
1/8	1/8	1/2	2	0.030	MTI4-R-0125-R030-C3	320640
1/8	1/8	3/4	2-1/2	0.010	MTI4-M-0125-R010-C3	320680
1/8	1/8	3/4	2-1/2	0.015	MTI4-M-0125-R015-C3	320700
1/8	1/8	3/4	2-1/2	0.030	MTI4-M-0125-R030-C3	320720
3/16	3/16	5/16	2	0.010	MTI4-S-0187-R010-C3	320760
3/16	3/16	5/16	2	0.015	MTI4-S-0187-R015-C3	320780
3/16	3/16	5/16	2	0.030	MTI4-S-0187-R030-C3	320800
3/16	3/16	9/16	2-1/2	0.010	MTI4-R-0187-R010-C3	320840
3/16	3/16	9/16	2-1/2	0.015	MTI4-R-0187-R015-C3	320860
3/16	3/16	9/16	2-1/2	0.030	MTI4-R-0187-R030-C3	320880
3/16	3/16	3/4	2-1/2	0.010	MTI4-M-0187-R010-C3	320920
3/16	3/16	3/4	2-1/2	0.015	MTI4-M-0187-R015-C3	320940
3/16	3/16	3/4	2-1/2	0.030	MTI4-M-0187-R030-C3	320960
1/4	1/4	3/8	2	0.015	MTI4-S-0250-R015-C3	321000
1/4	1/4	3/8	2	0.020	MTI4-S-0250-R020-C3	321020
1/4	1/4	3/8	2	0.030	MTI4-S-0250-R030-C3	321040
1/4	1/4	3/8	2	0.060	MTI4-S-0250-R060-C3	321060
1/4	1/4	3/8	2	0.090	MTI4-S-0250-R090-C3	321080
1/4	1/4	1/2	2-1/2	0.015	MTI4-SR-0250-R015-C3	321120
1/4	1/4	1/2	2-1/2	0.020	MTI4-SR-0250-R020-C3	321140
1/4	1/4	1/2	2-1/2	0.030	MTI4-SR-0250-R030-C3	321160
1/4	1/4	1/2	2-1/2	0.060	MTI4-SR-0250-R060-C3	321180
1/4	1/4	1/2	2-1/2	0.090	MTI4-SR-0250-R090-C3	321200
1/4	1/4	3/4	2-1/2	0.015	MTI4-R-0250-R015-C3	321240
1/4	1/4	3/4	2-1/2	0.020	MTI4-R-0250-R020-C3	321260
1/4	1/4	3/4	2-1/2	0.030	MTI4-R-0250-R030-C3	321280
1/4	1/4	3/4	2-1/2	0.060	MTI4-R-0250-R060-C3	321300
1/4	1/4	3/4	2-1/2	0.090	MTI4-R-0250-R090-C3	321320
1/4	1/4	1-1/4	3	0.015	MTI4-L-0250-R015-C3	321360
1/4	1/4	1-1/4	3	0.020	MTI4-L-0250-R020-C3	321380
1/4	1/4	1-1/4	3	0.030	MTI4-L-0250-R030-C3	321400
1/4	1/4	1-1/4	3	0.060	MTI4-L-0250-R060-C3	321420
1/4	1/4	1-1/4	3	0.090	MTI4-L-0250-R090-C3	321440
5/16	5/16	7/16	2	0.015	MTI4-S-0312-R015-C3	321480
5/16	5/16	7/16	2	0.030	MTI4-S-0312-R030-C3	321500
5/16	5/16	7/16	2	0.060	MTI4-S-0312-R060-C3	321520
5/16	5/16	7/16	2	0.090	MTI4-S-0312-R090-C3	321540
5/16	5/16	13/16	2-1/2	0.015	MTI4-R-0312-R015-C3	321580
5/16	5/16	13/16	2-1/2	0.030	MTI4-R-0312-R030-C3	321600

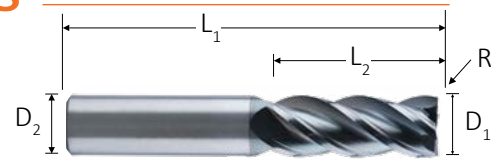
Speed & Feed: 185-186

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# TITANIUM ALLOYS & HIGH TEMP ALLOYS

Series: **MTi4**

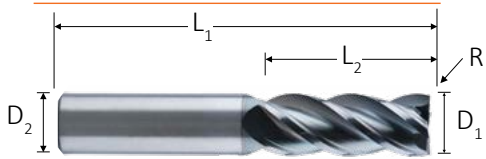
## 4 FLUTE • VARIABLE HELIX FOR ROUGHING & FINISHING



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
5/16	5/16	13/16	2-1/2	0.060	MTi4-R-0312-R060-C3	321620
5/16	5/16	13/16	2-1/2	0.090	MTi4-R-0312-R090-C3	321640
5/16	5/16	1	3	0.015	MTi4-M-0312-R015-C3	321680
5/16	5/16	1	3	0.030	MTi4-M-0312-R030-C3	321700
5/16	5/16	1	3	0.060	MTi4-M-0312-R060-C3	321720
5/16	5/16	1	3	0.090	MTi4-M-0312-R090-C3	321740
3/8	3/8	1/2	2	0.015	MTi4-S-0375-R015-C3	321780
3/8	3/8	1/2	2	0.020	MTi4-S-0375-R020-C3	321800
3/8	3/8	1/2	2	0.030	MTi4-S-0375-R030-C3	321820
3/8	3/8	1/2	2	0.060	MTi4-S-0375-R060-C3	321840
3/8	3/8	1/2	2	0.090	MTi4-S-0375-R090-C3	321860
3/8	3/8	1/2	2	0.120	MTi4-S-0375-R120-C3	321880
3/8	3/8	1	2-1/2	0.015	MTi4-R-0375-R015-C3	321920
3/8	3/8	1	2-1/2	0.020	MTi4-R-0375-R020-C3	321940
3/8	3/8	1	2-1/2	0.030	MTi4-R-0375-R030-C3	321960
3/8	3/8	1	2-1/2	0.060	MTi4-R-0375-R060-C3	321980
3/8	3/8	1	2-1/2	0.090	MTi4-R-0375-R090-C3	322000
3/8	3/8	1	2-1/2	0.120	MTi4-R-0375-R120-C3	322020
3/8	3/8	1-1/4	3	0.015	MTi4-M-0375-R015-C3	322060
3/8	3/8	1-1/4	3	0.020	MTi4-M-0375-R020-C3	322080
3/8	3/8	1-1/4	3	0.030	MTi4-M-0375-R030-C3	322100
3/8	3/8	1-1/4	3	0.060	MTi4-M-0375-R060-C3	322120
3/8	3/8	1-1/4	3	0.090	MTi4-M-0375-R090-C3	322140
3/8	3/8	1-1/4	3	0.120	MTi4-M-0375-R120-C3	322160
3/8	3/8	1-3/4	4	0.015	MTi4-L-0375-R015-C3	322200
3/8	3/8	1-3/4	4	0.020	MTi4-L-0375-R020-C3	322220
3/8	3/8	1-3/4	4	0.030	MTi4-L-0375-R030-C3	322240
3/8	3/8	1-3/4	4	0.060	MTi4-L-0375-R060-C3	322260
3/8	3/8	1-3/4	4	0.090	MTi4-L-0375-R090-C3	322280
3/8	3/8	1-3/4	4	0.120	MTi4-L-0375-R120-C3	322300
1/2	1/2	5/8	2-1/2	0.015	MTi4-S-0500-R015-C3	322340
1/2	1/2	5/8	2-1/2	0.020	MTi4-S-0500-R020-C3	322350
1/2	1/2	5/8	2-1/2	0.030	MTi4-S-0500-R030-C3	322360
1/2	1/2	5/8	2-1/2	0.060	MTi4-S-0500-R060-C3	322380
1/2	1/2	5/8	2-1/2	0.090	MTi4-S-0500-R090-C3	322400
1/2	1/2	5/8	2-1/2	0.120	MTi4-S-0500-R120-C3	322420
1/2	1/2	1	3	0.015	MTi4-SR-0500-R015-C3	322500
1/2	1/2	1	3	0.020	MTi4-SR-0500-R020-C3	322510
1/2	1/2	1	3	0.030	MTi4-SR-0500-R030-C3	322520
1/2	1/2	1	3	0.060	MTi4-SR-0500-R060-C3	322540
1/2	1/2	1	3	0.090	MTi4-SR-0500-R090-C3	322560
1/2	1/2	1	3	0.120	MTi4-SR-0500-R120-C3	322580
1/2	1/2	1-1/4	3	0.015	MTi4-R-0500-R015-C3	322660
1/2	1/2	1-1/4	3	0.020	MTi4-R-0500-R020-C3	322670
1/2	1/2	1-1/4	3	0.030	MTi4-R-0500-R030-C3	322680
1/2	1/2	1-1/4	3	0.060	MTi4-R-0500-R060-C3	322700
1/2	1/2	1-1/4	3	0.090	MTi4-R-0500-R090-C3	322720
1/2	1/2	1-1/4	3	0.120	MTi4-R-0500-R120-C3	322740
1/2	1/2	1-5/8	4	0.015	MTi4-M-0500-R015-C3	322820

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## 4 FLUTE • VARIABLE HELIX FOR ROUGHING &amp; FINISHING

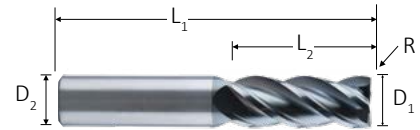
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/2	1/2	1-5/8	4	0.030	MTI4-M-0500-R030-C3	322840
1/2	1/2	1-5/8	4	0.060	MTI4-M-0500-R060-C3	322860
1/2	1/2	1-5/8	4	0.090	MTI4-M-0500-R090-C3	322880
1/2	1/2	1-5/8	4	0.120	MTI4-M-0500-R120-C3	322900
1/2	1/2	2	4	0.015	MTI4-L-0500-R015-C3	322980
1/2	1/2	2	4	0.030	MTI4-L-0500-R030-C3	323000
1/2	1/2	2	4	0.060	MTI4-L-0500-R060-C3	323020
1/2	1/2	2	4	0.090	MTI4-L-0500-R090-C3	323040
1/2	1/2	2	4	0.120	MTI4-L-0500-R120-C3	323060
5/8	5/8	3/4	3	0.015	MTI4-S-0625-R015-C3	323140
5/8	5/8	3/4	3	0.030	MTI4-S-0625-R030-C3	323160
5/8	5/8	3/4	3	0.060	MTI4-S-0625-R060-C3	323180
5/8	5/8	3/4	3	0.090	MTI4-S-0625-R090-C3	323200
5/8	5/8	3/4	3	0.120	MTI4-S-0625-R120-C3	323220
5/8	5/8	1-1/4	3-1/2	0.015	MTI4-SR-0625-R015-C3	323300
5/8	5/8	1-1/4	3-1/2	0.030	MTI4-SR-0625-R030-C3	323320
5/8	5/8	1-1/4	3-1/2	0.060	MTI4-SR-0625-R060-C3	323340
5/8	5/8	1-1/4	3-1/2	0.090	MTI4-SR-0625-R090-C3	323360
5/8	5/8	1-1/4	3-1/2	0.120	MTI4-SR-0625-R120-C3	323380
5/8	5/8	1-1/4	3-1/2	0.190	MTI4-SR-0625-R190-C3	323420
5/8	5/8	1-5/8	3-1/2	0.015	MTI4-R-0625-R015-C3	323460
5/8	5/8	1-5/8	3-1/2	0.030	MTI4-R-0625-R030-C3	323480
5/8	5/8	1-5/8	3-1/2	0.060	MTI4-R-0625-R060-C3	323500
5/8	5/8	1-5/8	3-1/2	0.090	MTI4-R-0625-R090-C3	323520
5/8	5/8	1-5/8	3-1/2	0.120	MTI4-R-0625-R120-C3	323540
5/8	5/8	1-5/8	3-1/2	0.156	MTI4-R-0625-R156-C3	323560
5/8	5/8	1-5/8	3-1/2	0.190	MTI4-R-0625-R190-C3	323580
5/8	5/8	2-1/8	4	0.015	MTI4-M-0625-R015-C3	323620
5/8	5/8	2-1/8	4	0.030	MTI4-M-0625-R030-C3	323640
5/8	5/8	2-1/8	4	0.060	MTI4-M-0625-R060-C3	323660
5/8	5/8	2-1/8	4	0.090	MTI4-M-0625-R090-C3	323680
5/8	5/8	2-1/8	4	0.120	MTI4-M-0625-R120-C3	323700
5/8	5/8	2-1/2	5	0.015	MTI4-L-0625-R015-C3	323780
5/8	5/8	2-1/2	5	0.030	MTI4-L-0625-R030-C3	323800
5/8	5/8	2-1/2	5	0.060	MTI4-L-0625-R060-C3	323820
5/8	5/8	2-1/2	5	0.090	MTI4-L-0625-R090-C3	323840
5/8	5/8	2-1/2	5	0.120	MTI4-L-0625-R120-C3	323860
3/4	3/4	1	3	0.015	MTI4-S-0750-R015-C3	323940
3/4	3/4	1	3	0.030	MTI4-S-0750-R030-C3	323960
3/4	3/4	1	3	0.060	MTI4-S-0750-R060-C3	323980
3/4	3/4	1	3	0.090	MTI4-S-0750-R090-C3	324000
3/4	3/4	1	3	0.120	MTI4-S-0750-R120-C3	324020
3/4	3/4	1-5/8	4	0.015	MTI4-R-0750-R015-C3	324120
3/4	3/4	1-5/8	4	0.030	MTI4-R-0750-R030-C3	324140
3/4	3/4	1-5/8	4	0.060	MTI4-R-0750-R060-C3	324160
3/4	3/4	1-5/8	4	0.090	MTI4-R-0750-R090-C3	324180
3/4	3/4	1-5/8	4	0.120	MTI4-R-0750-R120-C3	324200
3/4	3/4	1-5/8	4	0.156	MTI4-R-0750-R156-C3	324220

Speed &amp; Feed: 185-186

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## 4 FLUTE • VARIABLE HELIX FOR ROUGHING & FINISHING

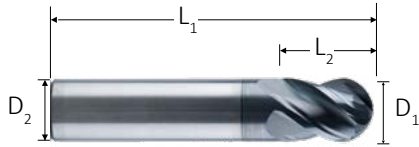


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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
3/4	3/4	1-5/8	4	0.190	MTi4-R-0750-R190-C3	324240
3/4	3/4	1-5/8	4	0.250	MTi4-R-0750-R250-C3	324260
3/4	3/4	2-1/4	5	0.015	MTi4-M-0750-R015-C3	324300
3/4	3/4	2-1/4	5	0.030	MTi4-M-0750-R030-C3	324320
3/4	3/4	2-1/4	5	0.060	MTi4-M-0750-R060-C3	324340
3/4	3/4	2-1/4	5	0.090	MTi4-M-0750-R090-C3	324360
3/4	3/4	2-1/4	5	0.120	MTi4-M-0750-R120-C3	324380
3/4	3/4	2-1/4	5	0.190	MTi4-M-0750-R190-C3	324420
3/4	3/4	2-1/4	5	0.250	MTi4-M-0750-R250-C3	324440
3/4	3/4	2-3/4	5	0.015	MTi4-L-0750-R015-C3	324480
3/4	3/4	2-3/4	5	0.030	MTi4-L-0750-R030-C3	324500
3/4	3/4	2-3/4	5	0.060	MTi4-L-0750-R060-C3	324520
3/4	3/4	2-3/4	5	0.090	MTi4-L-0750-R090-C3	324540
3/4	3/4	2-3/4	5	0.120	MTi4-L-0750-R120-C3	324560
3/4	3/4	2-3/4	5	0.250	MTi4-L-0750-R250-C3	324620
3/4	3/4	3-1/4	6	0.015	MTi4-LX-0750-R015-C3	324660
3/4	3/4	3-1/4	6	0.030	MTi4-LX-0750-R030-C3	324680
3/4	3/4	3-1/4	6	0.060	MTi4-LX-0750-R060-C3	324700
3/4	3/4	3-1/4	6	0.090	MTi4-LX-0750-R090-C3	324720
3/4	3/4	3-1/4	6	0.120	MTi4-LX-0750-R120-C3	324740
1	1	1-1/4	4	0.030	MTi4-S-1000-R030-C3	324860
1	1	1-1/4	4	0.060	MTi4-S-1000-R060-C3	324880
1	1	1-1/4	4	0.090	MTi4-S-1000-R090-C3	324900
1	1	1-1/4	4	0.120	MTi4-S-1000-R120-C3	324920
1	1	1-1/4	4	0.190	MTi4-S-1000-R190-C3	324960
1	1	2	4-1/2	0.030	MTi4-R-1000-R030-C3	325060
1	1	2	4-1/2	0.060	MTi4-R-1000-R060-C3	325080
1	1	2	4-1/2	0.090	MTi4-R-1000-R090-C3	325100
1	1	2	4-1/2	0.120	MTi4-R-1000-R120-C3	325120
1	1	2	4-1/2	0.250	MTi4-R-1000-R250-C3	325180
1	1	2-5/8	5	0.015	MTi4-M-1000-R015-C3	325240
1	1	2-5/8	5	0.030	MTi4-M-1000-R030-C3	325260
1	1	2-5/8	5	0.060	MTi4-M-1000-R060-C3	325280
1	1	2-5/8	5	0.090	MTi4-M-1000-R090-C3	325300
1	1	2-5/8	5	0.120	MTi4-M-1000-R120-C3	325320
1	1	3-1/4	6	0.015	MTi4-L-1000-R015-C3	325440
1	1	3-1/4	6	0.030	MTi4-L-1000-R030-C3	325460
1	1	3-1/4	6	0.060	MTi4-L-1000-R060-C3	325480
1	1	3-1/4	6	0.090	MTi4-L-1000-R090-C3	325500
1	1	3-1/4	6	0.120	MTi4-L-1000-R120-C3	325520
1	1	4-1/4	7	0.015	MTi4-X-1000-R015-C3	325640
1	1	4-1/4	7	0.030	MTi4-X-1000-R030-C3	325660
1	1	4-1/4	7	0.060	MTi4-X-1000-R060-C3	325680
1	1	4-1/4	7	0.090	MTi4-X-1000-R090-C3	325700
1	1	4-1/4	7	0.120	MTi4-X-1000-R120-C3	325720
1	1	4-1/4	7	0.190	MTi4-X-1000-R190-C3	325760
1	1	4-1/4	7	0.250	MTi4-X-1000-R250-C3	325780
1	1	4-1/4	7	0.375	MTi4-X-1000-R375-C3	325800

**Speed & Feed:** 185-186

No LBS Listed\* - Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck



## 4 FLUTE • BALL NOSE VARIABLE HELIX FOR 3D PROFILING FOR ROUGHING & FINISHING

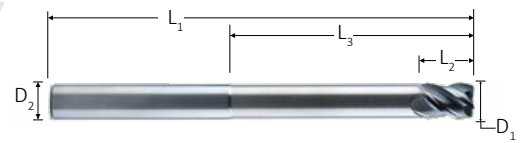
- 4 Flute Variable Pitch for reduced chatter and increase productivity
- Substrate, geometry & coating optimized for Titanium & Stainless Steels
- Highly polished flute and O.D. geometry leaves excellent finish
- Excellent for 3D machining

Carbide		Center Cutting		<b>C3</b>	+0.000 -0.002	+0.0005 -0.0005 <1/8						HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1/8	1/8	1/4	1-1/2	Ball	MTi4-S-0125-BN-C3	320570
1/8	1/8	1/2	2	Ball	MTi4-R-0125-BN-C3	320650
1/8	1/8	3/4	2-1/2	Ball	MTi4-M-0125-BN-C3	320730
3/16	3/16	5/16	2	Ball	MTi4-S-0187-BN-C3	320810
3/16	3/16	9/16	2-1/2	Ball	MTi4-R-0187-BN-C3	320890
3/16	3/16	3/4	2-1/2	Ball	MTi4-M-0187-BN-C3	320970
1/4	1/4	3/8	2	Ball	MTi4-S-0250-BN-C3	321090
1/4	1/4	1/2	2-1/2	Ball	MTi4-SR-0250-BN-C3	321210
1/4	1/4	3/4	2-1/2	Ball	MTi4-R-0250-BN-C3	321330
1/4	1/4	1-1/4	3	Ball	MTi4-L-0250-BN-C3	321450
5/16	5/16	7/16	2	Ball	MTi4-S-0312-BN-C3	321550
5/16	5/16	13/16	2-1/2	Ball	MTi4-R-0312-BN-C3	321650
5/16	5/16	1	3	Ball	MTi4-M-0312-BN-C3	321750
3/8	3/8	1/2	2	Ball	MTi4-S-0375-BN-C3	321890
3/8	3/8	1	2-1/2	Ball	MTi4-R-0375-BN-C3	322030
3/8	3/8	1-1/4	3	Ball	MTi4-M-0375-BN-C3	322170
3/8	3/8	1-3/4	4	Ball	MTi4-L-0375-BN-C3	322310
1/2	1/2	5/8	2-1/2	Ball	MTi4-S-0500-BN-C3	322470
1/2	1/2	1	3	Ball	MTi4-SR-0500-BN-C3	322630
1/2	1/2	1-1/4	3	Ball	MTi4-R-0500-BN-C3	322790
1/2	1/2	1-5/8	4	Ball	MTi4-M-0500-BN-C3	322950
1/2	1/2	2	4	Ball	MTi4-L-0500-BN-C3	323110
5/8	5/8	3/4	3	Ball	MTi4-S-0625-BN-C3	323270
5/8	5/8	1-1/4	3-1/2	Ball	MTi4-SR-0625-BN-C3	323430
5/8	5/8	1-5/8	3-1/2	Ball	MTi4-R-0625-BN-C3	323590
5/8	5/8	2-1/8	4	Ball	MTi4-M-0625-BN-C3	323750
5/8	5/8	2-1/2	5	Ball	MTi4-L-0625-BN-C3	323910
3/4	3/4	1	3	Ball	MTi4-S-0750-BN-C3	324090
3/4	3/4	1-5/8	4	Ball	MTi4-R-0750-BN-C3	324270
3/4	3/4	2-1/4	5	Ball	MTi4-M-0750-BN-C3	324450
3/4	3/4	2-3/4	5	Ball	MTi4-L-0750-BN-C3	324630
3/4	3/4	3-1/4	6	Ball	MTi4-LX-0750-BN-C3	324810
1	1	1-1/4	4	Ball	MTi4-S-1000-BN-C3	325010
1	1	2-5/8	5	Ball	MTi4-M-1000-BN-C3	325410
1	1	4-1/4	7	Ball	MTi4-X-1000-BN-C3	325810

**Speed & Feed: 185-186**

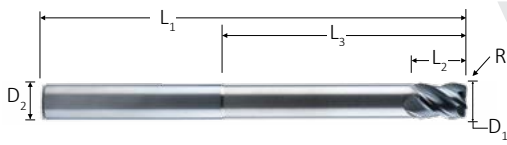
## 4 FLUTE • REDUCED NECK VARIABLE HELIX FOR LONG REACH FOR ROUGHING & FINISHING



- > 4 Flute Variable Pitch for reduced chatter and increased productivity
- > Substrate, geometry & coating optimized for Titanium & Stainless Steels
- > Long OAL with reduced neck for clearing walls while reaching into deep pockets

Carbide		Center Cutting	variable	<b>C3</b>	+0.000 -0.002	+0.0005 -0.0005 <1/8	Square						HRC <54	<b>M S</b>
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1/8	1/8	3/16	3/8	2	SQ	MTI4-RN-S-0125-SQ-C3	330500
1/8	1/8	3/16	1/2	2	SQ	MTI4-RN-R-0125-SQ-C3	330580
1/8	1/8	3/16	3/4	2-1/2	SQ	MTI4-RN-M-0125-SQ-C3	330660
3/16	3/16	1/4	1/2	2	SQ	MTI4-RN-S-0187-SQ-C3	330740
3/16	3/16	1/4	3/4	2-1/2	SQ	MTI4-RN-R-0187-SQ-C3	330820
3/16	3/16	1/4	1-1/8	2-1/2	SQ	MTI4-RN-M-0187-SQ-C3	330900
1/4	1/4	3/8	3/4	4	SQ	MTI4-RN-S-0250-SQ-C3	330980
1/4	1/4	3/8	1-1/8	4	SQ	MTI4-RN-R-0250-SQ-C3	331100
1/4	1/4	3/8	2-1/8	4	SQ	MTI4-RN-M-0250-SQ-C3	331220
1/4	1/4	3/8		4	SQ	MTI4-LS-0250-SQ-C3	331340
5/16	5/16	7/16	1-1/8	4	SQ	MTI4-RN-R-0312-SQ-C3	331460
5/16	5/16	7/16	2-1/8	4	SQ	MTI4-RN-M-0312-SQ-C3	331560
5/16	5/16	7/16		4	SQ	MTI4-LS-0312-SQ-C3	331660
3/8	3/8	1/2	1-1/8	4	SQ	MTI4-RN-S-0375-SQ-C3	331760
3/8	3/8	1/2	2-1/8	4	SQ	MTI4-RN-R-0375-SQ-C3	331900
3/8	3/8	1/2	3-1/8	6	SQ	MTI4-RN-M-0375-SQ-C3	332040
3/8	3/8	1/2	4-1/8	6	SQ	MTI4-RN-L-0375-SQ-C3	332180
3/8	3/8	1/2		6	SQ	MTI4-LS-0375-SQ-C3	332320
1/2	1/2	5/8	1-1/2	4	SQ	MTI4-RN-S-0500-SQ-C3	332460
1/2	1/2	5/8	2-1/4	4	SQ	MTI4-RN-R-0500-SQ-C3	332620
1/2	1/2	5/8	3-3/8	6	SQ	MTI4-RN-M-0500-SQ-C3	332780
1/2	1/2	5/8	4-1/8	6	SQ	MTI4-RN-L-0500-SQ-C3	332940
1/2	1/2	5/8		6	SQ	MTI4-LS-0500-SQ-C3	333100
1/2	1/2	5/8		8	SQ	MTI4-LS-XX-0500-SQ-C3	333260
5/8	5/8	3/4	1-5/8	4	SQ	MTI4-RN-S-0625-SQ-C3	333420
5/8	5/8	3/4	2-3/8	6	SQ	MTI4-RN-R-0625-SQ-C3	333580
5/8	5/8	3/4	3-3/8	6	SQ	MTI4-RN-M-0625-SQ-C3	333740
5/8	5/8	3/4	4-1/8	6	SQ	MTI4-RN-L-0625-SQ-C3	333900
5/8	5/8	3/4		6	SQ	MTI4-LS-0625-SQ-C3	334060
3/4	3/4	1	2	4	SQ	MTI4-RN-S-0750-SQ-C3	334220
3/4	3/4	1	2-1/2	6	SQ	MTI4-RN-R-0750-SQ-C3	334400
3/4	3/4	1	3-3/8	6	SQ	MTI4-RN-M-0750-SQ-C3	334580
3/4	3/4	1	4-1/8	6	SQ	MTI4-RN-L-0750-SQ-C3	334760
3/4	3/4	1		6	SQ	MTI4-LS-0750-SQ-C3	334940
3/4	3/4	1	4-7/8	7	SQ	MTI4-RN-X-0750-SQ-C3	335120
3/4	3/4	1		7	SQ	MTI4-LS-X-0750-SQ-C3	335300
1	1	1-1/4	2-1/4	4	SQ	MTI4-RN-S-1000-SQ-C3	335660
1	1	1-1/4	2-5/8	6	SQ	MTI4-RN-R-1000-SQ-C3	335860
1	1	1-1/4	3-3/8	6	SQ	MTI4-RN-M-1000-SQ-C3	336060
1	1	1-1/4	4-1/8	6	SQ	MTI4-RN-L-1000-SQ-C3	336260
1	1	1-1/4		6	SQ	MTI4-LS-1000-SQ-C3	336460
1	1	1-1/4	4-5/8	7	SQ	MTI4-RN-X-1000-SQ-C3	336660
1	1	1-1/4		7	SQ	MTI4-LS-X-1000-SQ-C3	336860
1	1	1-1/4		12-1/2	SQ	MTI4-LS-XX-1000-SQ-C3	337060



## 4 FLUTE • REDUCED NECK VARIABLE HELIX FOR LONG REACH FOR ROUGHING & FINISHING

- 4 Flute Variable Pitch for reduced chatter and increased productivity
- Substrate, geometry & coating optimized for Titanium & Stainless Steels
- For slotting, peripheral milling, trochoidal & high efficiency milling
- Long OAL with reduced neck for clearing walls while reaching into deep pockets

Carbide		Center Cutting		<b>C3</b>	+0.000 -0.002	+0.0005 -0.0005 <1/8							HRC <54		
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/8	1/8	3/16	3/8	2	0.010	MTI4-RN-S-0125-R010-C3	330520
1/8	1/8	3/16	3/8	2	0.015	MTI4-RN-S-0125-R015-C3	330540
1/8	1/8	3/16	3/8	2	0.030	MTI4-RN-S-0125-R030-C3	330560
1/8	1/8	3/16	1/2	2	0.010	MTI4-RN-R-0125-R010-C3	330600
1/8	1/8	3/16	1/2	2	0.015	MTI4-RN-R-0125-R015-C3	330620
1/8	1/8	3/16	1/2	2	0.030	MTI4-RN-R-0125-R030-C3	330640
1/8	1/8	3/16	3/4	2-1/2	0.010	MTI4-RN-M-0125-R010-C3	330680
1/8	1/8	3/16	3/4	2-1/2	0.015	MTI4-RN-M-0125-R015-C3	330700
1/8	1/8	3/16	3/4	2-1/2	0.030	MTI4-RN-M-0125-R030-C3	330720
3/16	3/16	1/4	1/2	2	0.010	MTI4-RN-S-0187-R010-C3	330760
3/16	3/16	1/4	1/2	2	0.015	MTI4-RN-S-0187-R015-C3	330780
3/16	3/16	1/4	1/2	2	0.030	MTI4-RN-S-0187-R030-C3	330800
3/16	3/16	1/4	3/4	2-1/2	0.010	MTI4-RN-R-0187-R010-C3	330840
3/16	3/16	1/4	3/4	2-1/2	0.015	MTI4-RN-R-0187-R015-C3	330860
3/16	3/16	1/4	3/4	2-1/2	0.030	MTI4-RN-R-0187-R030-C3	330880
3/16	3/16	1/4	1-1/8	2-1/2	0.010	MTI4-RN-M-0187-R010-C3	330920
3/16	3/16	1/4	1-1/8	2-1/2	0.015	MTI4-RN-M-0187-R015-C3	330940
3/16	3/16	1/4	1-1/8	2-1/2	0.030	MTI4-RN-M-0187-R030-C3	330960
1/4	1/4	3/8	3/4	4	0.015	MTI4-RN-S-0250-R015-C3	331000
1/4	1/4	3/8	3/4	4	0.020	MTI4-RN-S-0250-R020-C3	331020
1/4	1/4	3/8	3/4	4	0.030	MTI4-RN-S-0250-R030-C3	331040
1/4	1/4	3/8	3/4	4	0.060	MTI4-RN-S-0250-R060-C3	331060
1/4	1/4	3/8	3/4	4	0.090	MTI4-RN-S-0250-R090-C3	331080
1/4	1/4	3/8	1-1/8	4	0.015	MTI4-RN-R-0250-R015-C3	331120
1/4	1/4	3/8	1-1/8	4	0.020	MTI4-RN-R-0250-R020-C3	331140
1/4	1/4	3/8	1-1/8	4	0.030	MTI4-RN-R-0250-R030-C3	331160
1/4	1/4	3/8	1-1/8	4	0.060	MTI4-RN-R-0250-R060-C3	331180
1/4	1/4	3/8	1-1/8	4	0.090	MTI4-RN-R-0250-R090-C3	331200
1/4	1/4	3/8	2-1/8	4	0.015	MTI4-RN-M-0250-R015-C3	331240
1/4	1/4	3/8	2-1/8	4	0.020	MTI4-RN-M-0250-R020-C3	331260
1/4	1/4	3/8	2-1/8	4	0.030	MTI4-RN-M-0250-R030-C3	331280
1/4	1/4	3/8	2-1/8	4	0.060	MTI4-RN-M-0250-R060-C3	331300
1/4	1/4	3/8	2-1/8	4	0.090	MTI4-RN-M-0250-R090-C3	331320
1/4	1/4	3/8		4	0.015	MTI4-LS-0250-R015-C3	331360
1/4	1/4	3/8		4	0.020	MTI4-LS-0250-R020-C3	331380
1/4	1/4	3/8		4	0.030	MTI4-LS-0250-R030-C3	331400
1/4	1/4	3/8		4	0.060	MTI4-LS-0250-R060-C3	331420
1/4	1/4	3/8		4	0.090	MTI4-LS-0250-R090-C3	331440
5/16	5/16	7/16	1-1/8	4	0.015	MTI4-RN-R-0312-R015-C3	331480
5/16	5/16	7/16	1-1/8	4	0.030	MTI4-RN-R-0312-R030-C3	331500
5/16	5/16	7/16	1-1/8	4	0.060	MTI4-RN-R-0312-R060-C3	331520
5/16	5/16	7/16	1-1/8	4	0.090	MTI4-RN-R-0312-R090-C3	331540

Speed & Feed: 185-186

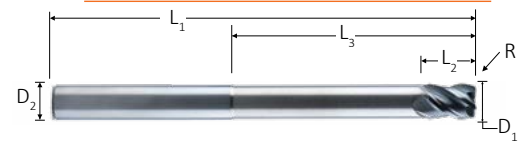
sizes continued on next page



# TITANIUM ALLOYS & HIGH TEMP ALLOYS

Series: **MTi4**

**4 FLUTE • REDUCED NECK VARIABLE HELIX FOR LONG REACH FOR ROUGHING & FINISHING**



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
5/16	5/16	7/16	2-1/8	4	0.015	MTi4-RN-M-0312-R015-C3	331580
5/16	5/16	7/16	2-1/8	4	0.030	MTi4-RN-M-0312-R030-C3	331600
5/16	5/16	7/16	2-1/8	4	0.060	MTi4-RN-M-0312-R060-C3	331620
5/16	5/16	7/16	2-1/8	4	0.090	MTi4-RN-M-0312-R090-C3	331640
5/16	5/16	7/16		4	0.015	MTi4-LS-0312-R015-C3	331680
5/16	5/16	7/16		4	0.030	MTi4-LS-0312-R030-C3	331700
5/16	5/16	7/16		4	0.060	MTi4-LS-0312-R060-C3	331720
5/16	5/16	7/16		4	0.090	MTi4-LS-0312-R090-C3	331740
3/8	3/8	1/2	1-1/8	4	0.015	MTi4-RN-S-0375-R015-C3	331780
3/8	3/8	1/2	1-1/8	4	0.020	MTi4-RN-S-0375-R020-C3	331800
3/8	3/8	1/2	1-1/8	4	0.030	MTi4-RN-S-0375-R030-C3	331820
3/8	3/8	1/2	1-1/8	4	0.060	MTi4-RN-S-0375-R060-C3	331840
3/8	3/8	1/2	1-1/8	4	0.090	MTi4-RN-S-0375-R090-C3	331860
3/8	3/8	1/2	1-1/8	4	0.120	MTi4-RN-S-0375-R120-C3	331880
3/8	3/8	1/2	2-1/8	4	0.015	MTi4-RN-R-0375-R015-C3	331920
3/8	3/8	1/2	2-1/8	4	0.020	MTi4-RN-R-0375-R020-C3	331940
3/8	3/8	1/2	2-1/8	4	0.030	MTi4-RN-R-0375-R030-C3	331960
3/8	3/8	1/2	2-1/8	4	0.060	MTi4-RN-R-0375-R060-C3	331980
3/8	3/8	1/2	2-1/8	4	0.090	MTi4-RN-R-0375-R090-C3	332000
3/8	3/8	1/2	2-1/8	4	0.120	MTi4-RN-R-0375-R120-C3	332020
3/8	3/8	1/2	3-1/8	6	0.015	MTi4-RN-M-0375-R015-C3	332060
3/8	3/8	1/2	3-1/8	6	0.020	MTi4-RN-M-0375-R020-C3	332080
3/8	3/8	1/2	3-1/8	6	0.030	MTi4-RN-M-0375-R030-C3	332100
3/8	3/8	1/2	3-1/8	6	0.060	MTi4-RN-M-0375-R060-C3	332120
3/8	3/8	1/2	3-1/8	6	0.090	MTi4-RN-M-0375-R090-C3	332140
3/8	3/8	1/2	3-1/8	6	0.120	MTi4-RN-M-0375-R120-C3	332160
3/8	3/8	1/2	4-1/8	6	0.015	MTi4-RN-L-0375-R015-C3	332200
3/8	3/8	1/2	4-1/8	6	0.020	MTi4-RN-L-0375-R020-C3	332220
3/8	3/8	1/2	4-1/8	6	0.030	MTi4-RN-L-0375-R030-C3	332240
3/8	3/8	1/2	4-1/8	6	0.060	MTi4-RN-L-0375-R060-C3	332260
3/8	3/8	1/2	4-1/8	6	0.090	MTi4-RN-L-0375-R090-C3	332280
3/8	3/8	1/2	4-1/8	6	0.120	MTi4-RN-L-0375-R120-C3	332300
3/8	3/8	1/2		6	0.015	MTi4-LS-0375-R015-C3	332340
3/8	3/8	1/2		6	0.020	MTi4-LS-0375-R020-C3	332360
3/8	3/8	1/2		6	0.030	MTi4-LS-0375-R030-C3	332380
3/8	3/8	1/2		6	0.060	MTi4-LS-0375-R060-C3	332400
3/8	3/8	1/2		6	0.090	MTi4-LS-0375-R090-C3	332420
3/8	3/8	1/2		6	0.120	MTi4-LS-0375-R120-C3	332440
1/2	1/2	5/8	1-1/2	4	0.015	MTi4-RN-S-0500-R015-C3	332480
1/2	1/2	5/8	1-1/2	4	0.030	MTi4-RN-S-0500-R030-C3	332500
1/2	1/2	5/8	1-1/2	4	0.060	MTi4-RN-S-0500-R060-C3	332520
1/2	1/2	5/8	1-1/2	4	0.090	MTi4-RN-S-0500-R090-C3	332540
1/2	1/2	5/8	1-1/2	4	0.120	MTi4-RN-S-0500-R120-C3	332560
1/2	1/2	5/8	1-1/2	4	0.156	MTi4-RN-S-0500-R156-C3	332580
1/2	1/2	5/8	1-1/2	4	0.190	MTi4-RN-S-0500-R190-C3	332600
1/2	1/2	5/8	2-1/4	4	0.015	MTi4-RN-R-0500-R015-C3	332640
1/2	1/2	5/8	2-1/4	4	0.030	MTi4-RN-R-0500-R030-C3	332660

Speed & Feed: 185-186

sizes continued on next page



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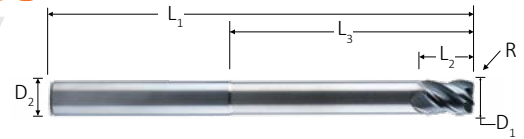
4 FLUTE • REDUCED NECK VARIABLE HELIX FOR LONG REACH  
FOR ROUGHING & FINISHING

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/2	1/2	5/8	2-1/4	4	0.060	MTI4-RN-R-0500-R060-C3	332680
1/2	1/2	5/8	2-1/4	4	0.090	MTI4-RN-R-0500-R090-C3	332700
1/2	1/2	5/8	2-1/4	4	0.120	MTI4-RN-R-0500-R120-C3	332720
1/2	1/2	5/8	2-1/4	4	0.156	MTI4-RN-R-0500-R156-C3	332740
1/2	1/2	5/8	2-1/4	4	0.190	MTI4-RN-R-0500-R190-C3	332760
1/2	1/2	5/8	3-3/8	6	0.015	MTI4-RN-M-0500-R015-C3	332800
1/2	1/2	5/8	3-3/8	6	0.030	MTI4-RN-M-0500-R030-C3	332820
1/2	1/2	5/8	3-3/8	6	0.060	MTI4-RN-M-0500-R060-C3	332840
1/2	1/2	5/8	3-3/8	6	0.090	MTI4-RN-M-0500-R090-C3	332860
1/2	1/2	5/8	3-3/8	6	0.120	MTI4-RN-M-0500-R120-C3	332880
1/2	1/2	5/8	3-3/8	6	0.156	MTI4-RN-M-0500-R156-C3	332900
1/2	1/2	5/8	3-3/8	6	0.190	MTI4-RN-M-0500-R190-C3	332920
1/2	1/2	5/8	4-1/8	6	0.015	MTI4-RN-L-0500-R015-C3	332960
1/2	1/2	5/8	4-1/8	6	0.030	MTI4-RN-L-0500-R030-C3	332980
1/2	1/2	5/8	4-1/8	6	0.060	MTI4-RN-L-0500-R060-C3	333000
1/2	1/2	5/8	4-1/8	6	0.090	MTI4-RN-L-0500-R090-C3	333020
1/2	1/2	5/8	4-1/8	6	0.120	MTI4-RN-L-0500-R120-C3	333040
1/2	1/2	5/8	4-1/8	6	0.156	MTI4-RN-L-0500-R156-C3	333060
1/2	1/2	5/8	4-1/8	6	0.190	MTI4-RN-L-0500-R190-C3	333080
1/2	1/2	5/8		6	0.015	MTI4-LS-0500-R015-C3	333120
1/2	1/2	5/8		6	0.030	MTI4-LS-0500-R030-C3	333140
1/2	1/2	5/8		6	0.060	MTI4-LS-0500-R060-C3	333160
1/2	1/2	5/8		6	0.090	MTI4-LS-0500-R090-C3	333180
1/2	1/2	5/8		6	0.120	MTI4-LS-0500-R120-C3	333200
1/2	1/2	5/8		6	0.156	MTI4-LS-0500-R156-C3	333220
1/2	1/2	5/8		6	0.190	MTI4-LS-0500-R190-C3	333240
1/2	1/2	5/8		8	0.015	MTI4-LS-XX-0500-R015-C3	333280
1/2	1/2	5/8		8	0.030	MTI4-LS-XX-0500-R030-C3	333300
1/2	1/2	5/8		8	0.060	MTI4-LS-XX-0500-R060-C3	333320
1/2	1/2	5/8		8	0.090	MTI4-LS-XX-0500-R090-C3	333340
1/2	1/2	5/8		8	0.120	MTI4-LS-XX-0500-R120-C3	333360
5/8	5/8	3/4	1-5/8	4	0.030	MTI4-RN-S-0625-R030-C3	333460
5/8	5/8	3/4	1-5/8	4	0.060	MTI4-RN-S-0625-R060-C3	333480
5/8	5/8	3/4	1-5/8	4	0.090	MTI4-RN-S-0625-R090-C3	333500
5/8	5/8	3/4	1-5/8	4	0.120	MTI4-RN-S-0625-R120-C3	333520
5/8	5/8	3/4	2-3/8	6	0.030	MTI4-RN-R-0625-R030-C3	333620
5/8	5/8	3/4	2-3/8	6	0.060	MTI4-RN-R-0625-R060-C3	333640
5/8	5/8	3/4	2-3/8	6	0.090	MTI4-RN-R-0625-R090-C3	333660
5/8	5/8	3/4	2-3/8	6	0.120	MTI4-RN-R-0625-R120-C3	333680
5/8	5/8	3/4	3-3/8	6	0.030	MTI4-RN-M-0625-R030-C3	333780
5/8	5/8	3/4	3-3/8	6	0.060	MTI4-RN-M-0625-R060-C3	333800
5/8	5/8	3/4	3-3/8	6	0.090	MTI4-RN-M-0625-R090-C3	333820
5/8	5/8	3/4	3-3/8	6	0.120	MTI4-RN-M-0625-R120-C3	333840
5/8	5/8	3/4	4-1/8	6	0.030	MTI4-RN-L-0625-R030-C3	333940
5/8	5/8	3/4	4-1/8	6	0.060	MTI4-RN-L-0625-R060-C3	333960
5/8	5/8	3/4	4-1/8	6	0.090	MTI4-RN-L-0625-R090-C3	333980
5/8	5/8	3/4	4-1/8	6	0.120	MTI4-RN-L-0625-R120-C3	334000

Speed &amp; Feed: 185-186

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## 4 FLUTE • REDUCED NECK VARIABLE HELIX FOR LONG REACH FOR ROUGHING & FINISHING

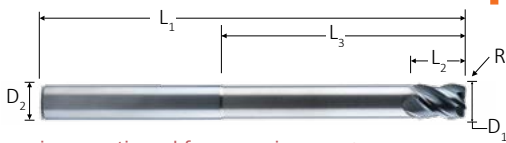


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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
5/8	5/8	3/4		6	0.015	MTi4-LS-0625-R015-C3	334080
5/8	5/8	3/4		6	0.030	MTi4-LS-0625-R030-C3	334100
5/8	5/8	3/4		6	0.060	MTi4-LS-0625-R060-C3	334120
5/8	5/8	3/4		6	0.090	MTi4-LS-0625-R090-C3	334140
5/8	5/8	3/4		6	0.120	MTi4-LS-0625-R120-C3	334160
3/4	3/4	1	2	4	0.030	MTi4-RN-S-0750-R030-C3	334260
3/4	3/4	1	2	4	0.060	MTi4-RN-S-0750-R060-C3	334280
3/4	3/4	1	2	4	0.090	MTi4-RN-S-0750-R090-C3	334300
3/4	3/4	1	2	4	0.120	MTi4-RN-S-0750-R120-C3	334320
3/4	3/4	1	2-1/2	6	0.015	MTi4-RN-R-0750-R015-C3	334420
3/4	3/4	1	2-1/2	6	0.030	MTi4-RN-R-0750-R030-C3	334440
3/4	3/4	1	2-1/2	6	0.060	MTi4-RN-R-0750-R060-C3	334460
3/4	3/4	1	2-1/2	6	0.090	MTi4-RN-R-0750-R090-C3	334480
3/4	3/4	1	2-1/2	6	0.120	MTi4-RN-R-0750-R120-C3	334500
3/4	3/4	1	2-1/2	6	0.190	MTi4-RN-R-0750-R190-C3	334540
3/4	3/4	1	2-1/2	6	0.250	MTi4-RN-R-0750-R250-C3	334560
3/4	3/4	1	3-3/8	6	0.015	MTi4-RN-M-0750-R015-C3	334600
3/4	3/4	1	3-3/8	6	0.030	MTi4-RN-M-0750-R030-C3	334620
3/4	3/4	1	3-3/8	6	0.060	MTi4-RN-M-0750-R060-C3	334640
3/4	3/4	1	3-3/8	6	0.090	MTi4-RN-M-0750-R090-C3	334660
3/4	3/4	1	3-3/8	6	0.120	MTi4-RN-M-0750-R120-C3	334680
3/4	3/4	1	3-3/8	6	0.190	MTi4-RN-M-0750-R190-C3	334720
3/4	3/4	1	3-3/8	6	0.250	MTi4-RN-M-0750-R250-C3	334740
3/4	3/4	1	4-1/8	6	0.015	MTi4-RN-L-0750-R015-C3	334780
3/4	3/4	1	4-1/8	6	0.030	MTi4-RN-L-0750-R030-C3	334800
3/4	3/4	1	4-1/8	6	0.060	MTi4-RN-L-0750-R060-C3	334820
3/4	3/4	1	4-1/8	6	0.090	MTi4-RN-L-0750-R090-C3	334840
3/4	3/4	1	4-1/8	6	0.120	MTi4-RN-L-0750-R120-C3	334860
3/4	3/4	1	4-1/8	6	0.190	MTi4-RN-L-0750-R190-C3	334900
3/4	3/4	1	4-1/8	6	0.250	MTi4-RN-L-0750-R250-C3	334920
3/4	3/4	1		6	0.015	MTi4-LS-0750-R015-C3	334960
3/4	3/4	1		6	0.030	MTi4-LS-0750-R030-C3	334980
3/4	3/4	1		6	0.060	MTi4-LS-0750-R060-C3	335000
3/4	3/4	1		6	0.090	MTi4-LS-0750-R090-C3	335020
3/4	3/4	1		6	0.120	MTi4-LS-0750-R120-C3	335040
3/4	3/4	1		6	0.190	MTi4-LS-0750-R190-C3	335080
3/4	3/4	1		6	0.250	MTi4-LS-0750-R250-C3	335100
3/4	3/4	1	4-7/8	7	0.030	MTi4-RN-X-0750-R030-C3	335160
3/4	3/4	1	4-7/8	7	0.060	MTi4-RN-X-0750-R060-C3	335180
3/4	3/4	1	4-7/8	7	0.090	MTi4-RN-X-0750-R090-C3	335200
3/4	3/4	1	4-7/8	7	0.120	MTi4-RN-X-0750-R120-C3	335220
3/4	3/4	1		7	0.030	MTi4-LS-X-0750-R030-C3	335340
3/4	3/4	1		7	0.060	MTi4-LS-X-0750-R060-C3	335360
3/4	3/4	1		7	0.090	MTi4-LS-X-0750-R090-C3	335380
3/4	3/4	1		7	0.120	MTi4-LS-X-0750-R120-C3	335400

**Speed & Feed: 185-186**

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4 FLUTE • REDUCED NECK VARIABLE HELIX FOR LONG REACH  
FOR ROUGHING & FINISHING

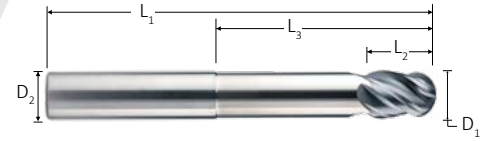
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
3/4	3/4	1		9	0.030	MTi4-LS-XX-0750-R030-C3	335520
3/4	3/4	1		9	0.060	MTi4-LS-XX-0750-R060-C3	335540
3/4	3/4	1		9	0.090	MTi4-LS-XX-0750-R090-C3	335560
3/4	3/4	1		9	0.120	MTi4-LS-XX-0750-R120-C3	335580
1	1	1-1/4	2-1/4	4	0.030	MTi4-RN-S-1000-R030-C3	335700
1	1	1-1/4	2-1/4	4	0.060	MTi4-RN-S-1000-R060-C3	335720
1	1	1-1/4	2-1/4	4	0.090	MTi4-RN-S-1000-R090-C3	335740
1	1	1-1/4	2-1/4	4	0.120	MTi4-RN-S-1000-R120-C3	335760
1	1	1-1/4	2-1/4	4	0.190	MTi4-RN-S-1000-R190-C3	335800
1	1	1-1/4	2-1/4	4	0.250	MTi4-RN-S-1000-R250-C3	335820
1	1	1-1/4	2-1/4	4	0.375	MTi4-RN-S-1000-R375-C3	335840
1	1	1-1/4	2-5/8	6	0.030	MTi4-RN-R-1000-R030-C3	335900
1	1	1-1/4	2-5/8	6	0.060	MTi4-RN-R-1000-R060-C3	335920
1	1	1-1/4	2-5/8	6	0.090	MTi4-RN-R-1000-R090-C3	335940
1	1	1-1/4	2-5/8	6	0.120	MTi4-RN-R-1000-R120-C3	335960
1	1	1-1/4	2-5/8	6	0.190	MTi4-RN-R-1000-R190-C3	336000
1	1	1-1/4	2-5/8	6	0.250	MTi4-RN-R-1000-R250-C3	336020
1	1	1-1/4	3-3/8	6	0.030	MTi4-RN-M-1000-R030-C3	336100
1	1	1-1/4	3-3/8	6	0.060	MTi4-RN-M-1000-R060-C3	336120
1	1	1-1/4	3-3/8	6	0.090	MTi4-RN-M-1000-R090-C3	336140
1	1	1-1/4	3-3/8	6	0.120	MTi4-RN-M-1000-R120-C3	336160
1	1	1-1/4	3-3/8	6	0.190	MTi4-RN-M-1000-R190-C3	336200
1	1	1-1/4	3-3/8	6	0.250	MTi4-RN-M-1000-R250-C3	336220
1	1	1-1/4	4-1/8	6	0.030	MTi4-RN-L-1000-R030-C3	336300
1	1	1-1/4	4-1/8	6	0.060	MTi4-RN-L-1000-R060-C3	336320
1	1	1-1/4	4-1/8	6	0.090	MTi4-RN-L-1000-R090-C3	336340
1	1	1-1/4	4-1/8	6	0.120	MTi4-RN-L-1000-R120-C3	336360
1	1	1-1/4	4-1/8	6	0.190	MTi4-RN-L-1000-R190-C3	336400
1	1	1-1/4	4-1/8	6	0.250	MTi4-RN-L-1000-R250-C3	336420
1	1	1-1/4		6	0.030	MTi4-LS-1000-R030-C3	336500
1	1	1-1/4		6	0.060	MTi4-LS-1000-R060-C3	336520
1	1	1-1/4		6	0.090	MTi4-LS-1000-R090-C3	336540
1	1	1-1/4		6	0.120	MTi4-LS-1000-R120-C3	336560
1	1	1-1/4		6	0.190	MTi4-LS-1000-R190-C3	336600
1	1	1-1/4		6	0.250	MTi4-LS-1000-R250-C3	336620
1	1	1-1/4	4-5/8	7	0.030	MTi4-RN-X-1000-R030-C3	336700
1	1	1-1/4	4-5/8	7	0.060	MTi4-RN-X-1000-R060-C3	336720
1	1	1-1/4	4-5/8	7	0.090	MTi4-RN-X-1000-R090-C3	336740
1	1	1-1/4	4-5/8	7	0.120	MTi4-RN-X-1000-R120-C3	336760
1	1	1-1/4		7	0.030	MTi4-LS-X-1000-R030-C3	336900
1	1	1-1/4		7	0.060	MTi4-LS-X-1000-R060-C3	336920
1	1	1-1/4		7	0.090	MTi4-LS-X-1000-R090-C3	336940
1	1	1-1/4		7	0.120	MTi4-LS-X-1000-R120-C3	336960
1	1	1-1/4		12-1/2	0.030	MTi4-LS-XX-1000-R030-C3	337100
1	1	1-1/4		12-1/2	0.060	MTi4-LS-XX-1000-R060-C3	337120
1	1	1-1/4		12-1/2	0.090	MTi4-LS-XX-1000-R090-C3	337140
1	1	1-1/4		12-1/2	0.120	MTi4-LS-XX-1000-R120-C3	337160

Speed & Feed: 185-186

No LBS Listed\* - Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck

## 4 FLUTE • BALL NOSE REDUCED NECK VARIABLE HELIX FOR LONG REACH FOR 3D PROFILING



- > 4 Flute Variable Pitch for reduced chatter and increased productivity
- > Substrate, geometry & coating optimized for Titanium & Stainless Steels
- > Excellent for 3D machining
- > Long OAL with reduced neck for clearing walls while reaching into deep pockets



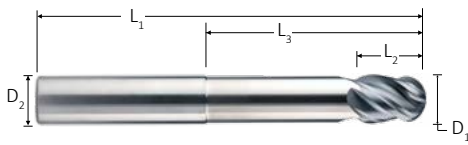
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1/8	1/8	3/16	3/8	2	Ball	MTi4-RN-S-0125-BN-C3	330570
1/8	1/8	3/16	1/2	2	Ball	MTi4-RN-R-0125-BN-C3	330650
1/8	1/8	3/16	3/4	2-1/2	Ball	MTi4-RN-M-0125-BN-C3	330730
3/16	3/16	1/4	1/2	2	Ball	MTi4-RN-S-0187-BN-C3	330810
3/16	3/16	1/4	3/4	2-1/2	Ball	MTi4-RN-R-0187-BN-C3	330890
3/16	3/16	1/4	1-1/8	2-1/2	Ball	MTi4-RN-M-0187-BN-C3	330970
1/4	1/4	3/8	3/4	4	Ball	MTi4-RN-S-0250-BN-C3	331090
1/4	1/4	3/8	1-1/8	4	Ball	MTi4-RN-R-0250-BN-C3	331210
1/4	1/4	3/8	2-1/8	4	Ball	MTi4-RN-M-0250-BN-C3	331330
1/4	1/4	3/8		4	Ball	MTi4-LS-0250-BN-C3	331450
5/16	5/16	7/16	1-1/8	4	Ball	MTi4-RN-R-0312-BN-C3	331550
5/16	5/16	7/16	2-1/8	4	Ball	MTi4-RN-M-0312-BN-C3	331650
5/16	5/16	7/16		4	Ball	MTi4-LS-0312-BN-C3	331750
3/8	3/8	1/2	1-1/8	4	Ball	MTi4-RN-S-0375-BN-C3	331890
3/8	3/8	1/2	2-1/8	4	Ball	MTi4-RN-R-0375-BN-C3	332030
3/8	3/8	1/2	3-1/8	6	Ball	MTi4-RN-M-0375-BN-C3	332170
3/8	3/8	1/2	4-1/8	6	Ball	MTi4-RN-L-0375-BN-C3	332310
3/8	3/8	1/2		6	Ball	MTi4-LS-0375-BN-C3	332450
1/2	1/2	5/8	1-1/2	4	Ball	MTi4-RN-S-0500-BN-C3	332610
1/2	1/2	5/8	2-1/4	4	Ball	MTi4-RN-R-0500-BN-C3	332770
1/2	1/2	5/8	3-3/8	6	Ball	MTi4-RN-M-0500-BN-C3	332930
1/2	1/2	5/8	4-1/8	6	Ball	MTi4-RN-L-0500-BN-C3	333090
1/2	1/2	5/8		6	Ball	MTi4-LS-0500-BN-C3	333250
1/2	1/2	5/8		8	Ball	MTi4-LS-XX-0500-BN-C3	333410
5/8	5/8	3/4	1-5/8	4	Ball	MTi4-RN-S-0625-BN-C3	333570
5/8	5/8	3/4	2-3/8	6	Ball	MTi4-RN-R-0625-BN-C3	333730
5/8	5/8	3/4	3-3/8	6	Ball	MTi4-RN-M-0625-BN-C3	333890
5/8	5/8	3/4	4-1/8	6	Ball	MTi4-RN-L-0625-BN-C3	334050
5/8	5/8	3/4		6	Ball	MTi4-LS-0625-BN-C3	334210
3/4	3/4	1	2-1/2	6	Ball	MTi4-RN-R-0750-BN-C3	334570
3/4	3/4	1	3-3/8	6	Ball	MTi4-RN-M-0750-BN-C3	334750
3/4	3/4	1	4-1/8	6	Ball	MTi4-RN-L-0750-BN-C3	334930
3/4	3/4	1		6	Ball	MTi4-LS-0750-BN-C3	335110
3/4	3/4	1	4-7/8	7	Ball	MTi4-RN-X-0750-BN-C3	335290
3/4	3/4	1		7	Ball	MTi4-LS-X-0750-BN-C3	335470
1	1	1-1/4	2-1/4	4	Ball	MTi4-RN-S-1000-BN-C3	335850
1	1	1-1/4	2-5/8	6	Ball	MTi4-RN-R-1000-BN-C3	336050

Speed & Feed: 185-186

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Series: **MTi4**

# TITANIUM ALLOYS & HIGH TEMP ALLOYS



**4 FLUTE • BALL NOSE REDUCED NECK VARIABLE HELIX FOR LONG REACH FOR 3D PROFILING**

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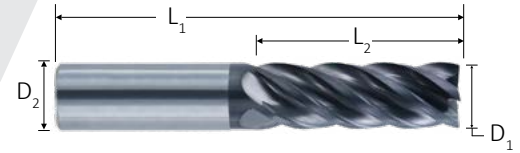
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1	1	1-1/4	3-3/8	6	Ball	MTi4-RN-M-1000-BN-C3	336250
1	1	1-1/4	4-1/8	6	Ball	MTi4-RN-L-1000-BN-C3	336450
1	1	1-1/4		6	Ball	MTi4-LS-1000-BN-C3	336650
1	1	1-1/4	4-5/8	7	Ball	MTi4-RN-X-1000-BN-C3	336850
1	1	1-1/4		7	Ball	MTi4-LS-X-1000-BN-C3	337050
1	1	1-1/4		12-1/2	Ball	MTi4-LS-XX-1000-BN-C3	337250

**Speed & Feed: 185-186**

No LBS Listed\* - Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck

## 5 FLUTE • VARIABLE INDEX FOR ROUGHING & FINISHING

- > 5 Flute Variable Pitch for reduced chatter and increased productivity over 4 flute
- > Substrate, geometry & coating optimized for Titanium and Stainless Steels
- > For slotting, peripheral milling, trochoidal & high efficiency milling



Carbide	5	Center Cutting	variable	C3	+0.000 -0.002	Square						HRC <54	M S
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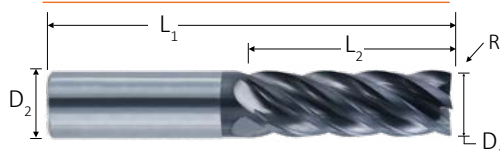
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1/8	1/8	1/4	1-1/2	SQ	MTI5-S-0125-SQ-C3	300500
1/8	1/8	1/2	2	SQ	MTI5-R-0125-SQ-C3	300580
1/8	1/8	3/4	2-1/2	SQ	MTI5-M-0125-SQ-C3	300660
3/16	3/16	5/16	2	SQ	MTI5-S-0187-SQ-C3	300740
3/16	3/16	9/16	2-1/2	SQ	MTI5-R-0187-SQ-C3	300820
3/16	3/16	3/4	2-1/2	SQ	MTI5-M-0187-SQ-C3	300900
1/4	1/4	3/8	2	SQ	MTI5-S-0250-SQ-C3	300980
1/4	1/4	1/2	2-1/2	SQ	MTI5-SR-0250-SQ-C3	301100
1/4	1/4	3/4	2-1/2	SQ	MTI5-R-0250-SQ-C3	301220
1/4	1/4	1-1/4	3	SQ	MTI5-L-0250-SQ-C3	301340
5/16	5/16	7/16	2	SQ	MTI5-S-0312-SQ-C3	301460
5/16	5/16	13/16	2-1/2	SQ	MTI5-R-0312-SQ-C3	301560
5/16	5/16	1	3	SQ	MTI5-M-0312-SQ-C3	301660
3/8	3/8	1/2	2	SQ	MTI5-S-0375-SQ-C3	301760
3/8	3/8	1	2-1/2	SQ	MTI5-R-0375-SQ-C3	301900
3/8	3/8	1-1/4	3	SQ	MTI5-M-0375-SQ-C3	302040
3/8	3/8	1-3/4	4	SQ	MTI5-L-0375-SQ-C3	302180
1/2	1/2	5/8	2-1/2	SQ	MTI5-S-0500-SQ-C3	302320
1/2	1/2	1	3	SQ	MTI5-SR-0500-SQ-C3	302480
1/2	1/2	1-1/4	3	SQ	MTI5-R-0500-SQ-C3	302640
1/2	1/2	1-5/8	4	SQ	MTI5-M-0500-SQ-C3	302800
1/2	1/2	2	4	SQ	MTI5-L-0500-SQ-C3	302960
5/8	5/8	3/4	3	SQ	MTI5-S-0625-SQ-C3	303120
5/8	5/8	1-1/4	3-1/2	SQ	MTI5-SR-0625-SQ-C3	303280
5/8	5/8	1-5/8	3-1/2	SQ	MTI5-R-0625-SQ-C3	303440
5/8	5/8	2-1/8	4	SQ	MTI5-M-0625-SQ-C3	303600
5/8	5/8	2-1/2	5	SQ	MTI5-L-0625-SQ-C3	303760
3/4	3/4	1	3	SQ	MTI5-S-0750-SQ-C3	303920
3/4	3/4	1-5/8	4	SQ	MTI5-R-0750-SQ-C3	304100
3/4	3/4	2-1/4	5	SQ	MTI5-M-0750-SQ-C3	304280
3/4	3/4	2-3/4	5	SQ	MTI5-L-0750-SQ-C3	304460
3/4	3/4	3-1/4	6	SQ	MTI5-LX-0750-SQ-C3	304640
1	1	1-1/4	4	SQ	MTI5-S-1000-SQ-C3	304820
1	1	2	4-1/2	SQ	MTI5-R-1000-SQ-C3	305020
1	1	2-5/8	5	SQ	MTI5-M-1000-SQ-C3	305220
1	1	3-1/4	6	SQ	MTI5-L-1000-SQ-C3	305420
1	1	4-1/4	7	SQ	MTI5-X-1000-SQ-C3	305620

Speed & Feed: 187-188



Series: **MTi5**

# TITANIUM ALLOYS & HIGH TEMP ALLOYS



## 5 FLUTE • VARIABLE INDEX FOR ROUGHING & FINISHING

- ▶ 5 Flute Variable Pitch for reduced chatter and increased productivity over 4 flute
- ▶ Substrate, geometry & coating optimized for Titanium and Stainless Steels
- ▶ For slotting, peripheral milling, trochoidal & high efficiency milling

Carbide	5	Center Cutting	variable	C3	+0.000 -0.002	Radius							HRC <54	M S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/8	1/8	1/4	1-1/2	0.010	MTi5-S-0125-R010-C3	300520
1/8	1/8	1/4	1-1/2	0.015	MTi5-S-0125-R015-C3	300540
1/8	1/8	1/4	1-1/2	0.030	MTi5-S-0125-R030-C3	300560
1/8	1/8	1/2	2	0.010	MTi5-R-0125-R010-C3	300600
1/8	1/8	1/2	2	0.015	MTi5-R-0125-R015-C3	300620
1/8	1/8	1/2	2	0.030	MTi5-R-0125-R030-C3	300640
1/8	1/8	3/4	2-1/2	0.010	MTi5-M-0125-R010-C3	300680
1/8	1/8	3/4	2-1/2	0.015	MTi5-M-0125-R015-C3	300700
1/8	1/8	3/4	2-1/2	0.030	MTi5-M-0125-R030-C3	300720
3/16	3/16	5/16	2	0.010	MTi5-S-0187-R010-C3	300760
3/16	3/16	5/16	2	0.015	MTi5-S-0187-R015-C3	300780
3/16	3/16	5/16	2	0.030	MTi5-S-0187-R030-C3	300800
3/16	3/16	9/16	2-1/2	0.010	MTi5-R-0187-R010-C3	300840
3/16	3/16	9/16	2-1/2	0.015	MTi5-R-0187-R015-C3	300860
3/16	3/16	9/16	2-1/2	0.030	MTi5-R-0187-R030-C3	300880
3/16	3/16	3/4	2-1/2	0.010	MTi5-M-0187-R010-C3	300920
3/16	3/16	3/4	2-1/2	0.015	MTi5-M-0187-R015-C3	300940
3/16	3/16	3/4	2-1/2	0.030	MTi5-M-0187-R030-C3	300960
1/4	1/4	3/8	2	0.015	MTi5-S-0250-R015-C3	301000
1/4	1/4	3/8	2	0.020	MTi5-S-0250-R020-C3	301020
1/4	1/4	3/8	2	0.030	MTi5-S-0250-R030-C3	301040
1/4	1/4	3/8	2	0.060	MTi5-S-0250-R060-C3	301060
1/4	1/4	3/8	2	0.090	MTi5-S-0250-R090-C3	301080
1/4	1/4	1/2	2-1/2	0.015	MTi5-SR-0250-R015-C3	301120
1/4	1/4	1/2	2-1/2	0.020	MTi5-SR-0250-R020-C3	301140
1/4	1/4	1/2	2-1/2	0.030	MTi5-SR-0250-R030-C3	301160
1/4	1/4	1/2	2-1/2	0.060	MTi5-SR-0250-R060-C3	301180
1/4	1/4	1/2	2-1/2	0.090	MTi5-SR-0250-R090-C3	301200
1/4	1/4	3/4	2-1/2	0.015	MTi5-R-0250-R015-C3	301240
1/4	1/4	3/4	2-1/2	0.020	MTi5-R-0250-R020-C3	301260
1/4	1/4	3/4	2-1/2	0.030	MTi5-R-0250-R030-C3	301280
1/4	1/4	3/4	2-1/2	0.060	MTi5-R-0250-R060-C3	301300
1/4	1/4	3/4	2-1/2	0.090	MTi5-R-0250-R090-C3	301320
1/4	1/4	1	3	0.020	MTi5-RL-0250-R020-C3	301333
1/4	1/4	1-1/4	3	0.015	MTi5-L-0250-R015-C3	301360
1/4	1/4	1-1/4	3	0.020	MTi5-L-0250-R020-C3	301380
1/4	1/4	1-1/4	3	0.030	MTi5-L-0250-R030-C3	301400
1/4	1/4	1-1/4	3	0.060	MTi5-L-0250-R060-C3	301420
5/16	5/16	7/16	2	0.015	MTi5-S-0312-R015-C3	301480
5/16	5/16	7/16	2	0.030	MTi5-S-0312-R030-C3	301500
5/16	5/16	7/16	2	0.060	MTi5-S-0312-R060-C3	301520
5/16	5/16	13/16	2-1/2	0.015	MTi5-R-0312-R015-C3	301580
5/16	5/16	13/16	2-1/2	0.030	MTi5-R-0312-R030-C3	301600

sizes continued on next page

## 5 FLUTE • VARIABLE INDEX FOR ROUGHING & FINISHING



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
5/16	5/16	13/16	2-1/2	0.060	MTi5-R-0312-R060-C3	301620
5/16	5/16	1	3	0.015	MTi5-M-0312-R015-C3	301680
5/16	5/16	1	3	0.030	MTi5-M-0312-R030-C3	301700
5/16	5/16	1	3	0.060	MTi5-M-0312-R060-C3	301720
3/8	3/8	1/2	2	0.015	MTi5-S-0375-R015-C3	301780
3/8	3/8	1/2	2	0.020	MTi5-S-0375-R020-C3	301800
3/8	3/8	1/2	2	0.030	MTi5-S-0375-R030-C3	301820
3/8	3/8	1/2	2	0.060	MTi5-S-0375-R060-C3	301840
3/8	3/8	1/2	2	0.090	MTi5-S-0375-R090-C3	301860
3/8	3/8	1/2	2	0.120	MTi5-S-0375-R120-C3	301880
3/8	3/8	1	2-1/2	0.015	MTi5-R-0375-R015-C3	301920
3/8	3/8	1	2-1/2	0.020	MTi5-R-0375-R020-C3	301940
3/8	3/8	1	2-1/2	0.030	MTi5-R-0375-R030-C3	301960
3/8	3/8	1	2-1/2	0.060	MTi5-R-0375-R060-C3	301980
3/8	3/8	1	2-1/2	0.090	MTi5-R-0375-R090-C3	302000
3/8	3/8	1	2-1/2	0.120	MTi5-R-0375-R120-C3	302020
3/8	3/8	1-1/4	3	0.015	MTi5-M-0375-R015-C3	302060
3/8	3/8	1-1/4	3	0.020	MTi5-M-0375-R020-C3	302080
3/8	3/8	1-1/4	3	0.030	MTi5-M-0375-R030-C3	302100
3/8	3/8	1-1/4	3	0.060	MTi5-M-0375-R060-C3	302120
3/8	3/8	1-1/4	3	0.090	MTi5-M-0375-R090-C3	302140
3/8	3/8	1-1/4	3	0.120	MTi5-M-0375-R120-C3	302160
3/8	3/8	1-3/4	4	0.015	MTi5-L-0375-R015-C3	302200
3/8	3/8	1-3/4	4	0.020	MTi5-L-0375-R020-C3	302220
3/8	3/8	1-3/4	4	0.030	MTi5-L-0375-R030-C3	302240
3/8	3/8	1-3/4	4	0.060	MTi5-L-0375-R060-C3	302260
3/8	3/8	1-3/4	4	0.090	MTi5-L-0375-R090-C3	302280
3/8	3/8	1-3/4	4	0.120	MTi5-L-0375-R120-C3	302300
1/2	1/2	5/8	2-1/2	0.015	MTi5-S-0500-R015-C3	302340
1/2	1/2	5/8	2-1/2	0.020	MTi5-S-0500-R020-C3	302350
1/2	1/2	5/8	2-1/2	0.030	MTi5-S-0500-R030-C3	302360
1/2	1/2	5/8	2-1/2	0.060	MTi5-S-0500-R060-C3	302380
1/2	1/2	5/8	2-1/2	0.090	MTi5-S-0500-R090-C3	302400
1/2	1/2	5/8	2-1/2	0.120	MTi5-S-0500-R120-C3	302420
1/2	1/2	5/8	2-1/2	0.156	MTi5-S-0500-R156-C3	302440
1/2	1/2	1	3	0.015	MTi5-SR-0500-R015-C3	302500
1/2	1/2	1	3	0.020	MTi5-SR-0500-R020-C3	302510
1/2	1/2	1	3	0.030	MTi5-SR-0500-R030-C3	302520
1/2	1/2	1	3	0.060	MTi5-SR-0500-R060-C3	302540
1/2	1/2	1	3	0.090	MTi5-SR-0500-R090-C3	302560
1/2	1/2	1	3	0.120	MTi5-SR-0500-R120-C3	302580
1/2	1/2	1-1/4	3	0.015	MTi5-R-0500-R015-C3	302660
1/2	1/2	1-1/4	3	0.020	MTi5-R-0500-R020-C3	302670
1/2	1/2	1-1/4	3	0.030	MTi5-R-0500-R030-C3	302680
1/2	1/2	1-1/4	3	0.060	MTi5-R-0500-R060-C3	302700
1/2	1/2	1-1/4	3	0.090	MTi5-R-0500-R090-C3	302720

Speed & Feed: 187-188

sizes continued on next page

**5 FLUTE • VARIABLE INDEX FOR ROUGHING & FINISHING**

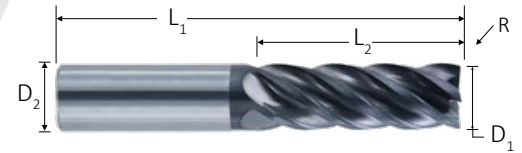
sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/2	1/2	1-1/4	3	0.120	MTI5-R-0500-R120-C3	302740
1/2	1/2	1-1/4	3	0.156	MTI5-R-0500-R156-C3	302760
1/2	1/2	1-1/4	3	0.190	MTI5-R-0500-R190-C3	302780
1/2	1/2	1-5/8	4	0.015	MTI5-M-0500-R015-C3	302820
1/2	1/2	1-5/8	4	0.030	MTI5-M-0500-R030-C3	302840
1/2	1/2	1-5/8	4	0.060	MTI5-M-0500-R060-C3	302860
1/2	1/2	1-5/8	4	0.090	MTI5-M-0500-R090-C3	302880
1/2	1/2	1-5/8	4	0.120	MTI5-M-0500-R120-C3	302900
1/2	1/2	1-5/8	4	0.190	MTI5-M-0500-R190-C3	302940
1/2	1/2	2	4	0.015	MTI5-L-0500-R015-C3	302980
1/2	1/2	2	4	0.030	MTI5-L-0500-R030-C3	303000
1/2	1/2	2	4	0.060	MTI5-L-0500-R060-C3	303020
1/2	1/2	2	4	0.090	MTI5-L-0500-R090-C3	303040
1/2	1/2	2	4	0.120	MTI5-L-0500-R120-C3	303060
5/8	5/8	3/4	3	0.015	MTI5-S-0625-R015-C3	303140
5/8	5/8	3/4	3	0.030	MTI5-S-0625-R030-C3	303160
5/8	5/8	3/4	3	0.060	MTI5-S-0625-R060-C3	303180
5/8	5/8	3/4	3	0.090	MTI5-S-0625-R090-C3	303200
5/8	5/8	3/4	3	0.120	MTI5-S-0625-R120-C3	303220
5/8	5/8	1-1/4	3-1/2	0.015	MTI5-SR-0625-R015-C3	303300
5/8	5/8	1-1/4	3-1/2	0.030	MTI5-SR-0625-R030-C3	303320
5/8	5/8	1-1/4	3-1/2	0.060	MTI5-SR-0625-R060-C3	303340
5/8	5/8	1-1/4	3-1/2	0.090	MTI5-SR-0625-R090-C3	303360
5/8	5/8	1-1/4	3-1/2	0.120	MTI5-SR-0625-R120-C3	303380
5/8	5/8	1-1/4	3-1/2	0.156	MTI5-SR-0625-R156-C3	303400
5/8	5/8	1-1/4	3-1/2	0.190	MTI5-SR-0625-R190-C3	303420
5/8	5/8	1-5/8	3-1/2	0.015	MTI5-R-0625-R015-C3	303460
5/8	5/8	1-5/8	3-1/2	0.030	MTI5-R-0625-R030-C3	303480
5/8	5/8	1-5/8	3-1/2	0.060	MTI5-R-0625-R060-C3	303500
5/8	5/8	1-5/8	3-1/2	0.090	MTI5-R-0625-R090-C3	303520
5/8	5/8	1-5/8	3-1/2	0.120	MTI5-R-0625-R120-C3	303540
5/8	5/8	1-5/8	3-1/2	0.156	MTI5-R-0625-R156-C3	303560
5/8	5/8	1-5/8	3-1/2	0.190	MTI5-R-0625-R190-C3	303580
5/8	5/8	2-1/8	4	0.015	MTI5-M-0625-R015-C3	303620
5/8	5/8	2-1/8	4	0.030	MTI5-M-0625-R030-C3	303640
5/8	5/8	2-1/8	4	0.060	MTI5-M-0625-R060-C3	303660
5/8	5/8	2-1/8	4	0.090	MTI5-M-0625-R090-C3	303680
5/8	5/8	2-1/8	4	0.120	MTI5-M-0625-R120-C3	303700
5/8	5/8	2-1/2	5	0.015	MTI5-L-0625-R015-C3	303780
5/8	5/8	2-1/2	5	0.030	MTI5-L-0625-R030-C3	303800
5/8	5/8	2-1/2	5	0.060	MTI5-L-0625-R060-C3	303820
5/8	5/8	2-1/2	5	0.090	MTI5-L-0625-R090-C3	303840
5/8	5/8	2-1/2	5	0.120	MTI5-L-0625-R120-C3	303860
3/4	3/4	1	3	0.015	MTI5-S-0750-R015-C3	303940
3/4	3/4	1	3	0.030	MTI5-S-0750-R030-C3	303960

**Speed & Feed: 187-188**

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## 5 FLUTE • VARIABLE INDEX FOR ROUGHING & FINISHING



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
3/4	3/4	1	3	0.060	MTi5-S-0750-R060-C3	303980
3/4	3/4	1	3	0.090	MTi5-S-0750-R090-C3	304000
3/4	3/4	1	3	0.120	MTi5-S-0750-R120-C3	304020
3/4	3/4	1-5/8	4	0.015	MTi5-R-0750-R015-C3	304120
3/4	3/4	1-5/8	4	0.030	MTi5-R-0750-R030-C3	304140
3/4	3/4	1-5/8	4	0.060	MTi5-R-0750-R060-C3	304160
3/4	3/4	1-5/8	4	0.090	MTi5-R-0750-R090-C3	304180
3/4	3/4	1-5/8	4	0.120	MTi5-R-0750-R120-C3	304200
3/4	3/4	1-5/8	4	0.156	MTi5-R-0750-R156-C3	304220
3/4	3/4	1-5/8	4	0.190	MTi5-R-0750-R190-C3	304240
3/4	3/4	1-5/8	4	0.250	MTi5-R-0750-R250-C3	304260
3/4	3/4	2-1/4	5	0.015	MTi5-M-0750-R015-C3	304300
3/4	3/4	2-1/4	5	0.030	MTi5-M-0750-R030-C3	304320
3/4	3/4	2-1/4	5	0.060	MTi5-M-0750-R060-C3	304340
3/4	3/4	2-1/4	5	0.090	MTi5-M-0750-R090-C3	304360
3/4	3/4	2-1/4	5	0.120	MTi5-M-0750-R120-C3	304380
3/4	3/4	2-1/4	5	0.190	MTi5-M-0750-R190-C3	304420
3/4	3/4	2-1/4	5	0.250	MTi5-M-0750-R250-C3	304440
3/4	3/4	2-3/4	5	0.015	MTi5-L-0750-R015-C3	304480
3/4	3/4	2-3/4	5	0.030	MTi5-L-0750-R030-C3	304500
3/4	3/4	2-3/4	5	0.060	MTi5-L-0750-R060-C3	304520
3/4	3/4	2-3/4	5	0.090	MTi5-L-0750-R090-C3	304540
3/4	3/4	2-3/4	5	0.120	MTi5-L-0750-R120-C3	304560
3/4	3/4	2-3/4	5	0.190	MTi5-L-0750-R190-C3	304600
3/4	3/4	2-3/4	5	0.250	MTi5-L-0750-R250-C3	304620
3/4	3/4	3-1/4	6	0.015	MTi5-LX-0750-R015-C3	304660
3/4	3/4	3-1/4	6	0.030	MTi5-LX-0750-R030-C3	304680
3/4	3/4	3-1/4	6	0.060	MTi5-LX-0750-R060-C3	304700
3/4	3/4	3-1/4	6	0.090	MTi5-LX-0750-R090-C3	304720
3/4	3/4	3-1/4	6	0.120	MTi5-LX-0750-R120-C3	304740
3/4	3/4	3-1/4	6	0.156	MTi5-LX-0750-R156-C3	304760
3/4	3/4	3-1/4	6	0.190	MTi5-LX-0750-R190-C3	304780
1	1	1-1/4	4	0.015	MTi5-S-1000-R015-C3	304840
1	1	1-1/4	4	0.030	MTi5-S-1000-R030-C3	304860
1	1	1-1/4	4	0.060	MTi5-S-1000-R060-C3	304880
1	1	1-1/4	4	0.090	MTi5-S-1000-R090-C3	304900
1	1	1-1/4	4	0.120	MTi5-S-1000-R120-C3	304920
1	1	1-1/4	4	0.190	MTi5-S-1000-R190-C3	304960
1	1	1-1/4	4	0.250	MTi5-S-1000-R250-C3	304980
1	1	2	4-1/2	0.030	MTi5-R-1000-R030-C3	305060
1	1	2	4-1/2	0.060	MTi5-R-1000-R060-C3	305080
1	1	2	4-1/2	0.090	MTi5-R-1000-R090-C3	305100
1	1	2	4-1/2	0.120	MTi5-R-1000-R120-C3	305120
1	1	2	4-1/2	0.250	MTi5-R-1000-R250-C3	305180
1	1	2-5/8	5	0.015	MTi5-M-1000-R015-C3	305240

Speed & Feed: 187-188

sizes continued on next page

Series: **MTi5**

# TITANIUM ALLOYS & HIGH TEMP ALLOYS



sizes continued from previous page

**5 FLUTE • VARIABLE INDEX FOR ROUGHING & FINISHING**

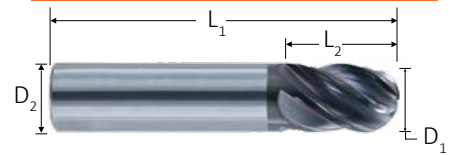
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1	1	2-5/8	5	0.030	MTi5-M-1000-R030-C3	305260
1	1	2-5/8	5	0.060	MTi5-M-1000-R060-C3	305280
1	1	2-5/8	5	0.090	MTi5-M-1000-R090-C3	305300
1	1	2-5/8	5	0.120	MTi5-M-1000-R120-C3	305320
1	1	2-5/8	5	0.156	MTi5-M-1000-R156-C3	305340
1	1	2-5/8	5	0.190	MTi5-M-1000-R190-C3	305360
1	1	3-1/4	6	0.015	MTi5-L-1000-R015-C3	305440
1	1	3-1/4	6	0.030	MTi5-L-1000-R030-C3	305460
1	1	3-1/4	6	0.060	MTi5-L-1000-R060-C3	305480
1	1	3-1/4	6	0.090	MTi5-L-1000-R090-C3	305500
1	1	3-1/4	6	0.120	MTi5-L-1000-R120-C3	305520
1	1	3-1/4	6	0.190	MTi5-L-1000-R190-C3	305560
1	1	3-1/4	6	0.250	MTi5-L-1000-R250-C3	305580
1	1	3-1/4	6	0.375	MTi5-L-1000-R375-C3	305600
1	1	4-1/4	7	0.015	MTi5-X-1000-R015-C3	305640
1	1	4-1/4	7	0.030	MTi5-X-1000-R030-C3	305660
1	1	4-1/4	7	0.060	MTi5-X-1000-R060-C3	305680
1	1	4-1/4	7	0.090	MTi5-X-1000-R090-C3	305700
1	1	4-1/4	7	0.120	MTi5-X-1000-R120-C3	305720
1	1	4-1/4	7	0.190	MTi5-X-1000-R190-C3	305760
1	1	4-1/4	7	0.250	MTi5-X-1000-R250-C3	305780
1-1/4	1-1/4	2	4-1/2	0.060	MTi5-R-1250-R060-C3	305880

**Speed & Feed: 187-188**

# TITANIUM ALLOYS & HIGH TEMP ALLOYS

Series: **MTi5**

## 5 FLUTE • BALL NOSE VARIABLE INDEX FOR 3D PROFILING ROUGHING & FINISHING

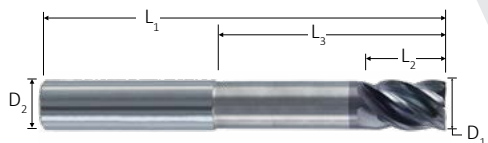


- > 5 Flute Variable Pitch for reduced chatter and increased productivity over 4 flute
- > Substrate, geometry & coating optimized for Titanium & Stainless Steels
- > Excellent for 3D machining

Carbide	5	Center Cutting	variable	C3	+0.000 -0.002	+0.0005 -0.0005 <1/8	Ball				HRC <54	M S
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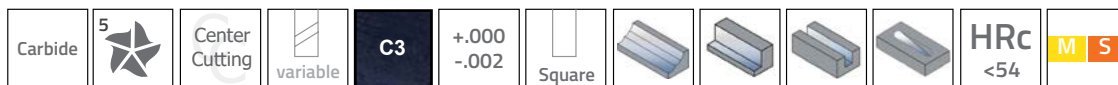
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1/8	1/8	1/4	1-1/2	Ball	MTi5-S-0125-BN-C3	300570
1/8	1/8	1/2	2	Ball	MTi5-R-0125-BN-C3	300650
1/8	1/8	3/4	2-1/2	Ball	MTi5-M-0125-BN-C3	300730
3/16	3/16	5/16	2	Ball	MTi5-S-0187-BN-C3	300810
3/16	3/16	9/16	2-1/2	Ball	MTi5-R-0187-BN-C3	300890
3/16	3/16	3/4	2-1/2	Ball	MTi5-M-0187-BN-C3	300970
1/4	1/4	3/8	2	Ball	MTi5-S-0250-BN-C3	301090
1/4	1/4	1/2	2-1/2	Ball	MTi5-SR-0250-BN-C3	301210
1/4	1/4	3/4	2-1/2	Ball	MTi5-R-0250-BN-C3	301330
1/4	1/4	1-1/4	3	Ball	MTi5-L-0250-BN-C3	301450
5/16	5/16	7/16	2	Ball	MTi5-S-0312-BN-C3	301550
5/16	5/16	13/16	2-1/2	Ball	MTi5-R-0312-BN-C3	301650
5/16	5/16	1	3	Ball	MTi5-M-0312-BN-C3	301750
3/8	3/8	1/2	2	Ball	MTi5-S-0375-BN-C3	301890
3/8	3/8	1	2-1/2	Ball	MTi5-R-0375-BN-C3	302030
3/8	3/8	1-1/4	3	Ball	MTi5-M-0375-BN-C3	302170
3/8	3/8	1-3/4	4	Ball	MTi5-L-0375-BN-C3	302310
1/2	1/2	5/8	2-1/2	Ball	MTi5-S-0500-BN-C3	302470
1/2	1/2	1	3	Ball	MTi5-SR-0500-BN-C3	302630
1/2	1/2	1-1/4	3	Ball	MTi5-R-0500-BN-C3	302790
1/2	1/2	1-5/8	4	Ball	MTi5-M-0500-BN-C3	302950
1/2	1/2	2	4	Ball	MTi5-L-0500-BN-C3	303110
5/8	5/8	3/4	3	Ball	MTi5-S-0625-BN-C3	303270
5/8	5/8	1-1/4	3-1/2	Ball	MTi5-SR-0625-BN-C3	303430
5/8	5/8	1-5/8	3-1/2	Ball	MTi5-R-0625-BN-C3	303590
5/8	5/8	2-1/2	5	Ball	MTi5-L-0625-BN-C3	303910
3/4	3/4	1	3	Ball	MTi5-S-0750-BN-C3	304090
3/4	3/4	1-5/8	4	Ball	MTi5-R-0750-BN-C3	304270
3/4	3/4	2-1/4	5	Ball	MTi5-M-0750-BN-C3	304450
1	1	1-1/4	4	Ball	MTi5-S-1000-BN-C3	305010
1	1	2-5/8	5	Ball	MTi5-M-1000-BN-C3	305410

**Speed & Feed: 187-188**



## 5 FLUTE • REDUCED NECK VARIABLE INDEX FOR LONG REACH ROUGHING & FINISHING

- ▶ 5 Flute Variable Pitch for reduced chatter and increase productivity
- ▶ Substrate, geometry & coating optimized for Titanium & Stainless Steels
- ▶ For slotting, peripheral milling, trochoidal & high efficiency milling
- ▶ Long OAL with reduced neck for clearing walls while reaching into deep pockets



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1/8	1/8	3/16	3/8	2	SQ	MTi5-RN-S-0125-SQ-C3	310500
1/8	1/8	3/16	1/2	2	SQ	MTi5-RN-R-0125-SQ-C3	310580
1/8	1/8	3/16	3/4	2-1/2	SQ	MTi5-RN-M-0125-SQ-C3	310660
3/16	3/16	1/4	1/2	2	SQ	MTi5-RN-S-0187-SQ-C3	310740
3/16	3/16	1/4	3/4	2-1/2	SQ	MTi5-RN-R-0187-SQ-C3	310820
3/16	3/16	1/4	1-1/8	2-1/2	SQ	MTi5-RN-M-0187-SQ-C3	310900
1/4	1/4	3/8	3/4	4	SQ	MTi5-RN-S-0250-SQ-C3	310980
1/4	1/4	3/8	1-1/8	4	SQ	MTi5-RN-R-0250-SQ-C3	311100
1/4	1/4	3/8	2-1/8	4	SQ	MTi5-RN-M-0250-SQ-C3	311220
1/4	1/4	3/8		4	SQ	MTi5-LS-0250-SQ-C3	311340
5/16	5/16	7/16	1-1/8	4	SQ	MTi5-RN-R-0312-SQ-C3	311460
5/16	5/16	7/16	2-1/8	4	SQ	MTi5-RN-M-0312-SQ-C3	311560
5/16	5/16	7/16		4	SQ	MTi5-LS-0312-SQ-C3	311660
3/8	3/8	1/2	1-1/8	4	SQ	MTi5-RN-S-0375-SQ-C3	311760
3/8	3/8	1/2	2-1/8	4	SQ	MTi5-RN-R-0375-SQ-C3	311900
3/8	3/8	1/2	3-1/8	6	SQ	MTi5-RN-M-0375-SQ-C3	312040
3/8	3/8	1/2	4-1/8	6	SQ	MTi5-RN-L-0375-SQ-C3	312180
3/8	3/8	1/2		6	SQ	MTi5-LS-0375-SQ-C3	312320
1/2	1/2	5/8	1-1/2	4	SQ	MTi5-RN-S-0500-SQ-C3	312460
1/2	1/2	5/8	2-1/4	4	SQ	MTi5-RN-R-0500-SQ-C3	312620
1/2	1/2	5/8	3-3/8	6	SQ	MTi5-RN-M-0500-SQ-C3	312780
1/2	1/2	5/8	4-1/8	6	SQ	MTi5-RN-L-0500-SQ-C3	312940
1/2	1/2	5/8		6	SQ	MTi5-LS-0500-SQ-C3	313100
1/2	1/2	5/8		8	SQ	MTi5-LS-XX-0500-SQ-C3	313260
5/8	5/8	3/4	1-5/8	4	SQ	MTi5-RN-S-0625-SQ-C3	313420
5/8	5/8	3/4	2-3/8	6	SQ	MTi5-RN-R-0625-SQ-C3	313580
5/8	5/8	3/4	3-3/8	6	SQ	MTi5-RN-M-0625-SQ-C3	313740
5/8	5/8	3/4	4-1/8	6	SQ	MTi5-RN-L-0625-SQ-C3	313900
5/8	5/8	3/4		6	SQ	MTi5-LS-0625-SQ-C3	314060
3/4	3/4	1	2	4	SQ	MTi5-RN-S-0750-SQ-C3	314220
3/4	3/4	1	2-1/2	6	SQ	MTi5-RN-R-0750-SQ-C3	314400
3/4	3/4	1	3-3/8	6	SQ	MTi5-RN-M-0750-SQ-C3	314580
3/4	3/4	1	4-1/8	6	SQ	MTi5-RN-L-0750-SQ-C3	314760
3/4	3/4	1		6	SQ	MTi5-LS-0750-SQ-C3	314940
3/4	3/4	1	4-7/8	7	SQ	MTi5-RN-X-0750-SQ-C3	315120
3/4	3/4	1		7	SQ	MTi5-LS-X-0750-SQ-C3	315300
3/4	3/4	1		9	SQ	MTi5-LS-XX-0750-SQ-C3	315480
1	1	1-1/4	2-1/4	4	SQ	MTi5-RN-S-1000-SQ-C3	315660
1	1	1-1/4	2-5/8	6	SQ	MTi5-RN-R-1000-SQ-C3	315860
1	1	1-1/4	3-3/8	6	SQ	MTi5-RN-M-1000-SQ-C3	316060

Speed & Feed: 187-188

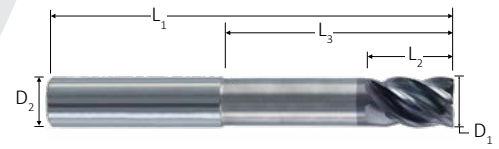
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# TITANIUM ALLOYS & HIGH TEMP ALLOYS

Series: **MTi5**

**5 FLUTE • REDUCED NECK VARIABLE INDEX FOR LONG REACH  
ROUGHING & FINISHING**

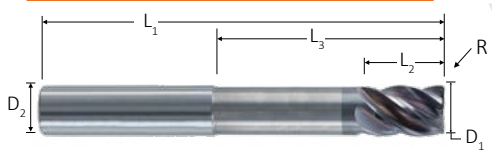


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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1	1	1-1/4	4-1/8	6	SQ	MTI5-RN-L-1000-SQ-C3	316260
1	1	1-1/4		6	SQ	MTI5-LS-1000-SQ-C3	316460
1	1	1-1/4	4-5/8	7	SQ	MTI5-RN-X-1000-SQ-C3	316660
1	1	1-1/4		7	SQ	MTI5-LS-X-1000-SQ-C3	316860
1	1	1-1/4		12-1/2	SQ	MTI5-LS-XX-1000-SQ-C3	317060

**Speed & Feed: 187-188**

No LBS Listed\* - Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck



## 5 FLUTE • REDUCED NECK VARIABLE INDEX FOR LONG REACH ROUGHING & FINISHING

- 5 Flute Variable Pitch for reduced chatter and increase productivity
- Substrate, geometry & coating optimized for Titanium & Stainless Steels
- For slotting, peripheral milling, trochoidal & high efficiency milling
- Long OAL with reduced neck for clearing walls while reaching into deep pockets

Carbide	5	Center Cutting	variable	C3	+0.000 -0.002	Radius		HRC <54	M S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/8	1/8	3/16	3/8	2	0.010	MTi5-RN-S-0125-R010-C3	310520
1/8	1/8	3/16	3/8	2	0.015	MTi5-RN-S-0125-R015-C3	310540
1/8	1/8	3/16	3/8	2	0.030	MTi5-RN-S-0125-R030-C3	310560
1/8	1/8	3/16	1/2	2	0.010	MTi5-RN-R-0125-R010-C3	310600
1/8	1/8	3/16	1/2	2	0.015	MTi5-RN-R-0125-R015-C3	310620
1/8	1/8	3/16	1/2	2	0.030	MTi5-RN-R-0125-R030-C3	310640
1/8	1/8	3/16	3/4	2-1/2	0.010	MTi5-RN-M-0125-R010-C3	310680
1/8	1/8	3/16	3/4	2-1/2	0.015	MTi5-RN-M-0125-R015-C3	310700
1/8	1/8	3/16	3/4	2-1/2	0.030	MTi5-RN-M-0125-R030-C3	310720
3/16	3/16	1/4	1/2	2	0.010	MTi5-RN-S-0187-R010-C3	310760
3/16	3/16	1/4	1/2	2	0.015	MTi5-RN-S-0187-R015-C3	310780
3/16	3/16	1/4	1/2	2	0.030	MTi5-RN-S-0187-R030-C3	310800
3/16	3/16	1/4	3/4	2-1/2	0.010	MTi5-RN-R-0187-R010-C3	310840
3/16	3/16	1/4	3/4	2-1/2	0.015	MTi5-RN-R-0187-R015-C3	310860
3/16	3/16	1/4	3/4	2-1/2	0.030	MTi5-RN-R-0187-R030-C3	310880
3/16	3/16	1/4	1-1/8	2-1/2	0.010	MTi5-RN-M-0187-R010-C3	310920
3/16	3/16	1/4	1-1/8	2-1/2	0.015	MTi5-RN-M-0187-R015-C3	310940
3/16	3/16	1/4	1-1/8	2-1/2	0.030	MTi5-RN-M-0187-R030-C3	310960
1/4	1/4	3/8	3/4	4	0.015	MTi5-RN-S-0250-R015-C3	311000
1/4	1/4	3/8	3/4	4	0.020	MTi5-RN-S-0250-R020-C3	311020
1/4	1/4	3/8	3/4	4	0.030	MTi5-RN-S-0250-R030-C3	311040
1/4	1/4	3/8	3/4	4	0.060	MTi5-RN-S-0250-R060-C3	311060
1/4	1/4	3/8	3/4	4	0.090	MTi5-RN-S-0250-R090-C3	311080
1/4	1/4	3/8	1-1/8	4	0.015	MTi5-RN-R-0250-R015-C3	311120
1/4	1/4	3/8	1-1/8	4	0.020	MTi5-RN-R-0250-R020-C3	311140
1/4	1/4	3/8	1-1/8	4	0.030	MTi5-RN-R-0250-R030-C3	311160
1/4	1/4	3/8	1-1/8	4	0.060	MTi5-RN-R-0250-R060-C3	311180
1/4	1/4	3/8	1-1/8	4	0.090	MTi5-RN-R-0250-R090-C3	311200
1/4	1/4	3/8	2-1/8	4	0.015	MTi5-RN-M-0250-R015-C3	311240
1/4	1/4	3/8	2-1/8	4	0.020	MTi5-RN-M-0250-R020-C3	311260
1/4	1/4	3/8	2-1/8	4	0.030	MTi5-RN-M-0250-R030-C3	311280
1/4	1/4	3/8	2-1/8	4	0.060	MTi5-RN-M-0250-R060-C3	311300
1/4	1/4	3/8	2-1/8	4	0.090	MTi5-RN-M-0250-R090-C3	311320
1/4	1/4	3/8		4	0.015	MTi5-LS-0250-R015-C3	311360
1/4	1/4	3/8		4	0.020	MTi5-LS-0250-R020-C3	311380
1/4	1/4	3/8		4	0.030	MTi5-LS-0250-R030-C3	311400
1/4	1/4	3/8		4	0.060	MTi5-LS-0250-R060-C3	311420
1/4	1/4	3/8		4	0.090	MTi5-LS-0250-R090-C3	311440
5/16	5/16	7/16	1-1/8	4	0.015	MTi5-RN-R-0312-R015-C3	311480
5/16	5/16	7/16	1-1/8	4	0.030	MTi5-RN-R-0312-R030-C3	311500
5/16	5/16	7/16	1-1/8	4	0.060	MTi5-RN-R-0312-R060-C3	311520
5/16	5/16	7/16	1-1/8	4	0.090	MTi5-RN-R-0312-R090-C3	311540

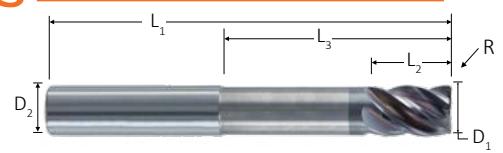
**Speed & Feed: 187-188**

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# TITANIUM ALLOYS & HIGH TEMP ALLOYS

Series: **MTi5**

**5 FLUTE • REDUCED NECK VARIABLE INDEX FOR LONG REACH  
ROUGHING & FINISHING**

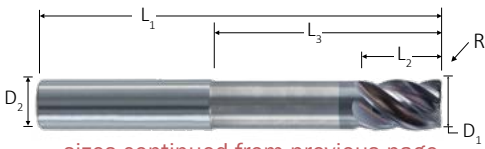


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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
5/16	5/16	7/16	2-1/8	4	0.015	MTi5-RN-M-0312-R015-C3	311580
5/16	5/16	7/16	2-1/8	4	0.030	MTi5-RN-M-0312-R030-C3	311600
5/16	5/16	7/16	2-1/8	4	0.060	MTi5-RN-M-0312-R060-C3	311620
5/16	5/16	7/16	2-1/8	4	0.090	MTi5-RN-M-0312-R090-C3	311640
5/16	5/16	7/16		4	0.015	MTi5-LS-0312-R015-C3	311680
5/16	5/16	7/16		4	0.030	MTi5-LS-0312-R030-C3	311700
5/16	5/16	7/16		4	0.060	MTi5-LS-0312-R060-C3	311720
5/16	5/16	7/16		4	0.090	MTi5-LS-0312-R090-C3	311740
3/8	3/8	1/2	1-1/8	4	0.015	MTi5-RN-S-0375-R015-C3	311780
3/8	3/8	1/2	1-1/8	4	0.020	MTi5-RN-S-0375-R020-C3	311800
3/8	3/8	1/2	1-1/8	4	0.030	MTi5-RN-S-0375-R030-C3	311820
3/8	3/8	1/2	1-1/8	4	0.060	MTi5-RN-S-0375-R060-C3	311840
3/8	3/8	1/2	1-1/8	4	0.090	MTi5-RN-S-0375-R090-C3	311860
3/8	3/8	1/2	1-1/8	4	0.120	MTi5-RN-S-0375-R120-C3	311880
3/8	3/8	1/2	2-1/8	4	0.015	MTi5-RN-R-0375-R015-C3	311920
3/8	3/8	1/2	2-1/8	4	0.020	MTi5-RN-R-0375-R020-C3	311940
3/8	3/8	1/2	2-1/8	4	0.030	MTi5-RN-R-0375-R030-C3	311960
3/8	3/8	1/2	2-1/8	4	0.060	MTi5-RN-R-0375-R060-C3	311980
3/8	3/8	1/2	2-1/8	4	0.090	MTi5-RN-R-0375-R090-C3	312000
3/8	3/8	1/2	2-1/8	4	0.120	MTi5-RN-R-0375-R120-C3	312020
3/8	3/8	1/2	3-1/8	6	0.015	MTi5-RN-M-0375-R015-C3	312060
3/8	3/8	1/2	3-1/8	6	0.020	MTi5-RN-M-0375-R020-C3	312080
3/8	3/8	1/2	3-1/8	6	0.030	MTi5-RN-M-0375-R030-C3	312100
3/8	3/8	1/2	3-1/8	6	0.060	MTi5-RN-M-0375-R060-C3	312120
3/8	3/8	1/2	3-1/8	6	0.090	MTi5-RN-M-0375-R090-C3	312140
3/8	3/8	1/2	3-1/8	6	0.120	MTi5-RN-M-0375-R120-C3	312160
3/8	3/8	1/2	4-1/8	6	0.015	MTi5-RN-L-0375-R015-C3	312200
3/8	3/8	1/2	4-1/8	6	0.020	MTi5-RN-L-0375-R020-C3	312220
3/8	3/8	1/2	4-1/8	6	0.030	MTi5-RN-L-0375-R030-C3	312240
3/8	3/8	1/2	4-1/8	6	0.060	MTi5-RN-L-0375-R060-C3	312260
3/8	3/8	1/2	4-1/8	6	0.090	MTi5-RN-L-0375-R090-C3	312280
3/8	3/8	1/2	4-1/8	6	0.120	MTi5-RN-L-0375-R120-C3	312300
3/8	3/8	1/2		6	0.015	MTi5-LS-0375-R015-C3	312340
3/8	3/8	1/2		6	0.020	MTi5-LS-0375-R020-C3	312360
3/8	3/8	1/2		6	0.030	MTi5-LS-0375-R030-C3	312380
3/8	3/8	1/2		6	0.060	MTi5-LS-0375-R060-C3	312400
3/8	3/8	1/2		6	0.090	MTi5-LS-0375-R090-C3	312420
3/8	3/8	1/2		6	0.120	MTi5-LS-0375-R120-C3	312440
1/2	1/2	5/8	1-1/2	4	0.015	MTi5-RN-S-0500-R015-C3	312480
1/2	1/2	5/8	1-1/2	4	0.030	MTi5-RN-S-0500-R030-C3	312500
1/2	1/2	5/8	1-1/2	4	0.060	MTi5-RN-S-0500-R060-C3	312520
1/2	1/2	5/8	1-1/2	4	0.090	MTi5-RN-S-0500-R090-C3	312540
1/2	1/2	5/8	1-1/2	4	0.120	MTi5-RN-S-0500-R120-C3	312560
1/2	1/2	5/8	1-1/2	4	0.156	MTi5-RN-S-0500-R156-C3	312580
1/2	1/2	5/8	1-1/2	4	0.190	MTi5-RN-S-0500-R190-C3	312600
1/2	1/2	5/8	2-1/4	4	0.015	MTi5-RN-R-0500-R015-C3	312640
1/2	1/2	5/8	2-1/4	4	0.030	MTi5-RN-R-0500-R030-C3	312660
1/2	1/2	5/8	2-1/4	4	0.060	MTi5-RN-R-0500-R060-C3	312680

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5 FLUTE • REDUCED NECK VARIABLE INDEX FOR LONG REACH  
ROUGHING & FINISHING

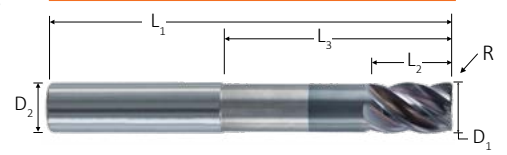
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/2	1/2	5/8	2-1/4	4	0.090	MTi5-RN-R-0500-R090-C3	312700
1/2	1/2	5/8	2-1/4	4	0.120	MTi5-RN-R-0500-R120-C3	312720
1/2	1/2	5/8	2-1/4	4	0.156	MTi5-RN-R-0500-R156-C3	312740
1/2	1/2	5/8	2-1/4	4	0.190	MTi5-RN-R-0500-R190-C3	312760
1/2	1/2	5/8	3-3/8	6	0.015	MTi5-RN-M-0500-R015-C3	312800
1/2	1/2	5/8	3-3/8	6	0.030	MTi5-RN-M-0500-R030-C3	312820
1/2	1/2	5/8	3-3/8	6	0.060	MTi5-RN-M-0500-R060-C3	312840
1/2	1/2	5/8	3-3/8	6	0.090	MTi5-RN-M-0500-R090-C3	312860
1/2	1/2	5/8	3-3/8	6	0.120	MTi5-RN-M-0500-R120-C3	312880
1/2	1/2	5/8	3-3/8	6	0.156	MTi5-RN-M-0500-R156-C3	312900
1/2	1/2	5/8	3-3/8	6	0.190	MTi5-RN-M-0500-R190-C3	312920
1/2	1/2	5/8	4-1/8	6	0.015	MTi5-RN-L-0500-R015-C3	312960
1/2	1/2	5/8	4-1/8	6	0.030	MTi5-RN-L-0500-R030-C3	312980
1/2	1/2	5/8	4-1/8	6	0.060	MTi5-RN-L-0500-R060-C3	313000
1/2	1/2	5/8	4-1/8	6	0.090	MTi5-RN-L-0500-R090-C3	313020
1/2	1/2	5/8	4-1/8	6	0.120	MTi5-RN-L-0500-R120-C3	313040
1/2	1/2	5/8	4-1/8	6	0.156	MTi5-RN-L-0500-R156-C3	313060
1/2	1/2	5/8	4-1/8	6	0.190	MTi5-RN-L-0500-R190-C3	313080
1/2	1/2	5/8		6	0.015	MTi5-LS-0500-R015-C3	313120
1/2	1/2	5/8		6	0.030	MTi5-LS-0500-R030-C3	313140
1/2	1/2	5/8		6	0.060	MTi5-LS-0500-R060-C3	313160
1/2	1/2	5/8		6	0.090	MTi5-LS-0500-R090-C3	313180
1/2	1/2	5/8		6	0.120	MTi5-LS-0500-R120-C3	313200
1/2	1/2	5/8		6	0.156	MTi5-LS-0500-R156-C3	313220
1/2	1/2	5/8		6	0.190	MTi5-LS-0500-R190-C3	313240
1/2	1/2	5/8		8	0.015	MTi5-LS-XX-0500-R015-C3	313280
1/2	1/2	5/8		8	0.030	MTi5-LS-XX-0500-R030-C3	313300
1/2	1/2	5/8		8	0.060	MTi5-LS-XX-0500-R060-C3	313320
1/2	1/2	5/8		8	0.090	MTi5-LS-XX-0500-R090-C3	313340
1/2	1/2	5/8		8	0.120	MTi5-LS-XX-0500-R120-C3	313360
1/2	1/2	5/8		8	0.156	MTi5-LS-XX-0500-R156-C3	313380
1/2	1/2	5/8		8	0.190	MTi5-LS-XX-0500-R190-C3	313400
5/8	5/8	3/4	1-5/8	4	0.030	MTi5-RN-S-0625-R030-C3	313460
5/8	5/8	3/4	1-5/8	4	0.060	MTi5-RN-S-0625-R060-C3	313480
5/8	5/8	3/4	1-5/8	4	0.090	MTi5-RN-S-0625-R090-C3	313500
5/8	5/8	3/4	1-5/8	4	0.120	MTi5-RN-S-0625-R120-C3	313520
5/8	5/8	3/4	2-3/8	6	0.030	MTi5-RN-R-0625-R030-C3	313620
5/8	5/8	3/4	2-3/8	6	0.060	MTi5-RN-R-0625-R060-C3	313640
5/8	5/8	3/4	2-3/8	6	0.090	MTi5-RN-R-0625-R090-C3	313660
5/8	5/8	3/4	2-3/8	6	0.120	MTi5-RN-R-0625-R120-C3	313680
5/8	5/8	3/4	3-3/8	6	0.030	MTi5-RN-M-0625-R030-C3	313780
5/8	5/8	3/4	3-3/8	6	0.060	MTi5-RN-M-0625-R060-C3	313800
5/8	5/8	3/4	3-3/8	6	0.090	MTi5-RN-M-0625-R090-C3	313820
5/8	5/8	3/4	3-3/8	6	0.120	MTi5-RN-M-0625-R120-C3	313840
5/8	5/8	3/4	4-1/8	6	0.030	MTi5-RN-L-0625-R030-C3	313940
5/8	5/8	3/4	4-1/8	6	0.060	MTi5-RN-L-0625-R060-C3	313960
5/8	5/8	3/4	4-1/8	6	0.090	MTi5-RN-L-0625-R090-C3	313980
5/8	5/8	3/4	4-1/8	6	0.120	MTi5-RN-L-0625-R120-C3	314000

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## 5 FLUTE • REDUCED NECK VARIABLE INDEX FOR LONG REACH ROUGHING & FINISHING

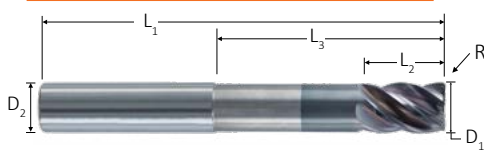


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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
5/8	5/8	3/4		6	0.015	MTi5-LS-0625-R015-C3	314080
5/8	5/8	3/4		6	0.030	MTi5-LS-0625-R030-C3	314100
5/8	5/8	3/4		6	0.060	MTi5-LS-0625-R060-C3	314120
5/8	5/8	3/4		6	0.090	MTi5-LS-0625-R090-C3	314140
5/8	5/8	3/4		6	0.120	MTi5-LS-0625-R120-C3	314160
3/4	3/4	1	2	4	0.030	MTi5-RN-S-0750-R030-C3	314260
3/4	3/4	1	2	4	0.060	MTi5-RN-S-0750-R060-C3	314280
3/4	3/4	1	2	4	0.090	MTi5-RN-S-0750-R090-C3	314300
3/4	3/4	1	2	4	0.120	MTi5-RN-S-0750-R120-C3	314320
3/4	3/4	1	2	4	0.156	MTi5-RN-S-0750-R156-C3	314340
3/4	3/4	1	2	4	0.190	MTi5-RN-S-0750-R190-C3	314360
3/4	3/4	1	2	4	0.250	MTi5-RN-S-0750-R250-C3	314380
3/4	3/4	1	2-1/2	6	0.015	MTi5-RN-R-0750-R015-C3	314420
3/4	3/4	1	2-1/2	6	0.030	MTi5-RN-R-0750-R030-C3	314440
3/4	3/4	1	2-1/2	6	0.060	MTi5-RN-R-0750-R060-C3	314460
3/4	3/4	1	2-1/2	6	0.090	MTi5-RN-R-0750-R090-C3	314480
3/4	3/4	1	2-1/2	6	0.120	MTi5-RN-R-0750-R120-C3	314500
3/4	3/4	1	2-1/2	6	0.156	MTi5-RN-R-0750-R156-C3	314520
3/4	3/4	1	2-1/2	6	0.190	MTi5-RN-R-0750-R190-C3	314540
3/4	3/4	1	2-1/2	6	0.250	MTi5-RN-R-0750-R250-C3	314560
3/4	3/4	1	3-3/8	6	0.015	MTi5-RN-M-0750-R015-C3	314600
3/4	3/4	1	3-3/8	6	0.030	MTi5-RN-M-0750-R030-C3	314620
3/4	3/4	1	3-3/8	6	0.060	MTi5-RN-M-0750-R060-C3	314640
3/4	3/4	1	3-3/8	6	0.090	MTi5-RN-M-0750-R090-C3	314660
3/4	3/4	1	3-3/8	6	0.120	MTi5-RN-M-0750-R120-C3	314680
3/4	3/4	1	3-3/8	6	0.190	MTi5-RN-M-0750-R190-C3	314720
3/4	3/4	1	3-3/8	6	0.250	MTi5-RN-M-0750-R250-C3	314740
3/4	3/4	1	4-1/8	6	0.015	MTi5-RN-L-0750-R015-C3	314780
3/4	3/4	1	4-1/8	6	0.030	MTi5-RN-L-0750-R030-C3	314800
3/4	3/4	1	4-1/8	6	0.060	MTi5-RN-L-0750-R060-C3	314820
3/4	3/4	1	4-1/8	6	0.090	MTi5-RN-L-0750-R090-C3	314840
3/4	3/4	1	4-1/8	6	0.120	MTi5-RN-L-0750-R120-C3	314860
3/4	3/4	1	4-1/8	6	0.190	MTi5-RN-L-0750-R190-C3	314900
3/4	3/4	1	4-1/8	6	0.250	MTi5-RN-L-0750-R250-C3	314920
3/4	3/4	1		6	0.015	MTi5-LS-0750-R015-C3	314960
3/4	3/4	1		6	0.030	MTi5-LS-0750-R030-C3	314980
3/4	3/4	1		6	0.060	MTi5-LS-0750-R060-C3	315000
3/4	3/4	1		6	0.090	MTi5-LS-0750-R090-C3	315020
3/4	3/4	1		6	0.120	MTi5-LS-0750-R120-C3	315040
3/4	3/4	1		6	0.190	MTi5-LS-0750-R190-C3	315080
3/4	3/4	1		6	0.250	MTi5-LS-0750-R250-C3	315100
3/4	3/4	1	4-7/8	7	0.030	MTi5-RN-X-0750-R030-C3	315160
3/4	3/4	1	4-7/8	7	0.060	MTi5-RN-X-0750-R060-C3	315180
3/4	3/4	1	4-7/8	7	0.090	MTi5-RN-X-0750-R090-C3	315200
3/4	3/4	1	4-7/8	7	0.120	MTi5-RN-X-0750-R120-C3	315220
3/4	3/4	1		7	0.015	MTi5-LS-X-0750-R015-C3	315320
3/4	3/4	1		7	0.030	MTi5-LS-X-0750-R030-C3	315340

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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
3/4	3/4	1		7	0.060	MTi5-LS-X-0750-R060-C3	315360
3/4	3/4	1		7	0.090	MTi5-LS-X-0750-R090-C3	315380
3/4	3/4	1		7	0.120	MTi5-LS-X-0750-R120-C3	315400
3/4	3/4	1		9	0.015	MTi5-LS-XX-0750-R015-C3	315500
3/4	3/4	1		9	0.030	MTi5-LS-XX-0750-R030-C3	315520
3/4	3/4	1		9	0.060	MTi5-LS-XX-0750-R060-C3	315540
3/4	3/4	1		9	0.090	MTi5-LS-XX-0750-R090-C3	315560
3/4	3/4	1		9	0.120	MTi5-LS-XX-0750-R120-C3	315580
1	1	1-1/4	2-1/4	4	0.030	MTi5-RN-S-1000-R030-C3	315700
1	1	1-1/4	2-1/4	4	0.060	MTi5-RN-S-1000-R060-C3	315720
1	1	1-1/4	2-1/4	4	0.090	MTi5-RN-S-1000-R090-C3	315740
1	1	1-1/4	2-1/4	4	0.120	MTi5-RN-S-1000-R120-C3	315760
1	1	1-1/4	2-1/4	4	0.156	MTi5-RN-S-1000-R156-C3	315780
1	1	1-1/4	2-1/4	4	0.190	MTi5-RN-S-1000-R190-C3	315800
1	1	1-1/4	2-1/4	4	0.250	MTi5-RN-S-1000-R250-C3	315820
1	1	1-1/4	2-1/4	4	0.375	MTi5-RN-S-1000-R375-C3	315840
1	1	1-1/4	2-5/8	6	0.030	MTi5-RN-R-1000-R030-C3	315900
1	1	1-1/4	2-5/8	6	0.060	MTi5-RN-R-1000-R060-C3	315920
1	1	1-1/4	2-5/8	6	0.090	MTi5-RN-R-1000-R090-C3	315940
1	1	1-1/4	2-5/8	6	0.120	MTi5-RN-R-1000-R120-C3	315960
1	1	1-1/4	2-5/8	6	0.190	MTi5-RN-R-1000-R190-C3	316000
1	1	1-1/4	2-5/8	6	0.250	MTi5-RN-R-1000-R250-C3	316020
1	1	1-1/4	3-3/8	6	0.030	MTi5-RN-M-1000-R030-C3	316100
1	1	1-1/4	3-3/8	6	0.060	MTi5-RN-M-1000-R060-C3	316120
1	1	1-1/4	3-3/8	6	0.090	MTi5-RN-M-1000-R090-C3	316140
1	1	1-1/4	3-3/8	6	0.120	MTi5-RN-M-1000-R120-C3	316160
1	1	1-1/4	3-3/8	6	0.190	MTi5-RN-M-1000-R190-C3	316200
1	1	1-1/4	3-3/8	6	0.250	MTi5-RN-M-1000-R250-C3	316220
1	1	1-1/4	4-1/8	6	0.030	MTi5-RN-L-1000-R030-C3	316300
1	1	1-1/4	4-1/8	6	0.060	MTi5-RN-L-1000-R060-C3	316320
1	1	1-1/4	4-1/8	6	0.090	MTi5-RN-L-1000-R090-C3	316340
1	1	1-1/4	4-1/8	6	0.120	MTi5-RN-L-1000-R120-C3	316360
1	1	1-1/4	4-1/8	6	0.190	MTi5-RN-L-1000-R190-C3	316400
1	1	1-1/4	4-1/8	6	0.250	MTi5-RN-L-1000-R250-C3	316420
1	1	1-1/4	4-1/8	6	0.375	MTi5-RN-L-1000-R375-C3	316440
1	1	1-1/4		6	0.015	MTi5-LS-1000-R015-C3	316480
1	1	1-1/4		6	0.030	MTi5-LS-1000-R030-C3	316500
1	1	1-1/4		6	0.060	MTi5-LS-1000-R060-C3	316520
1	1	1-1/4		6	0.090	MTi5-LS-1000-R090-C3	316540
1	1	1-1/4		6	0.120	MTi5-LS-1000-R120-C3	316560
1	1	1-1/4		6	0.190	MTi5-LS-1000-R190-C3	316600
1	1	1-1/4		6	0.250	MTi5-LS-1000-R250-C3	316620
1	1	1-1/4		6	0.375	MTi5-LS-1000-R375-C3	316640
1	1	1-1/4	4-5/8	7	0.030	MTi5-RN-X-1000-R030-C3	316700
1	1	1-1/4	4-5/8	7	0.060	MTi5-RN-X-1000-R060-C3	316720
1	1	1-1/4	4-5/8	7	0.090	MTi5-RN-X-1000-R090-C3	316740
1	1	1-1/4	4-5/8	7	0.120	MTi5-RN-X-1000-R120-C3	316760
1	1	1-1/4	4-5/8	7	0.375	MTi5-RN-X-1000-R375-C3	316840

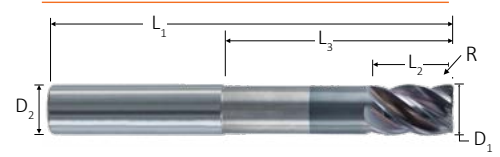
Speed & Feed: 187-188

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# TITANIUM ALLOYS & HIGH TEMP ALLOYS

Series: **MTi5**

**5 FLUTE • REDUCED NECK VARIABLE INDEX FOR LONG REACH  
ROUGHING & FINISHING**



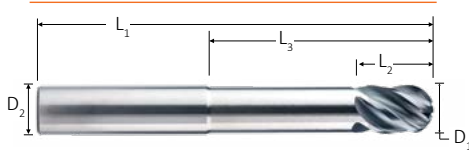
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1	1	1-1/4		7	0.030	MTi5-LS-X-1000-R030-C3	316900
1	1	1-1/4		7	0.060	MTi5-LS-X-1000-R060-C3	316920
1	1	1-1/4		7	0.090	MTi5-LS-X-1000-R090-C3	316940
1	1	1-1/4		7	0.120	MTi5-LS-X-1000-R120-C3	316960
1	1	1-1/4		7	0.375	MTi5-LS-X-1000-R375-C3	317040
1	1	1-1/4		12-1/2	0.030	MTi5-LS-XX-1000-R030-C3	317100
1	1	1-1/4		12-1/2	0.060	MTi5-LS-XX-1000-R060-C3	317120
1	1	1-1/4		12-1/2	0.090	MTi5-LS-XX-1000-R090-C3	317140
1	1	1-1/4		12-1/2	0.120	MTi5-LS-XX-1000-R120-C3	317160

**Speed & Feed: 187-188**

No LBS Listed\* -Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck





## 5 FLUTE • BALL NOSE REDUCED INDEX FOR 3D PROFILING FOR ROUGHING & FINISHING

- 5 Flute Variable pitch for reduced chatter and increased productivity over 4 flute
- Substrate, geometry & coating optimized for Titanium & Stainless Steels
- Excellent for 3D machining
- Long OAL with reduced neck for clearing walls while reaching into deep pockets

Carbide		Center Cutting		<b>C3</b>	+0.000 -0.002	+0.0005 -0.0005 <1/8						<b>HRC</b> <54	<b>M S</b>
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1/8	1/8	3/16	3/8	2	Ball	MTI5-RN-S-0125-BN-C3	310570
1/8	1/8	3/16	1/2	2	Ball	MTI5-RN-R-0125-BN-C3	310650
1/8	1/8	3/16	3/4	2-1/2	Ball	MTI5-RN-M-0125-BN-C3	310730
3/16	3/16	1/4	1/2	2	Ball	MTI5-RN-S-0187-BN-C3	310810
3/16	3/16	1/4	3/4	2-1/2	Ball	MTI5-RN-R-0187-BN-C3	310890
3/16	3/16	1/4	1-1/8	2-1/2	Ball	MTI5-RN-M-0187-BN-C3	310970
1/4	1/4	3/8	3/4	4	Ball	MTI5-RN-S-0250-BN-C3	311090
1/4	1/4	3/8	1-1/8	4	Ball	MTI5-RN-R-0250-BN-C3	311210
1/4	1/4	3/8	2-1/8	4	Ball	MTI5-RN-M-0250-BN-C3	311330
1/4	1/4	3/8		4	Ball	MTI5-LS-0250-BN-C3	311450
5/16	5/16	7/16	1-1/8	4	Ball	MTI5-RN-R-0312-BN-C3	311550
5/16	5/16	7/16	2-1/8	4	Ball	MTI5-RN-M-0312-BN-C3	311650
5/16	5/16	7/16		4	Ball	MTI5-LS-0312-BN-C3	311750
3/8	3/8	1/2	1-1/8	4	Ball	MTI5-RN-S-0375-BN-C3	311890
3/8	3/8	1/2	2-1/8	4	Ball	MTI5-RN-R-0375-BN-C3	312030
3/8	3/8	1/2	3-1/8	6	Ball	MTI5-RN-M-0375-BN-C3	312170
3/8	3/8	1/2	4-1/8	6	Ball	MTI5-RN-L-0375-BN-C3	312310
3/8	3/8	1/2		6	Ball	MTI5-LS-0375-BN-C3	312450
1/2	1/2	5/8	1-1/2	4	Ball	MTI5-RN-S-0500-BN-C3	312610
1/2	1/2	5/8	2-1/4	4	Ball	MTI5-RN-R-0500-BN-C3	312770
1/2	1/2	5/8	3-3/8	6	Ball	MTI5-RN-M-0500-BN-C3	312930
1/2	1/2	5/8	4-1/8	6	Ball	MTI5-RN-L-0500-BN-C3	313090
1/2	1/2	5/8		6	Ball	MTI5-LS-0500-BN-C3	313250
1/2	1/2	5/8		8	Ball	MTI5-LS-XX-0500-BN-C3	313410
5/8	5/8	3/4	1-5/8	4	Ball	MTI5-RN-S-0625-BN-C3	313570
5/8	5/8	3/4	2-3/8	6	Ball	MTI5-RN-R-0625-BN-C3	313730
5/8	5/8	3/4	3-3/8	6	Ball	MTI5-RN-M-0625-BN-C3	313890
5/8	5/8	3/4	4-1/8	6	Ball	MTI5-RN-L-0625-BN-C3	314050
5/8	5/8	3/4		6	Ball	MTI5-LS-0625-BN-C3	314210
3/4	3/4	1	2	4	Ball	MTI5-RN-S-0750-BN-C3	314390
3/4	3/4	1	2-1/2	6	Ball	MTI5-RN-R-0750-BN-C3	314570
3/4	3/4	1	3-3/8	6	Ball	MTI5-RN-M-0750-BN-C3	314750
3/4	3/4	1	4-1/8	6	Ball	MTI5-RN-L-0750-BN-C3	314930
3/4	3/4	1		6	Ball	MTI5-LS-0750-BN-C3	315110
3/4	3/4	1	4-7/8	7	Ball	MTI5-RN-X-0750-BN-C3	315290
3/4	3/4	1		7	Ball	MTI5-LS-X-0750-BN-C3	315470
1	1	1-1/4	2-1/4	4	Ball	MTI5-RN-S-1000-BN-C3	315850
1	1	1-1/4	2-5/8	6	Ball	MTI5-RN-R-1000-BN-C3	316050
1	1	1-1/4	3-3/8	6	Ball	MTI5-RN-M-1000-BN-C3	316250
1	1	1-1/4	4-1/8	6	Ball	MTI5-RN-L-1000-BN-C3	316450
1	1	1-1/4		6	Ball	MTI5-LS-1000-BN-C3	316650
1	1	1-1/4	4-5/8	7	Ball	MTI5-RN-X-1000-BN-C3	316850
1	1	1-1/4		7	Ball	MTI5-LS-X-1000-BN-C3	317050
1	1	1-1/4		12-1/2	Ball	MTI5-LS-XX-1000-BN-C3	317250

**Speed & Feed: 187-188**

# TITANIUM ALLOYS & HIGH TEMP ALLOYS

Series: **MTi5C**

## 5 FLUTE • VARIABLE INDEX FOR ROUGHING & FINISHING CHIPBREAKER FOR REDUCED CHIP NESTING



- ▶ Chipbreakers spaced to allow to be used for roughing & finishing
- ▶ Chipbreakers dramatically reduce tool pressure
- ▶ Geometry for machining Titanium & Stainless Steels
- ▶ Geometry along with chipbreaker increases MRR



CHIP BREAKER



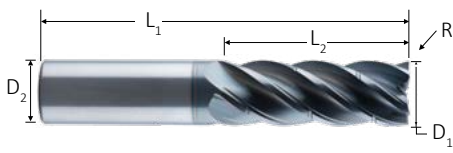
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/4	1/4	1-1/4	3	SQ	MTi5C-L-0250-SQ-C3	301340C
1/4	1/4	1-1/4	3	0.015	MTi5C-L-0250-R015-C3	301360C
1/4	1/4	1-1/4	3	0.030	MTi5C-L-0250-R030-C3	301400C
3/8	3/8	1-1/4	3	SQ	MTi5C-M-0375-SQ-C3	302040C
3/8	3/8	1-1/4	3	0.015	MTi5C-M-0375-R015-C3	302060C
3/8	3/8	1-1/4	3	0.030	MTi5C-M-0375-R030-C3	302100C
3/8	3/8	1-1/4	3	0.060	MTi5C-M-0375-R060-C3	302120C
1/2	1/2	1-1/4	3	SQ	MTi5C-R-0500-SQ-C3	302640C
1/2	1/2	1-1/4	3	0.015	MTi5C-R-0500-R015-C3	302660C
1/2	1/2	1-1/4	3	0.030	MTi5C-R-0500-R030-C3	302680C
1/2	1/2	1-1/4	3	0.060	MTi5C-R-0500-R060-C3	302700C
1/2	1/2	1-1/4	3	0.120	MTi5C-R-0500-R120-C3	302740C
1/2	1/2	1-5/8	4	0.060	MTi5C-M-0500-R060-C3	302860C
1/2	1/2	2-1/8	4	SQ	MTi5C-L-0500-SQ-C3	302960C
1/2	1/2	2-1/8	4	0.015	MTi5C-L-0500-R015-C3	302980C
1/2	1/2	2-1/8	4	0.030	MTi5C-L-0500-R030-C3	303000C
1/2	1/2	2-1/8	4	0.060	MTi5C-L-0500-R060-C3	303020C
5/8	5/8	1-1/4	3-1/2	SQ	MTi5C-SR-0625-SQ-C3	303280C
5/8	5/8	1-1/4	3-1/2	0.015	MTi5C-SR-0625-R015-C3	303300C
5/8	5/8	1-1/4	3-1/2	0.030	MTi5C-SR-0625-R030-C3	303320C
5/8	5/8	1-1/4	3-1/2	0.060	MTi5C-SR-0625-R060-C3	303340C
5/8	5/8	1-5/8	3-1/2	SQ	MTi5C-R-0625-SQ-C3	303440C
5/8	5/8	1-5/8	3-1/2	0.015	MTi5C-R-0625-R015-C3	303460C
5/8	5/8	1-5/8	3-1/2	0.030	MTi5C-R-0625-R030-C3	303480C
5/8	5/8	1-5/8	3-1/2	0.060	MTi5C-R-0625-R060-C3	303500C
5/8	5/8	2-1/8	4	SQ	MTi5C-M-0625-SQ-C3	303600C
5/8	5/8	2-1/8	4	0.015	MTi5C-M-0625-R015-C3	303620C
5/8	5/8	2-1/8	4	0.030	MTi5C-M-0625-R030-C3	303640C
5/8	5/8	2-1/8	4	0.060	MTi5C-M-0625-R060-C3	303660C
3/4	3/4	1-5/8	4	SQ	MTi5C-R-0750-SQ-C3	304100C
3/4	3/4	1-5/8	4	0.015	MTi5C-R-0750-R015-C3	304120C
3/4	3/4	1-5/8	4	0.030	MTi5C-R-0750-R030-C3	304140C
3/4	3/4	1-5/8	4	0.060	MTi5C-R-0750-R060-C3	304160C
3/4	3/4	1-5/8	4	0.090	MTi5C-R-0750-R090-C3	304180C
3/4	3/4	1-5/8	4	0.120	MTi5C-R-0750-R120-C3	304200C
3/4	3/4	2-1/4	5	SQ	MTi5C-M-0750-SQ-C3	304280C
3/4	3/4	2-1/4	5	0.015	MTi5C-M-0750-R015-C3	304300C
3/4	3/4	2-1/4	5	0.030	MTi5C-M-0750-R030-C3	304320C

Speed & Feed: 187-188

sizes continued on next page

Series: **MTi5C**

# TITANIUM ALLOYS & HIGH TEMP ALLOYS



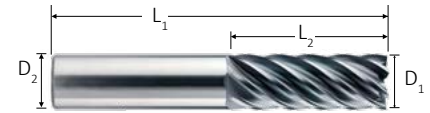
**5 FLUTE • VARIABLE INDEX FOR ROUGHING & FINISHING**  
**CHIPBREAKER FOR REDUCED CHIP NESTING**

sizes continued from previous page

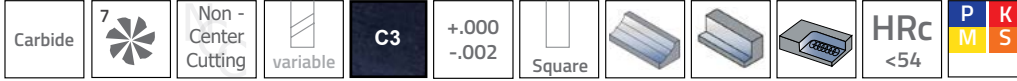
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
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3/4	3/4	2-1/4	5	0.090	MTi5C-M-0750-R090-C3	304360C
3/4	3/4	2-1/4	5	0.120	MTi5C-M-0750-R120-C3	304380C
3/4	3/4	3-1/4	6	SQ	MTi5C-LX-0750-SQ-C3	304640C
3/4	3/4	3-1/4	6	0.015	MTi5C-LX-0750-R015-C3	304660C
3/4	3/4	3-1/4	6	0.030	MTi5C-LX-0750-R030-C3	304680C
3/4	3/4	3-1/4	6	0.060	MTi5C-LX-0750-R060-C3	304700C
3/4	3/4	3-1/4	6	0.090	MTi5C-LX-0750-R090-C3	304720C
3/4	3/4	3-1/4	6	0.120	MTi5C-LX-0750-R120-C3	304740C
1	1	1-1/2	4	SQ	MTi5C-S-1000-SQ-C3	304820C
1	1	1-1/2	4	0.015	MTi5C-S-1000-R015-C3	304840C
1	1	1-1/2	4	0.030	MTi5C-S-1000-R030-C3	304860C
1	1	1-1/2	4	0.060	MTi5C-S-1000-R060-C3	304880C
1	1	1-1/2	4	0.090	MTi5C-S-1000-R090-C3	304900C
1	1	1-1/2	4	0.120	MTi5C-S-1000-R120-C3	304920C
1	1	2-5/8	5	SQ	MTi5C-M-1000-SQ-C3	305220C
1	1	2-5/8	5	0.015	MTi5C-M-1000-R015-C3	305240C
1	1	2-5/8	5	0.030	MTi5C-M-1000-R030-C3	305260C
1	1	2-5/8	5	0.060	MTi5C-M-1000-R060-C3	305280C
1	1	2-5/8	5	0.090	MTi5C-M-1000-R090-C3	305300C
1	1	2-5/8	5	0.120	MTi5C-M-1000-R120-C3	305320C
1	1	3-1/4	6	SQ	MTi5C-L-1000-SQ-C3	305420C
1	1	3-1/4	6	0.015	MTi5C-L-1000-R015-C3	305440C
1	1	3-1/4	6	0.030	MTi5C-L-1000-R030-C3	305460C
1	1	3-1/4	6	0.060	MTi5C-L-1000-R060-C3	305480C
1	1	3-1/4	6	0.090	MTi5C-L-1000-R090-C3	305500C
1	1	3-1/4	6	0.120	MTi5C-L-1000-R120-C3	305520C
1	1	4-1/4	7	0.250	MTi5C-X-1000-R250-C3	305780C

**Speed & Feed: 187-188**

## 7 FLUTE • VARIABLE INDEX FOR HEM ROUGHING & PROFILE FINISHING



- › 7 Flute variable index for reduced chatter and increased productivity.
- › Geometry for roughing (HEM) & finishing
- › Substrate, geometry & unique coating optimized for difficult to machine materials such as Titanium & Stainless Steel materials
- › Center cutting end geometry allows for ramping up to 10°



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
3/16	3/16	9/16	2-1/2	SQ	MTi7-R-0187-SQ-C3	380820
3/16	3/16	3/4	2-1/2	SQ	MTi7-M-0187-SQ-C3	380900
1/4	1/4	1/2	2-1/2	SQ	MTi7-SR-0250-SQ-C3	381100
1/4	1/4	3/4	2-1/2	SQ	MTi7-R-0250-SQ-C3	381220
1/4	1/4	1-1/4	3	SQ	MTi7-L-0250-SQ-C3	381340
3/8	3/8	1/2	2	SQ	MTi7-S-0375-SQ-C3	381760
3/8	3/8	1	2-1/2	SQ	MTi7-R-0375-SQ-C3	381900
3/8	3/8	1-1/4	3	SQ	MTi7-M-0375-SQ-C3	382040
1/2	1/2	5/8	2-1/2	SQ	MTi7-S-0500-SQ-C3	382320
1/2	1/2	1	3	SQ	MTi7-SR-0500-SQ-C3	382480
1/2	1/2	1-1/4	3	SQ	MTi7-R-0500-SQ-C3	382640
1/2	1/2	2-1/8	4	SQ	MTi7-L-0500-SQ-C3	382960
5/8	5/8	3/4	3	SQ	MTi7-S-0625-SQ-C3	383120
5/8	5/8	1-1/4	3-1/2	SQ	MTi7-SR-0625-SQ-C3	383280
5/8	5/8	1-5/8	3-1/2	SQ	MTi7-R-0625-SQ-C3	383440
5/8	5/8	2-1/8	4	SQ	MTi7-M-0625-SQ-C3	383600
3/4	3/4	1	3	SQ	MTi7-S-0750-SQ-C3	383920
3/4	3/4	1-5/8	4	SQ	MTi7-R-0750-SQ-C3	384100
3/4	3/4	2-1/4	5	SQ	MTi7-M-0750-SQ-C3	384280
3/4	3/4	3-1/4	6	SQ	MTi7-LX-0750-SQ-C3	384640
1	1	1-1/2	4	SQ	MTi7-S-1000-SQ-C3	384820
1	1	2-5/8	5	SQ	MTi7-M-1000-SQ-C3	385220
1	1	3-1/4	6	SQ	MTi7-L-1000-SQ-C3	385420

Speed & Feed: page 189



## 7 FLUTE • VARIABLE INDEX FOR HEM ROUGHING & PROFILE FINISHING

- 7 Flute variable index for reduced chatter and increased productivity.
- Geometry for roughing (HEM) & finishing
- Substrate, geometry & unique coating optimized for difficult to machine materials such as Titanium & Stainless Steel materials
- Center cutting end geometry allows for ramping up to 10°

Carbide		Non - Center Cutting		<b>C3</b>	+0.000 -0.002					HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
3/16	3/16	9/16	2-1/2	0.015	MTi7-R-0187-R015-C3	380860
3/16	3/16	3/4	2-1/2	0.015	MTi7-M-0187-R015-C3	380940
1/4	1/4	1/2	2-1/2	0.015	MTi7-SR-0250-R015-C3	381120
1/4	1/4	1/2	2-1/2	0.030	MTi7-SR-0250-R030-C3	381160
1/4	1/4	3/4	2-1/2	0.015	MTi7-R-0250-R015-C3	381240
1/4	1/4	3/4	2-1/2	0.030	MTi7-R-0250-R030-C3	381280
1/4	1/4	1-1/4	3	0.015	MTi7-L-0250-R015-C3	381360
1/4	1/4	1-1/4	3	0.030	MTi7-L-0250-R030-C3	381400
3/8	3/8	1/2	2	0.015	MTi7-S-0375-R015-C3	381780
3/8	3/8	1/2	2	0.030	MTi7-S-0375-R030-C3	381820
3/8	3/8	1/2	2	0.060	MTi7-S-0375-R060-C3	381840
3/8	3/8	1	2-1/2	0.015	MTi7-R-0375-R015-C3	381920
3/8	3/8	1	2-1/2	0.030	MTi7-R-0375-R030-C3	381960
3/8	3/8	1	2-1/2	0.060	MTi7-R-0375-R060-C3	381980
3/8	3/8	1-1/4	3	0.015	MTi7-M-0375-R015-C3	382060
3/8	3/8	1-1/4	3	0.030	MTi7-M-0375-R030-C3	382100
3/8	3/8	1-1/4	3	0.060	MTi7-M-0375-R060-C3	382120
1/2	1/2	5/8	2-1/2	0.015	MTi7-S-0500-R015-C3	382340
1/2	1/2	5/8	2-1/2	0.030	MTi7-S-0500-R030-C3	382360
1/2	1/2	5/8	2-1/2	0.060	MTi7-S-0500-R060-C3	382380
1/2	1/2	1	3	0.015	MTi7-SR-0500-R015-C3	382500
1/2	1/2	1	3	0.030	MTi7-SR-0500-R030-C3	382520
1/2	1/2	1	3	0.060	MTi7-SR-0500-R060-C3	382540
1/2	1/2	1-1/4	3	0.015	MTi7-R-0500-R015-C3	382660
1/2	1/2	1-1/4	3	0.030	MTi7-R-0500-R030-C3	382680
1/2	1/2	1-1/4	3	0.060	MTi7-R-0500-R060-C3	382700
1/2	1/2	1-1/4	3	0.120	MTi7-R-0500-R120-C3	382740
1/2	1/2	2-1/8	4	0.015	MTi7-L-0500-R015-C3	382980
1/2	1/2	2-1/8	4	0.030	MTi7-L-0500-R030-C3	383000
1/2	1/2	2-1/8	4	0.060	MTi7-L-0500-R060-C3	383020
5/8	5/8	3/4	3	0.015	MTi7-S-0625-R015-C3	383140
5/8	5/8	3/4	3	0.030	MTi7-S-0625-R030-C3	383160
5/8	5/8	3/4	3	0.060	MTi7-S-0625-R060-C3	383180
5/8	5/8	1-1/4	3-1/2	0.015	MTi7-SR-0625-R015-C3	383300
5/8	5/8	1-1/4	3-1/2	0.030	MTi7-SR-0625-R030-C3	383320
5/8	5/8	1-1/4	3-1/2	0.060	MTi7-SR-0625-R060-C3	383340
5/8	5/8	1-5/8	3-1/2	0.015	MTi7-R-0625-R015-C3	383460
5/8	5/8	1-5/8	3-1/2	0.030	MTi7-R-0625-R030-C3	383480
5/8	5/8	1-5/8	3-1/2	0.060	MTi7-R-0625-R060-C3	383500

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sizes continued on next page

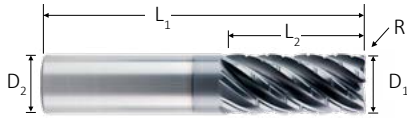
## 7 FLUTE • VARIABLE INDEX FOR HEM ROUGHING & PROFILE FINISHING



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
5/8	5/8	2-1/8	4	0.015	MTi7-M-0625-R015-C3	383620
5/8	5/8	2-1/8	4	0.030	MTi7-M-0625-R030-C3	383640
5/8	5/8	2-1/8	4	0.060	MTi7-M-0625-R060-C3	383660
3/4	3/4	1	3	0.015	MTi7-S-0750-R015-C3	383940
3/4	3/4	1	3	0.030	MTi7-S-0750-R030-C3	383960
3/4	3/4	1	3	0.060	MTi7-S-0750-R060-C3	383980
3/4	3/4	1	3	0.090	MTi7-S-0750-R090-C3	384000
3/4	3/4	1	3	0.120	MTi7-S-0750-R120-C3	384020
3/4	3/4	1-5/8	4	0.015	MTi7-R-0750-R015-C3	384120
3/4	3/4	1-5/8	4	0.030	MTi7-R-0750-R030-C3	384140
3/4	3/4	1-5/8	4	0.060	MTi7-R-0750-R060-C3	384160
3/4	3/4	1-5/8	4	0.090	MTi7-R-0750-R090-C3	384180
3/4	3/4	1-5/8	4	0.120	MTi7-R-0750-R120-C3	384200
3/4	3/4	2-1/4	5	0.015	MTi7-M-0750-R015-C3	384300
3/4	3/4	2-1/4	5	0.030	MTi7-M-0750-R030-C3	384320
3/4	3/4	2-1/4	5	0.060	MTi7-M-0750-R060-C3	384340
3/4	3/4	2-1/4	5	0.090	MTi7-M-0750-R090-C3	384360
3/4	3/4	2-1/4	5	0.120	MTi7-M-0750-R120-C3	384380
3/4	3/4	3-1/4	6	0.015	MTi7-LX-0750-R015-C3	384660
3/4	3/4	3-1/4	6	0.030	MTi7-LX-0750-R030-C3	384680
3/4	3/4	3-1/4	6	0.060	MTi7-LX-0750-R060-C3	384700
3/4	3/4	3-1/4	6	0.090	MTi7-LX-0750-R090-C3	384720
3/4	3/4	3-1/4	6	0.120	MTi7-LX-0750-R120-C3	384740
1	1	1-1/2	4	0.030	MTi7-S-1000-R030-C3	384860
1	1	1-1/2	4	0.015	MTi7-S-1000-R015-C3	384840
1	1	1-1/2	4	0.060	MTi7-S-1000-R060-C3	384880
1	1	1-1/2	4	0.090	MTi7-S-1000-R090-C3	384900
1	1	1-1/2	4	0.120	MTi7-S-1000-R120-C3	384920
1	1	2-5/8	5	0.015	MTi7-M-1000-R015-C3	385240
1	1	2-5/8	5	0.030	MTi7-M-1000-R030-C3	385260
1	1	2-5/8	5	0.060	MTi7-M-1000-R060-C3	385280
1	1	2-5/8	5	0.090	MTi7-M-1000-R090-C3	385300
1	1	2-5/8	5	0.120	MTi7-M-1000-R120-C3	385320
1	1	3-1/4	6	0.015	MTi7-L-1000-R015-C3	385440
1	1	3-1/4	6	0.030	MTi7-L-1000-R030-C3	385460
1	1	3-1/4	6	0.060	MTi7-L-1000-R060-C3	385480
1	1	3-1/4	6	0.090	MTi7-L-1000-R090-C3	385500
1	1	3-1/4	6	0.120	MTi7-L-1000-R120-C3	385520
1	1	4-1/4	7	0.030	MTi7-X-1000-R030-C3	385660

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## 7 FLUTE • VARIABLE INDEX FOR HEM ROUGHING & PROFILE FINISHING - CHIPBREAKER FOR REDUCED CHIP NESTING

- ▶ Geometry for roughing (HEM) & finishing
- ▶ Geometry for machining Titanium & Stainless Steel materials
- ▶ Center cutting end geometry allows for ramping up to 10°
- ▶ Chipbreaker design dramatically reduce tool pressure



CHIP BREAKER

Carbide	7	Non - Center Cutting	variable	C3	+0.002 -0.002	Square	Radius		HRC <54	P M K S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/4	1/4	1-1/4	3	SQ	MTi7C-L-0250-SQ-C3	381340C
1/4	1/4	1-1/4	3	0.015	MTi7C-L-0250-R015-C3	381360C
1/4	1/4	1-1/4	3	0.030	MTi7C-L-0250-R030-C3	381400C
3/8	3/8	1-1/4	3	SQ	MTi7C-M-0375-SQ-C3	382040C
3/8	3/8	1-1/4	3	0.015	MTi7C-M-0375-R015-C3	382060C
3/8	3/8	1-1/4	3	0.030	MTi7C-M-0375-R030-C3	382100C
3/8	3/8	1-1/4	3	0.060	MTi7C-M-0375-R060-C3	382120C
1/2	1/2	1-1/4	3	SQ	MTi7C-R-0500-SQ-C3	382640C
1/2	1/2	1-1/4	3	0.015	MTi7C-R-0500-R015-C3	382660C
1/2	1/2	1-1/4	3	0.030	MTi7C-R-0500-R030-C3	382680C
1/2	1/2	1-1/4	3	0.060	MTi7C-R-0500-R060-C3	382700C
1/2	1/2	2-1/8	4	SQ	MTi7C-L-0500-SQ-C3	382960C
1/2	1/2	2-1/8	4	0.015	MTi7C-L-0500-R015-C3	382980C
1/2	1/2	2-1/8	4	0.030	MTi7C-L-0500-R030-C3	383000C
1/2	1/2	2-1/8	4	0.060	MTi7C-L-0500-R060-C3	383020C
5/8	5/8	1-1/4	3-1/2	SQ	MTi7C-SR-0625-SQ-C3	383280C
5/8	5/8	1-1/4	3-1/2	0.015	MTi7C-SR-0625-R015-C3	383300C
5/8	5/8	1-1/4	3-1/2	0.030	MTi7C-SR-0625-R030-C3	383320C
5/8	5/8	1-1/4	3-1/2	0.060	MTi7C-SR-0625-R060-C3	383340C
5/8	5/8	1-5/8	3-1/2	SQ	MTi7C-R-0625-SQ-C3	383440C
5/8	5/8	1-5/8	3-1/2	0.015	MTi7C-R-0625-R015-C3	383460C
5/8	5/8	1-5/8	3-1/2	0.030	MTi7C-R-0625-R030-C3	383480C
5/8	5/8	1-5/8	3-1/2	0.060	MTi7C-R-0625-R060-C3	383500C
5/8	5/8	2-1/8	4	SQ	MTi7C-M-0625-SQ-C3	383600C
5/8	5/8	2-1/8	4	0.015	MTi7C-M-0625-R015-C3	383620C
5/8	5/8	2-1/8	4	0.030	MTi7C-M-0625-R030-C3	383640C
5/8	5/8	2-1/8	4	0.060	MTi7C-M-0625-R060-C3	383660C
3/4	3/4	1-5/8	4	SQ	MTi7C-R-0750-SQ-C3	384100C
3/4	3/4	1-5/8	4	0.015	MTi7C-R-0750-R015-C3	384120C
3/4	3/4	1-5/8	4	0.030	MTi7C-R-0750-R030-C3	384140C
3/4	3/4	1-5/8	4	0.060	MTi7C-R-0750-R060-C3	384160C
3/4	3/4	1-5/8	4	0.090	MTi7C-R-0750-R090-C3	384180C
3/4	3/4	1-5/8	4	0.120	MTi7C-R-0750-R120-C3	384200C
3/4	3/4	2-1/4	5	SQ	MTi7C-M-0750-SQ-C3	384280C
3/4	3/4	2-1/4	5	0.015	MTi7C-M-0750-R015-C3	384300C
3/4	3/4	2-1/4	5	0.030	MTi7C-M-0750-R030-C3	384320C
3/4	3/4	2-1/4	5	0.060	MTi7C-M-0750-R060-C3	384340C
3/4	3/4	2-1/4	5	0.090	MTi7C-M-0750-R090-C3	384360C
3/4	3/4	2-1/4	5	0.120	MTi7C-M-0750-R120-C3	384380C

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sizes continued on next page



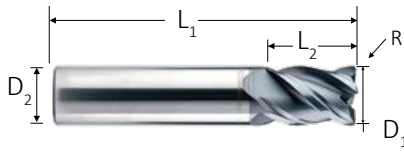
**7 FLUTE • VARIABLE INDEX FOR HEM ROUGHING & PROFILE FINISHING - CHIPBREAKER FOR REDUCED CHIP NESTING**



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
3/4	3/4	3-1/4	6	SQ	MTi7C-LX-0750-SQ-C3	384640C
3/4	3/4	3-1/4	6	0.015	MTi7C-LX-0750-R015-C3	384660C
3/4	3/4	3-1/4	6	0.030	MTi7C-LX-0750-R030-C3	384680C
3/4	3/4	3-1/4	6	0.060	MTi7C-LX-0750-R060-C3	384700C
3/4	3/4	3-1/4	6	0.090	MTi7C-LX-0750-R090-C3	384720C
3/4	3/4	3-1/4	6	0.120	MTi7C-LX-0750-R120-C3	384740C
1	1	1-1/2	4	SQ	MTi7C-S-1000-SQ-C3	384820C
1	1	1-1/2	4	0.015	MTi7C-S-1000-R015-C3	384840C
1	1	1-1/2	4	0.030	MTi7C-S-1000-R030-C3	384860C
1	1	1-1/2	4	0.060	MTi7C-S-1000-R060-C3	384880C
1	1	1-1/2	4	0.090	MTi7C-S-1000-R090-C3	384900C
1	1	1-1/2	4	0.120	MTi7C-S-1000-R120-C3	384920C
1	1	2-5/8	5	SQ	MTi7C-M-1000-SQ-C3	385220C
1	1	2-5/8	5	0.015	MTi7C-M-1000-R015-C3	385240C
1	1	2-5/8	5	0.030	MTi7C-M-1000-R030-C3	385260C
1	1	2-5/8	5	0.060	MTi7C-M-1000-R060-C3	385280C
1	1	2-5/8	5	0.090	MTi7C-M-1000-R090-C3	385300C
1	1	2-5/8	5	0.120	MTi7C-M-1000-R120-C3	385320C
1	1	3-1/4	6	SQ	MTi7C-L-1000-SQ-C3	385420C
1	1	3-1/4	6	0.015	MTi7C-L-1000-R015-C3	385440C
1	1	3-1/4	6	0.030	MTi7C-L-1000-R030-C3	385460C
1	1	3-1/4	6	0.060	MTi7C-L-1000-R060-C3	385480C
1	1	3-1/4	6	0.090	MTi7C-L-1000-R090-C3	385500C
1	1	3-1/4	6	0.120	MTi7C-L-1000-R120-C3	385520C

**Speed & Feed:** page 189



## 4 FLUTE • VARIABLE HELIX FOR ROUGHING & FINISHING

- Geometry targeted for Nickel based materials
- For roughing & finishing
- Variable Helix and Variable Indexing helps reduce chatter and tool pressure

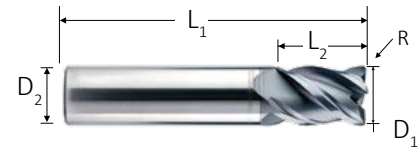
Carbide		Center Cutting		<b>C3</b>	+0.000 -0.002	+0.0005 -0.0005 <1/8	Radius							HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/8	1/8	1/4	1-1/2	0.015	MNi4-S-0125-R015-C3	340540
1/8	1/8	1/4	1-1/2	0.030	MNi4-S-0125-R030-C3	340560
1/8	1/8	1/2	2	0.015	MNi4-R-0125-R015-C3	340620
1/8	1/8	1/2	2	0.030	MNi4-R-0125-R030-C3	340640
3/16	3/16	5/16	2	0.015	MNi4-S-0187-R015-C3	340780
3/16	3/16	5/16	2	0.030	MNi4-S-0187-R030-C3	340800
3/16	3/16	9/16	2-1/2	0.015	MNi4-R-0187-R015-C3	340860
3/16	3/16	9/16	2-1/2	0.030	MNi4-R-0187-R030-C3	340880
1/4	1/4	3/8	2	0.015	MNi4-S-0250-R015-C3	341000
1/4	1/4	3/8	2	0.020	MNi4-S-0250-R020-C3	341020
1/4	1/4	3/8	2	0.030	MNi4-S-0250-R030-C3	341040
1/4	1/4	3/8	2	0.060	MNi4-S-0250-R060-C3	341060
1/4	1/4	3/8	2	0.090	MNi4-S-0250-R090-C3	341080
1/4	1/4	1/2	2-1/2	0.015	MNi4-SR-0250-R015-C3	341120
1/4	1/4	1/2	2-1/2	0.020	MNi4-SR-0250-R020-C3	341140
1/4	1/4	1/2	2-1/2	0.030	MNi4-SR-0250-R030-C3	341160
1/4	1/4	1/2	2-1/2	0.060	MNi4-SR-0250-R060-C3	341180
1/4	1/4	1/2	2-1/2	0.090	MNi4-SR-0250-R090-C3	341200
1/4	1/4	3/4	2-1/2	0.015	MNi4-R-0250-R015-C3	341240
1/4	1/4	3/4	2-1/2	0.020	MNi4-R-0250-R020-C3	341260
1/4	1/4	3/4	2-1/2	0.030	MNi4-R-0250-R030-C3	341280
1/4	1/4	3/4	2-1/2	0.060	MNi4-R-0250-R060-C3	341300
1/4	1/4	3/4	2-1/2	0.090	MNi4-R-0250-R090-C3	341320
1/4	1/4	1	3	0.015	MNi4-M-0250-R015-C3	341332
1/4	1/4	1	3	0.020	MNi4-M-0250-R020-C3	341333
1/4	1/4	1	3	0.030	MNi4-M-0250-R030-C3	341334
1/4	1/4	1	3	0.060	MNi4-M-0250-R060-C3	341335
1/4	1/4	1	3	0.090	MNi4-M-0250-R090-C3	341336
5/16	5/16	7/16	2	0.015	MNi4-S-0312-R015-C3	341480
5/16	5/16	7/16	2	0.030	MNi4-S-0312-R030-C3	341500
5/16	5/16	7/16	2	0.060	MNi4-S-0312-R060-C3	341520
5/16	5/16	7/16	2	0.090	MNi4-S-0312-R090-C3	341540
5/16	5/16	13/16	2-1/2	0.015	MNi4-R-0312-R015-C3	341580
5/16	5/16	13/16	2-1/2	0.030	MNi4-R-0312-R030-C3	341600
5/16	5/16	13/16	2-1/2	0.060	MNi4-R-0312-R060-C3	341620
5/16	5/16	13/16	2-1/2	0.090	MNi4-R-0312-R090-C3	341640
3/8	3/8	1/2	2	0.015	MNi4-S-0375-R015-C3	341780
3/8	3/8	1/2	2	0.020	MNi4-S-0375-R020-C3	341800
3/8	3/8	1/2	2	0.030	MNi4-S-0375-R030-C3	341820
3/8	3/8	1/2	2	0.060	MNi4-S-0375-R060-C3	341840
3/8	3/8	1/2	2	0.090	MNi4-S-0375-R090-C3	341860
3/8	3/8	1/2	2	0.120	MNi4-S-0375-R120-C3	341880

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sizes continued on next page

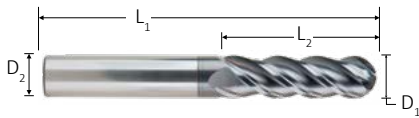
## 4 FLUTE • VARIABLE HELIX FOR ROUGHING & FINISHING



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
3/8	3/8	1	2-1/2	0.015	MNi4-R-0375-R015-C3	341920
3/8	3/8	1	2-1/2	0.020	MNi4-R-0375-R020-C3	341940
3/8	3/8	1	2-1/2	0.030	MNi4-R-0375-R030-C3	341960
3/8	3/8	1	2-1/2	0.060	MNi4-R-0375-R060-C3	341980
3/8	3/8	1	2-1/2	0.090	MNi4-R-0375-R090-C3	342000
3/8	3/8	1	2-1/2	0.120	MNi4-R-0375-R120-C3	342020
3/8	3/8	1-1/4	3	0.015	MNi4-M-0375-R015-C3	342060
3/8	3/8	1-1/4	3	0.020	MNi4-M-0375-R020-C3	342080
3/8	3/8	1-1/4	3	0.030	MNi4-M-0375-R030-C3	342100
3/8	3/8	1-1/4	3	0.060	MNi4-M-0375-R060-C3	342120
3/8	3/8	1-1/4	3	0.090	MNi4-M-0375-R090-C3	342140
3/8	3/8	1-1/4	3	0.120	MNi4-M-0375-R120-C3	342160
1/2	1/2	5/8	2-1/2	0.015	MNi4-S-0500-R015-C3	342340
1/2	1/2	5/8	2-1/2	0.030	MNi4-S-0500-R030-C3	342360
1/2	1/2	5/8	2-1/2	0.060	MNi4-S-0500-R060-C3	342380
1/2	1/2	5/8	2-1/2	0.090	MNi4-S-0500-R090-C3	342400
1/2	1/2	5/8	2-1/2	0.120	MNi4-S-0500-R120-C3	342420
1/2	1/2	1	3	0.015	MNi4-SR-0500-R015-C3	342500
1/2	1/2	1	3	0.030	MNi4-SR-0500-R030-C3	342520
1/2	1/2	1	3	0.060	MNi4-SR-0500-R060-C3	342540
1/2	1/2	1	3	0.090	MNi4-SR-0500-R090-C3	342560
1/2	1/2	1	3	0.120	MNi4-SR-0500-R120-C3	342580
1/2	1/2	1-1/4	3	0.015	MNi4-R-0500-R015-C3	342660
1/2	1/2	1-1/4	3	0.030	MNi4-R-0500-R030-C3	342680
1/2	1/2	1-1/4	3	0.060	MNi4-R-0500-R060-C3	342700
1/2	1/2	1-1/4	3	0.090	MNi4-R-0500-R090-C3	342720
1/2	1/2	1-1/4	3	0.120	MNi4-R-0500-R120-C3	342740
1/2	1/2	1-5/8	4	0.015	MNi4-M-0500-R015-C3	342820
1/2	1/2	1-5/8	4	0.030	MNi4-M-0500-R030-C3	342840
1/2	1/2	1-5/8	4	0.060	MNi4-M-0500-R060-C3	342860
1/2	1/2	1-5/8	4	0.090	MNi4-M-0500-R090-C3	342880
1/2	1/2	1-5/8	4	0.120	MNi4-M-0500-R120-C3	342900

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## 4 FLUTE • BALL NOSE VARIABLE HELIX FOR ROUGHING & FINISHING

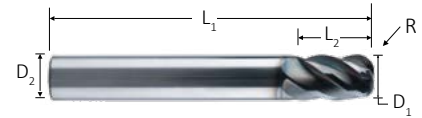
- › Geometry targeted for Nickel based materials
- › For 3D roughing & finishing
- › Variable Helix & Variable Indexing helps reduce chatter and tool pressure

Carbide	4	Center Cutting	variable	<b>C3</b>	+0.000 -0.002	+0.0005 -0.0005 <1/8	Ball						HRC <54	M S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	C3 EDP
1/8	1/8	1/4	1-1/2	Ball	MNi4-S-0125-BN-C3	340570
1/8	1/8	1/2	2	Ball	MNi4-R-0125-BN-C3	340650
3/16	3/16	5/16	2	Ball	MNi4-S-0187-BN-C3	340810
3/16	3/16	9/16	2-1/2	Ball	MNi4-R-0187-BN-C3	340890
1/4	1/4	3/8	2	Ball	MNi4-S-0250-BN-C3	341090
1/4	1/4	1/2	2-1/2	Ball	MNi4-SR-0250-BN-C3	341210
1/4	1/4	3/4	2-1/2	Ball	MNi4-R-0250-BN-C3	341330
1/4	1/4	1	3	Ball	MNi4-M-0250-BN-C3	341337
5/16	5/16	7/16	2	Ball	MNi4-S-0312-BN-C3	341550
5/16	5/16	13/16	2-1/2	Ball	MNi4-R-0312-BN-C3	341650
3/8	3/8	1/2	2	Ball	MNi4-S-0375-BN-C3	341890
3/8	3/8	1	2-1/2	Ball	MNi4-R-0375-BN-C3	342030
3/8	3/8	1-1/4	3	Ball	MNi4-M-0375-BN-C3	342170
1/2	1/2	5/8	2-1/2	Ball	MNi4-S-0500-BN-C3	342470
1/2	1/2	1	3	Ball	MNi4-SR-0500-BN-C3	342630
1/2	1/2	1-1/4	3	Ball	MNi4-R-0500-BN-C3	342790
1/2	1/2	1-5/8	4	Ball	MNi4-M-0500-BN-C3	342950

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## 5 FLUTE • VARIABLE HELIX FOR ROUGHING & FINISHING



- › Targeted for Nickel based materials
- › Designed for Roughing & Finishing
- › Variable Helix and Index for reduced chatter
- › Higher productivity over 4 flute tooling



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/4	1/4	3/8	2	0.015	MNi5-S-0250-R015-C3	361000
1/4	1/4	3/8	2	0.020	MNi5-S-0250-R020-C3	361020
1/4	1/4	3/8	2	0.030	MNi5-S-0250-R030-C3	361040
1/4	1/4	3/8	2	0.060	MNi5-S-0250-R060-C3	361060
1/4	1/4	3/8	2	0.090	MNi5-S-0250-R090-C3	361080
1/4	1/4	1/2	2-1/2	0.015	MNi5-SR-0250-R015-C3	361120
1/4	1/4	1/2	2-1/2	0.020	MNi5-SR-0250-R020-C3	361140
1/4	1/4	1/2	2-1/2	0.030	MNi5-SR-0250-R030-C3	361160
1/4	1/4	1/2	2-1/2	0.060	MNi5-SR-0250-R060-C3	361180
1/4	1/4	1/2	2-1/2	0.090	MNi5-SR-0250-R090-C3	361200
1/4	1/4	3/4	2-1/2	0.015	MNi5-R-0250-R015-C3	361240
1/4	1/4	3/4	2-1/2	0.020	MNi5-R-0250-R020-C3	361260
1/4	1/4	3/4	2-1/2	0.030	MNi5-R-0250-R030-C3	361280
1/4	1/4	3/4	2-1/2	0.060	MNi5-R-0250-R060-C3	361300
1/4	1/4	3/4	2-1/2	0.090	MNi5-R-0250-R090-C3	361320
1/4	1/4	1	3	0.015	MNi5-M-0250-R015-C3	361332
1/4	1/4	1	3	0.020	MNi5-M-0250-R020-C3	361333
1/4	1/4	1	3	0.030	MNi5-M-0250-R030-C3	361334
1/4	1/4	1	3	0.060	MNi5-M-0250-R060-C3	361335
1/4	1/4	1	3	0.090	MNi5-M-0250-R090-C3	361336
5/16	5/16	7/16	2	0.015	MNi5-S-0312-R015-C3	361480
5/16	5/16	7/16	2	0.030	MNi5-S-0312-R030-C3	361500
5/16	5/16	7/16	2	0.060	MNi5-S-0312-R060-C3	361520
5/16	5/16	7/16	2	0.090	MNi5-S-0312-R090-C3	361540
5/16	5/16	13/16	2-1/2	0.015	MNi5-R-0312-R015-C3	361580
5/16	5/16	13/16	2-1/2	0.030	MNi5-R-0312-R030-C3	361600
5/16	5/16	13/16	2-1/2	0.060	MNi5-R-0312-R060-C3	361620
5/16	5/16	13/16	2-1/2	0.090	MNi5-R-0312-R090-C3	361640
3/8	3/8	1/2	2	0.015	MNi5-S-0375-R015-C3	361780
3/8	3/8	1/2	2	0.020	MNi5-S-0375-R020-C3	361800
3/8	3/8	1/2	2	0.030	MNi5-S-0375-R030-C3	361820
3/8	3/8	1/2	2	0.060	MNi5-S-0375-R060-C3	361840
3/8	3/8	1/2	2	0.090	MNi5-S-0375-R090-C3	361860
3/8	3/8	1/2	2	0.120	MNi5-S-0375-R120-C3	361880
3/8	3/8	1	2-1/2	0.015	MNi5-R-0375-R015-C3	361920
3/8	3/8	1	2-1/2	0.020	MNi5-R-0375-R020-C3	361940
3/8	3/8	1	2-1/2	0.030	MNi5-R-0375-R030-C3	361960
3/8	3/8	1	2-1/2	0.060	MNi5-R-0375-R060-C3	361980
3/8	3/8	1	2-1/2	0.090	MNi5-R-0375-R090-C3	362000
3/8	3/8	1	2-1/2	0.120	MNi5-R-0375-R120-C3	362020

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**5 FLUTE • VARIABLE HELIX FOR ROUGHING & FINISHING**

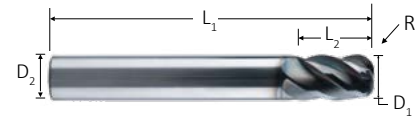
sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
3/8	3/8	1-1/4	3	0.015	MNi5-M-0375-R015-C3	362060
3/8	3/8	1-1/4	3	0.020	MNi5-M-0375-R020-C3	362080
3/8	3/8	1-1/4	3	0.030	MNi5-M-0375-R030-C3	362100
3/8	3/8	1-1/4	3	0.060	MNi5-M-0375-R060-C3	362120
3/8	3/8	1-1/4	3	0.090	MNi5-M-0375-R090-C3	362140
3/8	3/8	1-1/4	3	0.120	MNi5-M-0375-R120-C3	362160
1/2	1/2	5/8	2-1/2	SQ	MNi5-S-0500-SQ-C3	362320
1/2	1/2	5/8	2-1/2	0.015	MNi5-S-0500-R015-C3	362340
1/2	1/2	5/8	2-1/2	0.030	MNi5-S-0500-R030-C3	362360
1/2	1/2	5/8	2-1/2	0.060	MNi5-S-0500-R060-C3	362380
1/2	1/2	5/8	2-1/2	0.090	MNi5-S-0500-R090-C3	362400
1/2	1/2	5/8	2-1/2	0.120	MNi5-S-0500-R120-C3	362420
1/2	1/2	1	3	0.015	MNi5-SR-0500-R015-C3	362500
1/2	1/2	1	3	0.030	MNi5-SR-0500-R030-C3	362520
1/2	1/2	1	3	0.060	MNi5-SR-0500-R060-C3	362540
1/2	1/2	1	3	0.090	MNi5-SR-0500-R090-C3	362560
1/2	1/2	1	3	0.120	MNi5-SR-0500-R120-C3	362580
1/2	1/2	1-1/4	3	0.015	MNi5-R-0500-R015-C3	362660
1/2	1/2	1-1/4	3	0.030	MNi5-R-0500-R030-C3	362680
1/2	1/2	1-1/4	3	0.060	MNi5-R-0500-R060-C3	362700
1/2	1/2	1-1/4	3	0.090	MNi5-R-0500-R090-C3	362720
1/2	1/2	1-1/4	3	0.120	MNi5-R-0500-R120-C3	362740
1/2	1/2	1-5/8	4	0.015	MNi5-M-0500-R015-C3	362820
1/2	1/2	1-5/8	4	0.030	MNi5-M-0500-R030-C3	362840
1/2	1/2	1-5/8	4	0.060	MNi5-M-0500-R060-C3	362860
1/2	1/2	1-5/8	4	0.090	MNi5-M-0500-R090-C3	362880
1/2	1/2	1-5/8	4	0.120	MNi5-M-0500-R120-C3	362900
5/8	5/8	3/4	3	0.015	MNi5-S-0625-R015-C3	363140
5/8	5/8	3/4	3	0.030	MNi5-S-0625-R030-C3	363160
5/8	5/8	3/4	3	0.060	MNi5-S-0625-R060-C3	363180
5/8	5/8	3/4	3	0.090	MNi5-S-0625-R090-C3	363200
5/8	5/8	3/4	3	0.120	MNi5-S-0625-R120-C3	363220
5/8	5/8	1-1/4	3-1/2	0.015	MNi5-SR-0625-R015-C3	363300
5/8	5/8	1-1/4	3-1/2	0.030	MNi5-SR-0625-R030-C3	363320
5/8	5/8	1-1/4	3-1/2	0.060	MNi5-SR-0625-R060-C3	363340
5/8	5/8	1-1/4	3-1/2	0.090	MNi5-SR-0625-R090-C3	363360
5/8	5/8	1-1/4	3-1/2	0.120	MNi5-SR-0625-R120-C3	363380
5/8	5/8	1-5/8	3-1/2	0.015	MNi5-R-0625-R015-C3	363460
5/8	5/8	1-5/8	3-1/2	0.030	MNi5-R-0625-R030-C3	363480
5/8	5/8	1-5/8	3-1/2	0.060	MNi5-R-0625-R060-C3	363500
5/8	5/8	1-5/8	3-1/2	0.090	MNi5-R-0625-R090-C3	363520
5/8	5/8	1-5/8	3-1/2	0.120	MNi5-R-0625-R120-C3	363540
3/4	3/4	1	3	0.015	MNi5-S-0750-R015-C3	363940
3/4	3/4	1	3	0.030	MNi5-S-0750-R030-C3	363960
3/4	3/4	1	3	0.060	MNi5-S-0750-R060-C3	363980
3/4	3/4	1	3	0.090	MNi5-S-0750-R090-C3	364000

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sizes continued on next page

## 5 FLUTE • VARIABLE HELIX FOR ROUGHING & FINISHING



sizes continued from previous page

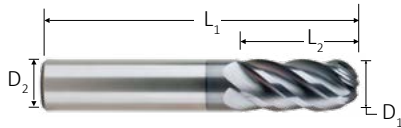
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
3/4	3/4	1	3	0.120	MNi5-S-0750-R120-C3	364020
3/4	3/4	1-5/8	4	0.015	MNi5-R-0750-R015-C3	364120
3/4	3/4	1-5/8	4	0.030	MNi5-R-0750-R030-C3	364140
3/4	3/4	1-5/8	4	0.060	MNi5-R-0750-R060-C3	364160
3/4	3/4	1-5/8	4	0.090	MNi5-R-0750-R090-C3	364180
3/4	3/4	1-5/8	4	0.120	MNi5-R-0750-R120-C3	364200
3/4	3/4	2-1/4	5	0.015	MNi5-M-0750-R015-C3	364300
3/4	3/4	2-1/4	5	0.030	MNi5-M-0750-R030-C3	364320
3/4	3/4	2-1/4	5	0.060	MNi5-M-0750-R060-C3	364340
3/4	3/4	2-1/4	5	0.090	MNi5-M-0750-R090-C3	364360
3/4	3/4	2-1/4	5	0.120	MNi5-M-0750-R120-C3	364380
1	1	1-1/2	4	0.015	MNi5-S-1000-R015-C3	364840
1	1	1-1/2	4	0.030	MNi5-S-1000-R030-C3	364860
1	1	1-1/2	4	0.060	MNi5-S-1000-R060-C3	364880
1	1	1-1/2	4	0.090	MNi5-S-1000-R090-C3	364900
1	1	1-1/2	4	0.120	MNi5-S-1000-R120-C3	364920

**Speed & Feed:** page 191



Series: **MNi5**

# INCONEL & NICKEL BASED ALLOYS



## 5 FLUTE • BALL NOSE VARIABLE HELIX FOR ROUGHING & FINISHING

- › Geometry targeted for Nickel based materials
- › For 3D roughing & finishing
- › Variable Helix & Variable Indexing helps reduce chatter and tool pressure



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	C3 EDP
1/4	1/4	3/8	2	Ball	MNi5-S-0250-BN-C3	361090
1/4	1/4	1/2	2-1/2	Ball	MNi5-SR-0250-BN-C3	361210
1/4	1/4	3/4	2-1/2	Ball	MNi5-R-0250-BN-C3	361330
1/4	1/4	1	3	Ball	MNi5-M-0250-BN-C3	361337
5/16	5/16	7/16	2	Ball	MNi5-S-0312-BN-C3	361550
5/16	5/16	13/16	2-1/2	Ball	MNi5-R-0312-BN-C3	361650
3/8	3/8	1/2	2	Ball	MNi5-S-0375-BN-C3	361890
3/8	3/8	1	2-1/2	Ball	MNi5-R-0375-BN-C3	362030
3/8	3/8	1-1/4	3	Ball	MNi5-M-0375-BN-C3	362170
1/2	1/2	5/8	2-1/2	Ball	MNi5-S-0500-BN-C3	362470
1/2	1/2	1	3	Ball	MNi5-SR-0500-BN-C3	362630
1/2	1/2	1-1/4	3	Ball	MNi5-R-0500-BN-C3	362790
1/2	1/2	1-5/8	4	Ball	MNi5-M-0500-BN-C3	362950
5/8	5/8	3/4	3	Ball	MNi5-S-0625-BN-C3	363270
5/8	5/8	1-1/4	3-1/2	Ball	MNi5-SR-0625-BN-C3	363430
5/8	5/8	1-5/8	3-1/2	Ball	MNi5-R-0625-BN-C3	363590
3/4	3/4	1	3	Ball	MNi5-S-0750-BN-C3	364090
3/4	3/4	1-5/8	4	Ball	MNi5-R-0750-BN-C3	364270
3/4	3/4	2-1/4	5	Ball	MNi5-M-0750-BN-C3	364450
1	1	1-1/2	4	Ball	MNi5-S-1000-BN-C3	365010

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## 3 FLUTE • VARIABLE FLUTE - HP ROUGHING & FINISHING APPLICATION



- ▶ Geometry designed to reduce chatter, universal machining operations
- ▶ Unique titanium focused geometry and edge prep enables efficient cutting action
- ▶ Eccentric relief provides an exceptionally strong cutting edge
- ▶ Proprietary nACRo coating allows for higher SFM and is especially effective in extending tool life



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	nACRo EDP
.031 (1/32)	1/8	.046		1-1/2	0.005	VXMG3T-.031-SF	H6917
.031 (1/32)	1/8	.046	0.156	2-1/2	0.005	VXMG3T-.031-SF5	H6918
.031 (1/32)	1/8	.046	0.250	2-1/2	0.005	VXMG3T-.031-SF8	H6919
.031 (1/32)	1/8	.093		1-1/2	SQ	VXMG3T-.031-NR	H6920
.031 (1/32)	1/8	.093		1-1/2	0.005	VXMG3T-.031-LF3	H6921
.031 (1/32)	1/8	.156		2-1/2	0.005	VXMG3T-.031-LF5	H6922
.047 (3/64)	1/8	.070		1-1/2	0.005	VXMG3T-.047-SF	H6923
.047 (3/64)	1/8	.070	0.250	2-1/2	0.005	VXMG3T-.047-SF5	H6924
.047 (3/64)	1/8	.070	0.375	2-1/2	0.005	VXMG3T-.047-SF8	H6925
.047 (3/64)	1/8	.141		1-1/2	SQ	VXMG3T-.047-NR	H6926
.047 (3/64)	1/8	.141		1-1/2	0.005	VXMG3T-.047-LF3	H6927
.047 (3/64)	1/8	.250		2-1/2	0.005	VXMG3T-.047-LF5	H6928
.055	1/8	.083		1-1/2	0.005	VXMG3T-.055-SF	H6929
.055	1/8	.165		1-1/2	0.005	VXMG3T-.055-LF3	H6930
.055	1/8	.275		1-1/2	0.005	VXMG3T-.055-LF5	H6931
.062 (1/16)	1/8	.093		1-1/2	0.010	VXMG3T-.062-SF	H6932
.062 (1/16)	1/8	.093	0.312	2-1/2	0.010	VXMG3T-.062-SF5	H6933
.062 (1/16)	1/8	.093	0.500	2-1/2	0.010	VXMG3T-.062-SF8	H6934
.062 (1/16)	1/8	.186		1-1/2	SQ	VXMG3T-.062-NR	H6935
.062 (1/16)	1/8	.186		1-1/2	0.010	VXMG3T-.062-LF3	H6936
.062 (1/16)	1/8	.312		2-1/2	0.010	VXMG3T-.062-LF5	H6937
.078 (5/64)	1/8	.117		1-1/2	0.010	VXMG3T-.078-SF	H6938
.078 (5/64)	1/8	.234		1-1/2	SQ	VXMG3T-.078-NR	H6939
.078 (5/64)	1/8	.234		1-1/2	0.010	VXMG3T-.078-LF3	H6940
.093 (3/32)	1/8	.140		1-1/2	0.010	VXMG3T-.093-SF	H6941
.093 (3/32)	1/8	.140	0.500	2-1/2	0.010	VXMG3T-.093-SF5	H6942
.093 (3/32)	1/8	.140	0.750	2-1/2	0.010	VXMG3T-.093-SF8	H6943
.093 (3/32)	1/8	.279		1-1/2	SQ	VXMG3T-.093-NR	H6944
.093 (3/32)	1/8	.279		1-1/2	0.010	VXMG3T-.093-LF3	H6945
.093 (3/32)	1/8	.500		2-1/2	0.010	VXMG3T-.093-LF5	H6946
* Shank 1/4							
.093 (3/32)	1/4	.188		2-1/2	SQ	VXMG3T-803-SF-NR	H7990
.093 (3/32)	1/4	.188		2-1/2	0.010	VXMG3T-803-SF	H7991
.093 (3/32)	1/4	.375		2-1/2	SQ	VXMG3T-803-LF-NR	H7977
.093 (3/32)	1/4	.375		2-1/2	0.010	VXMG3T-803-LF	H7992
.125 (1/8)	1/4	.250		2-1/2	SQ	VXMG3T-804-SF-NR	H7997
.125 (1/8)	1/4	.250		2-1/2	0.015	VXMG3T-804-SF	H7946
.125 (1/8)	1/4	.500		2-1/2	SQ	VXMG3T-804-LF-NR	H7998
.125 (1/8)	1/4	.500		2-1/2	0.015	VXMG3T-804-LF	H7999

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sizes continued on next page



## 3 FLUTE • VARIABLE FLUTE - HP ROUGHING & FINISHING APPLICATION

sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	nACRo EDP
.1562 (5/32)	1/4	0.375		2-1/2	SQ	VXMG3T-805-SF-NR	H7965
.1562 (5/32)	1/4	0.375	0.7810	2-1/2	SQ	VXMG3T-805-SF-NR3	H7966
.1562 (5/32)	1/4	0.375		2-1/2	0.015	VXMG3T-805-SF	H7967
.1562 (5/32)	1/4	0.563		2-1/2	SQ	VXMG3T-805-LF-NR	H7968
.1562 (5/32)	1/4	0.563		2-1/2	0.015	VXMG3T-805-LF	H7969
.1562 (5/32)	1/4	0.563	0.7810	2-1/2	0.015	VXMG3T-805-LF3	H7970
.1875 (3/16)	1/4	.375		2-1/2	SQ	VXMG3T-806-SF-NR	H7971
.1875 (3/16)	1/4	.375		2-1/2	0.015	VXMG3T-806-SF	H8223
.1875 (3/16)	1/4	.625		2-1/2	SQ	VXMG3T-806-LF-NR	H8224
.1875 (3/16)	1/4	.625		2-1/2	0.015	VXMG3T-806-LF	H8225
.250 (1/4)	1/4	.500		2-1/2	SQ	VXMG3T-808-SF-NR	H8230
.250 (1/4)	1/4	.500		2-1/2	0.015	VXMG3T-808-SF	H8231
.250 (1/4)	1/4	.750		2-1/2	SQ	VXMG3T-808-LF-NR	H8232
.250 (1/4)	1/4	.750		2-1/2	0.015	VXMG3T-808-LF	H8233

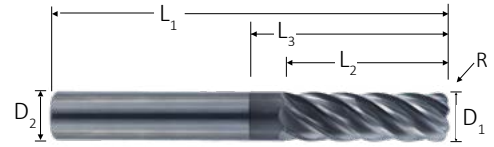
**Speed & Feed:** page 192

Carbide	3	Center Cutting	variable	nACRo	+ .012mm - .012mm < 3mm	+ .000mm - .050mm 3mm	Radius		HRC < 54	M S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	nACRo EDP
1.0mm	4mm	1.5mm		50mm	0.10mm	VXMG3T-M1.0-SF	H6947
1.0mm	4mm	1.5mm	5mm	50mm	0.10mm	VXMG3T-M1.0-SF5	H6948
1.0mm	4mm	1.5mm	8mm	50mm	0.10mm	VXMG3T-M1.0-SF8	H6949
1.0mm	4mm	3.0mm		50mm	0.10mm	VXMG3T-M1.0-LF3	H6950
1.5mm	4mm	2.2mm		50mm	0.20mm	VXMG3T-M1.5-SF	H6951
1.5mm	4mm	2.2mm	7.5mm	50mm	0.20mm	VXMG3T-M1.5-SF5	H6952
1.5mm	4mm	2.2mm	12mm	50mm	0.20mm	VXMG3T-M1.5-SF8	H6953
1.5mm	4mm	4.5mm		50mm	0.20mm	VXMG3T-M1.5-LF3	H6954
1.6mm	4mm	2.4mm		50mm	0.20mm	VXMG3T-M1.6-SF	H2074
1.6mm	4mm	5.0mm		50mm	0.20mm	VXMG3T-M1.6-LF3	H6915
2.0mm	4mm	3.0mm		50mm	0.20mm	VXMG3T-M2.0-SF	H6955
2.0mm	4mm	3.0mm	10mm	50mm	0.20mm	VXMG3T-M2.0-SF5	H6956
2.0mm	4mm	3.0mm	16mm	50mm	0.20mm	VXMG3T-M2.0-SF8	H6957
2.0mm	4mm	6.0mm		50mm	0.20mm	VXMG3T-M2.0-LF3	H6958
2.5mm	4mm	3.8mm		50mm	0.20mm	VXMG3T-M2.5-SF	H6916
2.5mm	4mm	7.5mm		50mm	0.20mm	VXMG3T-M2.5-LF3	H6959
3.0mm	4mm	4.5mm		50mm	0.20mm	VXMG3T-M3.0-SF	H6960
3.0mm	4mm	4.5mm	15mm	50mm	0.20mm	VXMG3T-M3.0-SF5	H6961
3.0mm	4mm	9.0mm		50mm	0.20mm	VXMG3T-M3.0-LF3	H6962

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## 6 FLUTE • VARIABLE FL - ROUGHING & FINISHING APPLICATIONS



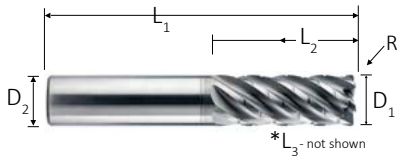
- > Geometry designed to reduce chatter, universal machining operations
- > Titanium focused geometry and edge prep enables efficient cutting action
- > Eccentric relief provides an exceptionally strong cutting edge
- > Excellent for roughing & finishing applications



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	nACRo EDP
3/8	3/8	1		3	SQ	VXMG6T-1212-NR	H7191
3/8	3/8	1		3	0.015	VXMG6T-1212-R015	H7192
3/8	3/8	1		3	0.030	VXMG6T-1212-R030	H7196
3/8	3/8	1		3	0.060	VXMG6T-1212-R060	H7193
3/8	3/8	1	1-7/8	4	0.015	VXMG6T-1212-R015N1	H7194
3/8	3/8	1	1-7/8	4	0.030	VXMG6T-1212-R030N1	H7195
1/2	1/2	1-1/4		3	SQ	VXMG6T-1616-NR	H7201
1/2	1/2	1-1/4		3	0.015	VXMG6T-1616-R015	H7197
1/2	1/2	1-1/4		3	0.030	VXMG6T-1616-R030	H7198
1/2	1/2	1-1/4		3	0.060	VXMG6T-1616-R060	H7199
1/2	1/2	1-1/4		3	0.120	VXMG6T-1616-R120	H7200
1/2	1/2	1-1/4	2-1/4	4	SQ	VXMG6T-1616-NRN1	H7861
1/2	1/2	1-1/4	2-1/4	4	0.030	VXMG6T-1616-R030N1	H7202
1/2	1/2	1-1/4	2-1/4	4	0.060	VXMG6T-1616-R060N1	H7203
1/2	1/2	1-1/4	2-1/4	4	0.120	VXMG6T-1616-R120N1	H7862
1/2	1/2	1-1/4	3	5	SQ	VXMG6T-1616-NRN2	H7863
1/2	1/2	1-1/4	3	5	0.030	VXMG6T-1616-R030N2	H7864
1/2	1/2	1-1/4	3	5	0.060	VXMG6T-1616-R060N2	H7865
1/2	1/2	1-1/4	3	5	0.120	VXMG6T-1616-R120N2	H7866
5/8	5/8	1-1/4		3-1/2	SQ	VXMG6T-2020-NR	H7206
5/8	5/8	1-1/4		3-1/2	0.030	VXMG6T-2020-R030	H7204
5/8	5/8	1-1/4		3-1/2	0.060	VXMG6T-2020-R060	H7205
5/8	5/8	1-1/4	2-1/4	4	0.030	VXMG6T-2020-R030N1	H7207
5/8	5/8	1-1/4	2-1/4	4	0.060	VXMG6T-2020-R060N1	H7208
3/4	3/4	1-5/8		4	SQ	VXMG6T-2424-NR	H7209
3/4	3/4	1-5/8		4	0.030	VXMG6T-2424-R030	H7210
3/4	3/4	1-5/8		4	0.060	VXMG6T-2424-R060	H7215
3/4	3/4	1-5/8		4	0.090	VXMG6T-2424-R090	H7211
3/4	3/4	1-5/8		4	0.120	VXMG6T-2424-R120	H7212
3/4	3/4	1-5/8	3	5	SQ	VXMG6T-2424-NRN1	H7825
3/4	3/4	1-5/8	3	5	0.030	VXMG6T-2424-R030N1	H7213
3/4	3/4	1-5/8	3	5	0.060	VXMG6T-2424-R060N1	H7214
3/4	3/4	1-5/8	3	5	0.120	VXMG6T-2424-R120N1	H7826
1	1	1-3/4		4-1/2	SQ	VXMG6T-3232-NR	H7220
1	1	1-3/4		4-1/2	0.030	VXMG6T-3232-R030	H7216
1	1	1-3/4		4-1/2	0.060	VXMG6T-3232-R060	H7217
1	1	1-3/4		4-1/2	0.120	VXMG6T-3232-R120	H7218
1	1	1-3/4	3-1/4	5-1/2	SQ	VXMG6T-3232-N1	H7867
1	1	1-3/4	3-1/4	5-1/2	0.030	VXMG6T-3232-R030N1	H7221
1	1	1-3/4	3-1/4	5-1/2	0.060	VXMG6T-3232-R060N1	H7222
1	1	1-3/4	3-1/4	5-1/2	0.120	VXMG6T-3232-R120N1	H7868
1-1/4	1-1/4	2-1/4		5	SQ	VXMG6T-4040-NR	H7225
1-1/4	1-1/4	2-1/4		5	0.030	VXMG6T-4040-R030	H7223

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## 6 FLUTE • VARIABLE FL - ROUGHING & FINISHING APPLICATIONS



- Geometry designed to reduce chatter, universal machining operations
- Titanium focused geometry and edge prep enables efficient cutting action
- Eccentric relief provides an exceptionally strong cutting edge
- Excellent for roughing & finishing applications
- Aggressive Chip Breaker option avoid chip nesting



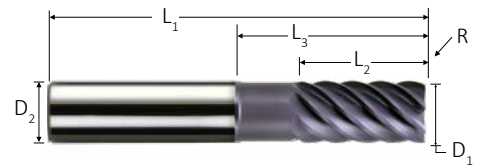
CHIP BREAKER

Carbide	6	Center Cutting	variable	nACRo	+0.000 -0.002	Radius		HRC <54	M S
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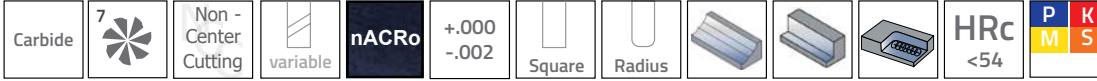
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	nACRo ChipBreaker EDP
3/8	3/8	1		3	0.015	VXMG6TCB-1212-R015	H7192B
3/8	3/8	1		3	0.030	VXMG6TCB-1212-R030	H7196B
3/8	3/8	1		3	0.060	VXMG6TCB-1212-R060	H7193B
3/8	3/8	1	1-7/8	4	0.015	VXMG6TCB-1212-R015N1	H7194B
3/8	3/8	1	1-7/8	4	0.030	VXMG6TCB-1212-R030N1	H7195B
1/2	1/2	1-1/4		3	0.015	VXMG6TCB-1616-R015	H7197B
1/2	1/2	1-1/4		3	0.030	VXMG6TCB-1616-R030	H7198B
1/2	1/2	1-1/4		3	0.060	VXMG6TCB-1616-R060	H7199B
1/2	1/2	1-1/4		3	0.120	VXMG6TCB-1616-R120	H7200B
1/2	1/2	1-1/4	2-1/4	4	0.030	VXMG6TCB-1616-R030N1	H7202B
1/2	1/2	1-1/4	2-1/4	4	0.060	VXMG6TCB-1616-R060N1	H7203B
1/2	1/2	1-1/4	2-1/4	4	0.120	VXMG6TCB-1616-R120N1	H7862B
1/2	1/2	1-1/4	3	5	0.030	VXMG6TCB-1616-R030N2	H7864B
1/2	1/2	1-1/4	3	5	0.060	VXMG6TCB-1616-R060N2	H7865B
1/2	1/2	1-1/4	3	5	0.120	VXMG6TCB-1616-R120N2	H7866B
5/8	5/8	1-1/4		3-1/2	0.030	VXMG6TCB-2020-R030	H7204B
5/8	5/8	1-1/4		3-1/2	0.060	VXMG6TCB-2020-R060	H7205B
5/8	5/8	1-1/4	2-1/4	4	0.030	VXMG6TCB-2020-R030N1	H7207B
5/8	5/8	1-1/4	2-1/4	4	0.060	VXMG6TCB-2020-R060N1	H7208B
3/4	3/4	1-5/8		4	0.030	VXMG6TCB-2424-R030	H7210B
3/4	3/4	1-5/8		4	0.060	VXMG6TCB-2424-R060	H7215B
3/4	3/4	1-5/8		4	0.090	VXMG6TCB-2424-R090	H7211B
3/4	3/4	1-5/8		4	0.120	VXMG6TCB-2424-R120	H7212B
3/4	3/4	1-5/8	3	5	0.030	VXMG6TCB-2424-R030N1	H7213B
3/4	3/4	1-5/8	3	5	0.060	VXMG6TCB-2424-R060N1	H7214B
3/4	3/4	1-5/8	3	5	0.120	VXMG6TCB-2424-R120N1	H7826B
1	1	1-3/4		4-1/2	0.030	VXMG6TCB-3232-R030	H7216B
1	1	1-3/4		4-1/2	0.060	VXMG6TCB-3232-R060	H7217B
1	1	1-3/4		4-1/2	0.120	VXMG6TCB-3232-R120	H7218B
1	1	1-3/4	3-1/4	5-1/2	0.030	VXMG6TCB-3232-R030N1	H7221B
1	1	1-3/4	3-1/4	5-1/2	0.060	VXMG6TCB-3232-R060N1	H7222B
1	1	1-3/4	3-1/4	5-1/2	0.120	VXMG6TCB-3232-R120N1	H7868B
1-1/4	1-1/4	2-1/4		5	0.030	VXMG6TCB-4040-R030	H7223B

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## 7 FLUTE • VARIABLE FL HIGH EFFICIENCY ROUGHING & FINISHING



- ▶ Geometry designed to reduce chatter, utilizing maximum metal removal rates
- ▶ Unique titanium focused geometry and edge prep enables efficient cutting action
- ▶ Additional flutes provide over 40% higher metal removal rates over 4 & 5 flute tools
- ▶ Extreme metal removal rates delivered at full flute length & 15% x D radial depth
- ▶ Excellent for high feed machining processes

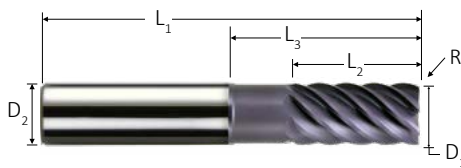


DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	LENGTH	PART NAME	nACRo EDP
1/8	1/8	3/16		1-1/2	SQ	stub	VXMG7-404-NRS-NACRO	H6614
1/8	1/8	3/16		1-1/2	0.010	stub	VXMG7-404-R010S-NACRO	H6615
1/8	1/8	3/8		1-1/2	SQ	std	VXMG7-404-NR-NACRO	H6616
1/8	1/8	3/8		1-1/2	0.010	std	VXMG7-404-R010-NACRO	H6617
3/16	3/16	9/32		1-1/2	SQ	stub	VXMG7-606-NRS-NACRO	34720
3/16	3/16	9/32		1-1/2	0.010	stub	VXMG7-606-R010S-NACRO	H6618
3/16	3/16	9/16		2	SQ	std	VXMG7-606-NR-NACRO	H6619
3/16	3/16	9/16		2	0.010	std	VXMG7-606-R010-NACRO	H6620
1/4	1/4	3/8		2	SQ	stub	VXMG7-808-NRS-NACRO	32241
1/4	1/4	3/8		2	0.015	stub	VXMG7-808-R015S-NACRO	32242
1/4	1/4	3/8	2-1/8	4	0.015	ext neck	VXMG7-808-R015N3-NACRO	32246
1/4	1/4	3/8		4	0.015	no neck	VXMG7-808-R015NN-NACRO	32247
1/4	1/4	3/4	1	2-1/2	SQ	std	VXMG7-808-NR-NACRO	32244
1/4	1/4	3/4	1	2-1/2	0.015	std	VXMG7-808-R015-NACRO	32245
3/8	3/8	1/2		2	SQ	stub	VXMG7-1212-NRS-NACRO	32248
3/8	3/8	1/2		2	0.015	stub	VXMG7-1212-R015S-NACRO	32249
3/8	3/8	1/2	1-1/8	3	0.015	ext neck	VXMG7-1212-R015N1-NACRO	32252
3/8	3/8	1/2	2-1/8	4	0.015	ext neck	VXMG7-1212-R015N2-NACRO	32253
3/8	3/8	1		2-1/2	SQ	std	VXMG7-1212-NR-NACRO	32250
3/8	3/8	1		2-1/2	0.015	std	VXMG7-1212-R015-NACRO	32251
1/2	1/2	5/8		2-1/2	SQ	stub	VXMG7-1616-NRS-NACRO	32254
1/2	1/2	5/8		2-1/2	0.015	stub	VXMG7-1616-R015S-NACRO	32255
1/2	1/2	5/8	1-1/2	4	0.015	ext neck	VXMG7-1616-R015N1-NACRO	32260
1/2	1/2	5/8	2-1/4	4	0.015	ext neck	VXMG7-1616-R015N2-NACRO	32261
1/2	1/2	1	1-1/4	3	SQ	std	VXMG7-1616-NR-NACRO	32256
1/2	1/2	1	1-1/4	3	0.015	std	VXMG7-1616-R015-NACRO	31805
1/2	1/2	1	1-1/4	3	0.030	std	VXMG7-1616-R030-NACRO	31797
1/2	1/2	1-1/4		3	SQ	med	VXMG7-1616-NRM-NACRO	32257
1/2	1/2	1-1/4		3	0.015	med	VXMG7-1616-R015M-NACRO	32258
1/2	1/2	1-1/4		3	0.030	med	VXMG7-1616-R030M-NACRO	32259
5/8	5/8	3/4		3	SQ	stub	VXMG7-2020-NRS-NACRO	32262
5/8	5/8	3/4		3	0.030	stub	VXMG7-2020-R030S-NACRO	32263
5/8	5/8	3/4	1-5/8	5	0.030	ext neck	VXMG7-2020-R030N1-NACRO	32267
5/8	5/8	1-1/4	1-1/2	3-1/2	SQ	std	VXMG7-2020-NR-NACRO	32264
5/8	5/8	1-1/4	1-1/2	3-1/2	0.030	std	VXMG7-2020-R030-NACRO	32265
3/4	3/4	7/8		3	SQ	stub	VXMG7-2424-NRS-NACRO	32269
3/4	3/4	7/8		3	0.030	stub	VXMG7-2424-R030S-NACRO	32271
3/4	3/4	7/8	2	5	0.030	ext neck	VXMG7-2424-R030N1-NACRO	32277
3/4	3/4	1-1/2	1-3/4	4	SQ	std	VXMG7-2424-NR-NACRO	32273
3/4	3/4	1-1/2	1-3/4	4	0.030	std	VXMG7-2424-R030-NACRO	32275
1	1	1-1/2	1-3/4	4	SQ	std	VXMG7-3232-NR-NACRO	32283
1	1	1-1/2	1-3/4	4	0.030	std	VXMG7-3232-R030-NACRO	32287

Speed & Feed: page 194

No LBS Listed\* - Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck

## 7 FLUTE • VARIABLE FL HIGH EFFICIENCY ROUGHING & FINISHING



- ▶ Geometry designed to reduce chatter, utilizing maximum metal removal rates
- ▶ Unique titanium focused geometry and edge prep enables efficient cutting action
- ▶ Additional flutes provide over 40% higher metal removal rates over 4 & 5 flute tools
- ▶ Extreme metal removal rates delivered at full flute length & 15% x D radial depth
- ▶ Excellent for high feed machining processes

Carbide	7	Non - Center Cutting	variable	nACRo	+0.000mm -0.050mm	Square	Radius		HRC <54	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr></table>	P	K	M	S
P	K													
M	S													

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	LENGTH	PART NAME	nACRo EDP
3mm	3mm	6mm		38mm	SQ	stub	VXMG7-M3M3-NRS-NACRO	H6621
3mm	3mm	6mm		38mm	0.25mm	stub	VXMG7-M3M3-R0.25S-NACRO	H6622
3mm	3mm	12mm		38mm	SQ	std	VXMG7-M3M3-NR-NACRO	H6623
3mm	3mm	12mm		38mm	0.25mm	std	VXMG7-M3M3-R0.25S-NACRO	H6624
4mm	4mm	12mm		51mm	SQ	std	VXMG7-M4M4-NR-NACRO	H6625
4mm	4mm	12mm		51mm	0.25mm	std	VXMG7-M4M4-R0.25S-NACRO	H6626
6mm	6mm	20mm	26mm	63mm	SQ	std	VXMG7-M6M6-NR-NACRO	35169
6mm	6mm	20mm	26mm	63mm	0.5mm	std	VXMG7-M6M6-R0.5S-NACRO	35120
6mm	6mm	20mm	no neck	100mm	0.5mm	no neck	VXMG7-M6M6-NN-NACRO	35121
8mm	8mm	20mm	26mm	63mm	SQ	std	VXMG7-M8M8-NR-NACRO	35171
8mm	8mm	20mm	26mm	63mm	0.5mm	std	VXMG7-M8M8-R0.5S-NACRO	35122
8mm	8mm	20mm	26mm	63mm	1.0mm	std	VXMG7-M8M8-R1.0S-NACRO	H6627
8mm	8mm	20mm	no neck	100mm	0.5mm	no neck	VXMG7-M8M8-NN-NACRO	35123
10mm	10mm	24mm	30mm	70mm	SQ	std	VXMG7-M10M10-NR-NACRO	35173
10mm	10mm	24mm	30mm	70mm	0.5mm	std	VXMG7-M10M10-R0.5S-NACRO	35124
10mm	10mm	24mm	30mm	70mm	1.0mm	std	VXMG7-M10M10-R1.0S-NACRO	H6628
10mm	10mm	24mm	30mm	70mm	2.0mm	std	VXMG7-M10M10-R2.0S-NACRO	H6659
10mm	10mm	24mm	no neck	100mm	0.5mm	no neck	VXMG7-M10M10-NN-NACRO	35125
12mm	12mm	25mm	31mm	76mm	SQ	std	VXMG7-M12M12-NR-NACRO	35175
12mm	12mm	25mm	31mm	76mm	0.5mm	std	VXMG7-M12M12-R0.5S-NACRO	35126
12mm	12mm	25mm	31mm	76mm	1.0mm	std	VXMG7-M12M12-R1.0S-NACRO	35605
12mm	12mm	25mm	31mm	76mm	2.0mm	std	VXMG7-M12M12-R2.0S-NACRO	H6629
12mm	12mm	25mm	no neck	100mm	0.5mm	no neck	VXMG7-M12M12-NN-NACRO	35127
14mm	14mm	32mm	38mm	89mm	SQ	std	VXMG7-M14M14-NR-NACRO	35177
14mm	14mm	32mm	38mm	89mm	0.5mm	std	VXMG7-M14M14-R0.5S-NACRO	35128
14mm	14mm	32mm	38mm	89mm	1.0mm	std	VXMG7-M14M14-R1.0S-NACRO	H6630
16mm	16mm	32mm	38mm	89mm	SQ	std	VXMG7-M16M16-NR-NACRO	35179
16mm	16mm	32mm	38mm	89mm	0.5mm	std	VXMG7-M16M16-R0.5S-NACRO	35129
16mm	16mm	32mm	38mm	89mm	1.0mm	std	VXMG7-M16M16-R1.0S-NACRO	H6631
16mm	16mm	32mm	38mm	89mm	2.0mm	std	VXMG7-M16M16-R2.0S-NACRO	H6632
16mm	16mm	32mm	no neck	100mm	0.5mm	std	VXMG7-M16M16-NN-NACRO	35130
18mm	18mm	36mm	42mm	100mm	SQ	std	VXMG7-M18M18-NR-NACRO	35181
18mm	18mm	36mm	42mm	100mm	0.5mm	std	VXMG7-M18M18-R0.5S-NACRO	35131
18mm	18mm	36mm	42mm	100mm	1.0mm	std	VXMG7-M18M18-R1.0S-NACRO	H6633
20mm	20mm	36mm	42mm	100mm	SQ	std	VXMG7-M20M20-NR-NACRO	35183
20mm	20mm	36mm	42mm	100mm	0.5mm	std	VXMG7-M20M20-R0.5S-NACRO	H6634

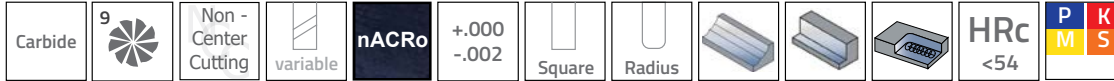
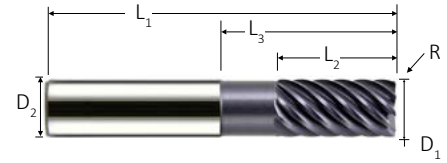
Speed & Feed: page 194

No LBS Listed\* - Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck



## 9 FLUTE • VARIABLE FL - FINE-FINISHING APPLICATIONS

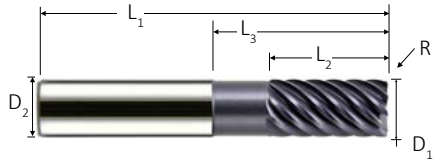
- > Designed to deliver outstanding surface finishes, utilizing maximum metal removal rates
- > Unique titanium focused geometry and edge prep enables efficient cutting action
- > Extreme metal removal rates delivered at full flute length & 5% x D radial depth
- > Proprietary nACRo coating allows for higher SFM and is especially effective in extending tool life
- > Ideal for finishing tight tolerance walls



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	LENGTH	PART NAME	nACRo EDP
3/16	3/16	9/32		1-1/2	SQ	stub	VXMG9-606-NRS-NACRO	H6639
3/16	3/16	9/32		1-1/2	0.010	stub	VXMG9-606-R010S-NACRO	H6640
3/16	3/16	9/16		2	SQ	std	VXMG9-606-NR-NACRO	H6641
3/16	3/16	9/16		2	0.010	std	VXMG9-606-R010-NACRO	H6642
1/4	1/4	3/8		2	SQ	stub	VXMG9-808-NRS-NACRO	32288
1/4	1/4	3/8		2	0.015	stub	VXMG9-808-R015S-NACRO	32289
1/4	1/4	3/8	2-1/8	4	0.015	ext neck	VXMG9-808-R015N3-NACRO	32302
1/4	1/4	3/8	no neck	4	0.015	no neck	VXMG9-808-R015NN-NACRO	32303
1/4	1/4	3/4	1	2-1/2	SQ	std	VXMG9-808-NR-NACRO	32290
1/4	1/4	3/4	1	2-1/2	0.015	std	VXMG9-808-R015-NACRO	32291
3/8	3/8	1/2		2	SQ	stub	VXMG9-1212-NRS-NACRO	32304
3/8	3/8	1/2		2	0.015	stub	VXMG9-1212-R015S-NACRO	32305
3/8	3/8	1/2	1-1/8	3	0.015	ext neck	VXMG9-1212-R015N1-NACRO	32317
3/8	3/8	1/2	2-1/8	4	0.015	ext neck	VXMG9-1212-R015N2-NACRO	32325
3/8	3/8	1		2-1/2	SQ	std	VXMG9-1212-NR-NACRO	32315
3/8	3/8	1		2-1/2	0.015	std	VXMG9-1212-R015-NACRO	32316
1/2	1/2	5/8		2-1/2	SQ	stub	VXMG9-1616-NRS-NACRO	32327
1/2	1/2	5/8		2-1/2	0.015	stub	VXMG9-1616-R015S-NACRO	32328
1/2	1/2	5/8	1-1/2	4	0.015	ext neck	VXMG9-1616-R015N1-NACRO	32377
1/2	1/2	5/8	2-1/4	4	0.015	ext neck	VXMG9-1616-R015N2-NACRO	32405
1/2	1/2	1	1-1/4	3	SQ	std	VXMG9-1616-NR-NACRO	32329
1/2	1/2	1	1-1/4	3	0.015	std	VXMG9-1616-R015-NACRO	31801
1/2	1/2	1	1-1/4	3	0.030	std	VXMG9-1616-R030-NACRO	31799
1/2	1/2	1-1/4		3	SQ	med	VXMG9-1616-NRM-NACRO	32330
1/2	1/2	1-1/4		3	0.015	med	VXMG9-1616-R015M-NACRO	32373
1/2	1/2	1-1/4		3	0.030	med	VXMG9-1616-R030M-NACRO	32376
5/8	5/8	3/4		3	SQ	stub	VXMG9-2020-NRS-NACRO	32406
5/8	5/8	3/4		3	0.030	stub	VXMG9-2020-R030S-NACRO	32407
5/8	5/8	3/4	1-5/8	5	0.030	ext neck	VXMG9-2020-R030N1-NACRO	32410
5/8	5/8	1-1/4	1-1/2	3-1/2	SQ	std	VXMG9-2020-NR-NACRO	32408
5/8	5/8	1-1/4	1-1/2	3-1/2	0.030	std	VXMG9-2020-R030-NACRO	32409
3/4	3/4	7/8		3	SQ	stub	VXMG9-2424-NRS-NACRO	32411
3/4	3/4	7/8		3	0.030	stub	VXMG9-2424-R030S-NACRO	32412
3/4	3/4	7/8	2	5	0.030	ext neck	VXMG9-2424-R030N1-NACRO	32415
3/4	3/4	1-1/2	1-3/4	4	SQ	std	VXMG9-2424-NR-NACRO	32413
3/4	3/4	1-1/2	1-3/4	4	0.030	std	VXMG9-2424-R030-NACRO	32414
1	1	1-1/2	1-3/4	4	SQ	std	VXMG9-3232-NR-NACRO	32416
1	1	1-1/2	1-3/4	4	0.030	std	VXMG9-3232-R030-NACRO	32417

Speed & Feed: page 195

No LBS Listed\* - Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck



## 9 FLUTE • VARIABLE FL - FINE-FINISHING APPLICATIONS

- Designed to deliver outstanding surface finishes, utilizing maximum metal removal rates
- Unique titanium focused geometry and edge prep enables efficient cutting action
- Extreme metal removal rates delivered at full flute length & 5% x D radial depth
- Proprietary nACRo coating allows for higher SFM and is especially effective in extending tool life
- Ideal for finishing tight tolerance walls

Carbide	9	Non - Center Cutting	variable	nACRo	+0.00mm -0.050mm	Square	Radius		HRC <54	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr></table>	P	K	M	S
P	K													
M	S													

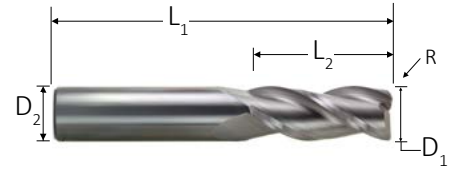
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	LENGTH	PART NAME	nACRo EDP
4mm	4mm	12mm		51mm	SQ	std	VXMG9-M4M4-NR-NACRO	H6643
4mm	4mm	12mm		51mm	0.25mm	std	VXMG9-M4M4-R0.25-NACRO	H6644
6mm	6mm	20mm	26mm	63mm	SQ	std	VXMG9-M6M6-NR-NACRO	35151
6mm	6mm	20mm	26mm	63mm	0.5mm	std	VXMG9-M6M6-R0.5-NACRO	35134
6mm	6mm	20mm	no neck	100mm	0.5mm	no neck	VXMG9-M6M6-NN-NACRO	35135
8mm	8mm	20mm	26mm	63mm	SQ	std	VXMG9-M8M8-NR-NACRO	35153
8mm	8mm	20mm	26mm	63mm	0.5mm	std	VXMG9-M8M8-R0.5-NACRO	35136
8mm	8mm	20mm	26mm	63mm	1.0mm	std	VXMG9-M8M8-R1.0-NACRO	H6645
8mm	8mm	20mm	no neck	100mm	0.5mm	no neck	VXMG9-M8M8-NN-NACRO	35137
10mm	10mm	24mm	30mm	70mm	SQ	std	VXMG9-M10M10-NR-NACRO	35155
10mm	10mm	24mm	30mm	70mm	0.5mm	std	VXMG9-M10M10-R0.5-NACRO	35138
10mm	10mm	24mm	30mm	70mm	1.0mm	std	VXMG9-M10M10-R1.0-NACRO	H6646
10mm	10mm	24mm	no neck	100mm	0.5mm	no neck	VXMG9-M10M10-NN-NACRO	35139
12mm	12mm	25mm	31mm	76mm	SQ	std	VXMG9-M12M12-NR-NACRO	35157
12mm	12mm	25mm	31mm	76mm	0.5mm	std	VXMG9-M12M12-R0.5-NACRO	35140
12mm	12mm	25mm	31mm	76mm	1.0mm	std	VXMG9-M12M12-R1.0-NACRO	H6647
12mm	12mm	25mm	31mm	76mm	2.0mm	std	VXMG9-M12M12-R2.0-NACRO	H6648
12mm	12mm	25mm	no neck	100mm	0.5mm	no neck	VXMG9-M12M12-NN-NACRO	35141
14mm	14mm	32mm	38mm	89mm	SQ	std	VXMG9-M14M14-NR-NACRO	35159
14mm	14mm	32mm	38mm	89mm	0.5mm	std	VXMG9-M14M14-R0.5-NACRO	35142
14mm	14mm	32mm	38mm	89mm	1.0mm	std	VXMG9-M14M14-R1.0-NACRO	H6649
16mm	16mm	32mm	38mm	89mm	SQ	std	VXMG9-M16M16-NR-NACRO	35161
16mm	16mm	32mm	38mm	89mm	0.5mm	std	VXMG9-M16M16-R0.5-NACRO	35143
16mm	16mm	32mm	38mm	89mm	1.0mm	std	VXMG9-M16M16-R1.0-NACRO	H6650
16mm	16mm	32mm	38mm	89mm	2.0mm	std	VXMG9-M16M16-R2.0-NACRO	H6651
16mm	16mm	32mm	no neck	100mm	0.5mm	no neck	VXMG9-M16M16-NN-NACRO	35144

**Speed & Feed:** page 195

No LBS Listed\* - Designed with long overall lengths for adding a custom LBS. They are not delivered with a reduced neck

## 3 FLUTE • 35° FOR STAINLESS STEEL

- ▶ Unique geometry and higher helix maximizes heat & wear resistance
- ▶ Outstanding performance in single pass slotting applications
- ▶ Cost effective for use on older, NC machines on short run production



Carbide		Center Cutting			+0.000 -0.002			HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ALTiN EDP
1/8	1/8	1/4	1-1/2	.0090	EMGS35-404	17658	57658
1/8	1/8	1/2	1-1/2	.0090	EMGS35-404	16709	56709
5/32	3/16	5/16	2	.0090	EMGS35-605	17659	57659
5/32	3/16	9/16	2	.0090	EMGS35-605	17722	57722
3/16	3/16	5/16	2	.0090	EMGS35-606	17660	57660
3/16	3/16	9/16	2	.0090	EMGS35-606	17723	57723
1/4	1/4	3/8	2	.0175	EMGS35-808	17662	57662
1/4	1/4	3/4	2-1/2	.0175	EMGS35-808	16702	56702
5/16	5/16	7/16	2	.0175	EMGS35-1010	17664	57664
5/16	5/16	13/16	2-1/2	.0175	EMGS35-1010	17727	57727
3/8	3/8	1/2	2	.0175	EMGS35-1212	17666	57666
3/8	3/8	1	2-1/2	.0175	EMGS35-1212	17729	57729
7/16	7/16	9/16	2-1/2	.0175	EMGS35-1414	17667	57667
7/16	7/16	1	2-3/4	.0175	EMGS35-1414	17730	57730
1/2	1/2	5/8	2-1/2	.0325	EMGS35-1616	17668	57668
1/2	1/2	1-1/4	3	.0325	EMGS35-1616	16708	56708
5/8	5/8	3/4	3	.0325	EMGS35-2020	17669	57669
5/8	5/8	1-5/8	3-1/2	.0325	EMGS35-2020	17732	57732
3/4	3/4	1	3	.0325	EMGS35-2424	17670	57670
3/4	3/4	1-5/8	4	.0325	EMGS35-2424	17733	57733

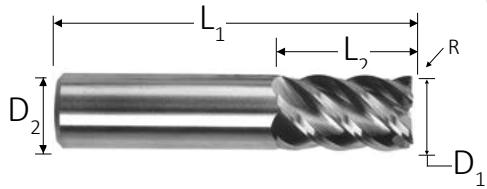
Speed & Feed: page 196

Carbide		Center Cutting			+0.000mm -0.050mm			HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	ALTiN EDP
3mm	3mm	12mm	38mm	0.23mm	EMG35-M3M3	13394	53394
4mm	4mm	14mm	51mm	0.23mm	EMG35-M4M4	13395	53395
5mm	5mm	20mm	51mm	0.23mm	EMG35-M5M5	13396	53396
6mm	6mm	20mm	63mm	0.45mm	EMG35-M6M6	13397	53397
8mm	8mm	20mm	63mm	0.45mm	EMG35-M8M8	13398	53398
10mm	10mm	25mm	70mm	0.45mm	EMG35-M10M10	13399	53399
12mm	12mm	25mm	76mm	0.45mm	EMG35-M12M12	13400	53400
14mm	14mm	32mm	89mm	0.82mm	EMG35-M14M14	13401	53401
16mm	16mm	32mm	89mm	0.82mm	EMG35-M16M16	13402	53402
20mm	20mm	38mm	100mm	0.82mm	EMG35-M20M20	13404	53404

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**5 FLUTE • 45° FOR STAINLESS STEELS/NICKEL BASED ALLOYS**



- Unique geometry and higher helix maximizes resistance to heat and wear
- Outstanding performance in heavy profiling applications
- Cost effective for use on short run production

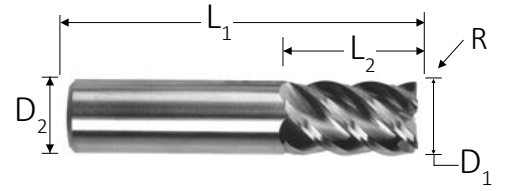
Carbide	5	Center Cutting	45°	Bright ATiN	+0.000 -0.002	Square	Radius		HRC <54	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr></table>	P	K	M	S
P	K													
M	S													

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NUMBER	BRIGHT EDP	AITiN EDP
1/16	1/8	3/16	1-1/2	SQ	GMG-402	14707	54707
3/32	1/8	9/32	1-1/2	SQ	GMG-403	14708	54708
1/8	1/8	1/4	1-1/2	SQ	GMGS-404	17698	57698
1/8	1/8	1/4	1-1/2	0.010	GMGS-404-R010	10232	50232
1/8	1/8	1/2	1-1/2	SQ	GMG-404	15942	55942
1/8	1/8	1/2	1-1/2	0.010	GMG-404-R010	11350	51350
5/32	3/16	5/16	2	SQ	GMGS-605	17699	57699
5/32	3/16	9/16	2	SQ	GMG-605	15943	55943
3/16	3/16	5/16	2	SQ	GMGS-606	17700	57700
3/16	3/16	9/16	2	SQ	GMG-606	15944	55944
3/16	3/16	9/16	2	0.010	GMG-606-R010	11571	51571
7/32	1/4	3/8	2	SQ	GMGS-807	17701	57701
7/32	1/4	3/4	2-1/2	SQ	GMG-807	15945	55945
1/4	1/4	3/8	2	SQ	GMGS-808	17702	57702
1/4	1/4	3/8	2	0.015	GMGS-808-R015	11648	51648
1/4	1/4	3/4	2-1/2	SQ	GMG-808	15946	55946
1/4	1/4	3/4	2-1/2	0.015	GMG-808-R015	11704	51704
1/4	1/4	1-1/2	4	SQ	GMG-808-E	15947	55947
5/16	5/16	7/16	2	SQ	GMGS-1010	17703	57703
5/16	5/16	13/16	2-1/2	SQ	GMG-1010	15948	55948
5/16	5/16	13/16	2-1/2	0.015	GMG-1010-R015	11705	51705
3/8	3/8	1/2	2	SQ	GMGS-1212	17704	57704
3/8	3/8	1/2	2	0.015	GMGS-1212-R015	11706	51706
3/8	3/8	1/2	2	0.030	GMGS-1212-R030	11707	51707
3/8	3/8	1	2-1/2	SQ	GMG-1212	15949	55949
3/8	3/8	1	2-1/2	0.015	GMG-1212-R015	11708	51708
3/8	3/8	1	2-1/2	0.030	GMG-1212-R030	11710	51710
3/8	3/8	1-3/4	4	SQ	GMG-1212-E	15950	55950
13/32	7/16	9/16	2-1/2	SQ	GMGS-1413	10739	50739
7/16	7/16	9/16	2-1/2	SQ	GMGS-1414	17705	57705
7/16	7/16	1	2-3/4	SQ	GMG-1414	15951	55951
1/2	1/2	5/8	2-1/2	SQ	GMGS-1616	17706	57706
1/2	1/2	5/8	2-1/2	0.030	GMGS-1616-R030	11711	51711
1/2	1/2	5/8	2-1/2	0.060	GMGS-1616-R060	11716	51716
1/2	1/2	1-1/4	3	SQ	GMG-1616	15952	55952
1/2	1/2	1-1/4	3	0.030	GMG-1616-R030	11978	51978
1/2	1/2	1-1/4	3	0.060	GMG-1616-R060	11781	51781
1/2	1/2	2	4	SQ	GMG-1616-M	11886	51886
1/2	1/2	2	4	0.030	GMG-1616-R030M	15241	55241
1/2	1/2	3	6	SQ	GMG-1616-E	15953	55953
9/16	9/16	1-1/2	3-1/2	SQ	GMG-1818	15954	55954
5/8	5/8	3/4	3	SQ	GMGS-2020	17707	57707
5/8	5/8	3/4	3	0.030	GMGS-2020-R030	15243	55243

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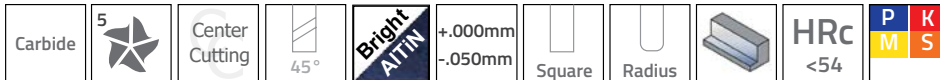
**5 FLUTE • 45° FOR STAINLESS STEELS/NICKEL BASED ALLOYS**



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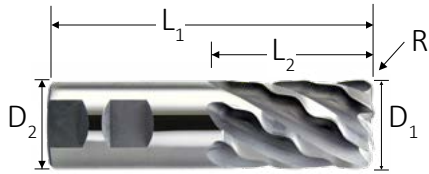
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NUMBER	BRIGHT EDP	AITiN EDP
5/8	5/8	3/4	3	0.060	GMGS-2020-R060	15245	55245
5/8	5/8	1-5/8	3-1/2	SQ	GMG-2020	15955	55955
5/8	5/8	1-5/8	3-1/2	0.030	GMG-2020-R030	15247	55247
5/8	5/8	1-5/8	3-1/2	0.060	GMG-2020-R060	H6836	H6837
5/8	5/8	3	6	SQ	GMG-2020-E	11203	51203
3/4	3/4	1	3	SQ	GMGS-2424	17708	57708
3/4	3/4	1	3	0.030	GMGS-2424-R030	15249	55249
3/4	3/4	1	3	0.060	GMGS-2424-R060	15253	55253
3/4	3/4	1-5/8	4	SQ	GMG-2424	15956	55956
3/4	3/4	1-5/8	4	0.030	GMG-2424-R030	15257	55257
3/4	3/4	1-5/8	4	0.060	GMG-2424-R060	15259	55259
3/4	3/4	3	6	SQ	GMG-2424-E	15957	55957
1	1	1-1/4	3	SQ	GMGS-3232	17709	57709
1	1	1-1/2	4	SQ	GMG-3232	15958	55958
1	1	1-1/2	4	0.030	GMG-3232-R030	15261	55261
1	1	1-1/2	4	0.060	GMG-3232-R060	15263	55263
1	1	3	6	SQ	GMG-3232-E	15959	55959

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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	BRIGHT EDP	AITiN EDP
3mm	3mm	12mm	38mm	SQ	GMG-M3M3	13405	53405
4mm	4mm	14mm	51mm	SQ	GMG-M4M4	13406	53406
5mm	5mm	20mm	51mm	SQ	GMG-M5M5	13407	53407
6mm	6mm	20mm	63mm	SQ	GMG-M6M6	13408	53408
6mm	6mm	20mm	63mm	0.5mm	GMG-M6M6-R0.5	H6818	H6827
6mm	6mm	25mm	75mm	SQ	GMG-M6M6-M	H6819	H6828
8mm	8mm	20mm	63mm	SQ	GMG-M8M8	13409	53409
8mm	8mm	20mm	63mm	0.5mm	GMG-M8M8-R0.5	H6820	H6829
8mm	8mm	25mm	75mm	SQ	GMG-M8M8-M	H6821	H6830
10mm	10mm	25mm	70mm	SQ	GMG-M10M10	13410	53410
10mm	10mm	25mm	70mm	0.5mm	GMG-M10M10-R0.5	H6822	H6831
12mm	12mm	25mm	76mm	SQ	GMG-M12M12	13411	53411
12mm	12mm	25mm	76mm	1.0mm	GMG-M12M12-R1.0	H6824	H6833
12mm	12mm	50mm	100mm	SQ	GMG-M12M12-L	H6825	H6834
16mm	16mm	32mm	89mm	SQ	GMG-M16M16	13413	53413
16mm	16mm	32mm	89mm	1.0mm	GMG-M16M16-R1.0	H6826	H6835
20mm	20mm	38mm	100mm	SQ	GMG-M20M20	13415	53415

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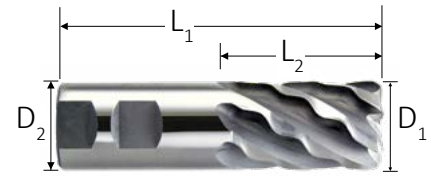
## 4 OR 6 FLUTE • COBALT AEROCUT ROUGHING END MILL

- Designed for high volume removal of Titanium Alloys
- Unique sinusoidal wave along flute provides ideal chip evacuation
- Enables heavy cuts at high feed rates while eliminating chip nesting
- Outstanding performance on large Gantry-style machines
- Non-Stocked Standard - Made to order



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	LENGTH	Flutes	PART NAME	Bright EDP
3/4	3/4	1-5/8	3-7/8	CH .022	std	4	CCAC4-2424	13124
3/4	3/4	1-5/8	3-7/8	0.060	std	4	CCAC4-2424-R060	14327
3/4	3/4	1-5/8	3-7/8	0.090	std	4	CCAC4-2424-R090	14328
3/4	3/4	1-5/8	3-7/8	0.120	std	4	CCAC4-2424-R120	14329
3/4	3/4	3	5-1/4	CH .022	long	4	CCAC4-2424-L	13125
3/4	3/4	3	5-1/4	0.060	long	4	CCAC4-2424-R060L	14331
3/4	3/4	3	5-1/4	0.090	long	4	CCAC4-2424-R090L	14332
3/4	3/4	3	5-1/4	0.120	long	4	CCAC4-2424-R120L	14333
1	1	2	4-1/2	CH .022	std	6	CCAC6-3232	14343
1	1	2	4-1/2	0.060	std	6	CCAC6-3232-R060	14345
1	1	2	4-1/2	0.090	std	6	CCAC6-3232-R090	14346
1	1	2	4-1/2	0.120	std	6	CCAC6-3232-R120	14347
1	1	2	4-1/2	0.250	std	6	CCAC6-3232-R250	14348
1	1	3	5-1/2	CH .022	med	6	CCAC6-3232-M	14353
1	1	3	5-1/2	0.060	med	6	CCAC6-3232-R060M	14355
1	1	3	5-1/2	0.090	med	6	CCAC6-3232-R090M	14356
1	1	3	5-1/2	0.120	med	6	CCAC6-3232-R120M	14357
1	1	3	5-1/2	0.250	med	6	CCAC6-3232-R250M	14358
1	1	4	6-1/2	CH .022	long	6	CCAC6-3232-L	14363
1	1	4	6-1/2	0.060	long	6	CCAC6-3232-R060L	14365
1	1	4	6-1/2	0.090	long	6	CCAC6-3232-R090L	14366
1	1	4	6-1/2	0.120	long	6	CCAC6-3232-R120L	14367
1	1	4	6-1/2	0.250	long	6	CCAC6-3232-R250L	14368
1-1/4	1-1/4	2	4-1/2	CH .022	std	6	CCAC6-4040	13135
1-1/4	1-1/4	2	4-1/2	0.060	std	6	CCAC6-4040-R060	14387
1-1/4	1-1/4	2	4-1/2	0.090	std	6	CCAC6-4040-R090	14388
1-1/4	1-1/4	2	4-1/2	0.120	std	6	CCAC6-4040-R120	13304
1-1/4	1-1/4	2	4-1/2	0.190	std	6	CCAC6-4040-R190	14389
1-1/4	1-1/4	2	4-1/2	0.250	std	6	CCAC6-4040-R250	14390
1-1/4	1-1/4	3	5-1/2	CH .022	med	6	CCAC6-4040-M	13338
1-1/4	1-1/4	3	5-1/2	0.060	med	6	CCAC6-4040-R060M	14398
1-1/4	1-1/4	3	5-1/2	0.090	med	6	CCAC6-4040-R090M	14399
1-1/4	1-1/4	3	5-1/2	0.120	med	6	CCAC6-4040-R120M	13339
1-1/4	1-1/4	3	5-1/2	0.190	med	6	CCAC6-4040-R190M	14400
1-1/4	1-1/4	3	5-1/2	0.250	med	6	CCAC6-4040-R250M	14401
1-1/4	1-1/4	4	6-1/2	CH .022	long	6	CCAC6-4040-L	13340
1-1/4	1-1/4	4	6-1/2	0.060	long	6	CCAC6-4040-R060L	14423
1-1/4	1-1/4	4	6-1/2	0.090	long	6	CCAC6-4040-R090L	14424
1-1/4	1-1/4	4	6-1/2	0.120	long	6	CCAC6-4040-R120L	13341
1-1/4	1-1/4	4	6-1/2	0.190	long	6	CCAC6-4040-R190L	14425
1-1/4	1-1/4	4	6-1/2	0.250	long	6	CCAC6-4040-R250L	14426

## 4 OR 6 FLUTE • COBALT AEROCUT ROUGHING END MILL



sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	LENGTH	Flutes	PART NAME	Bright EDP
1-1/4	1-1/4	6	8-1/2	CH .022	xl	6	CCAC6-4040-E	14434
1-1/4	1-1/4	6	8-1/2	0.060	xl	6	CCAC6-4040-R060E	14436
1-1/4	1-1/4	6	8-1/2	0.090	xl	6	CCAC6-4040-R090E	14437
1-1/4	1-1/4	6	8-1/2	0.120	xl	6	CCAC6-4040-R120E	14438
1-1/4	1-1/4	6	8-1/2	0.190	xl	6	CCAC6-4040-R190E	14439
1-1/4	1-1/4	6	8-1/2	0.250	xl	6	CCAC6-4040-R250E	14440
1-1/2	1-1/4	2	4-1/2	CH .040	std	6	CCAC6-4048	14448
1-1/2	1-1/4	2	4-1/2	0.060	std	6	CCAC6-4048-R060	14568
1-1/2	1-1/4	2	4-1/2	0.090	std	6	CCAC6-4048-R090	14569
1-1/2	1-1/4	2	4-1/2	0.120	std	6	CCAC6-4048-R120	14570
1-1/2	1-1/4	2	4-1/2	0.190	std	6	CCAC6-4048-R190	14571
1-1/2	1-1/4	2	4-1/2	0.250	std	6	CCAC6-4048-R250	14572
1-1/2	1-1/4	3	5-1/2	CH .040	med	6	CCAC6-4048-M	14580
1-1/2	1-1/4	3	5-1/2	0.060	med	6	CCAC6-4048-R060M	14582
1-1/2	1-1/4	3	5-1/2	0.090	med	6	CCAC6-4048-R090M	14583
1-1/2	1-1/4	3	5-1/2	0.120	med	6	CCAC6-4048-R120M	14584
1-1/2	1-1/4	3	5-1/2	0.190	med	6	CCAC6-4048-R190M	14585
1-1/2	1-1/4	3	5-1/2	0.250	med	6	CCAC6-4048-R250M	14586
1-1/2	1-1/4	4	6-1/2	CH .040	long	6	CCAC6-4048-L	14596
1-1/2	1-1/4	4	6-1/2	0.060	long	6	CCAC6-4048-R060L	14598
1-1/2	1-1/4	4	6-1/2	0.090	long	6	CCAC6-4048-R090L	14599
1-1/2	1-1/4	4	6-1/2	0.120	long	6	CCAC6-4048-R120L	14600
1-1/2	1-1/4	4	6-1/2	0.190	long	6	CCAC6-4048-R190L	14601
1-1/2	1-1/4	4	6-1/2	0.250	long	6	CCAC6-4048-R250L	14602
1-1/2	1-1/4	6	8-1/2	CH .040	xl	6	CCAC6-4048-E	14610
1-1/2	1-1/4	6	8-1/2	0.060	xl	6	CCAC6-4048-R060E	14612
1-1/2	1-1/4	6	8-1/2	0.090	xl	6	CCAC6-4048-R090E	14613
1-1/2	1-1/4	6	8-1/2	0.120	xl	6	CCAC6-4048-R120E	14614
2	2	2	5-3/4	CH .040	std	6	CCAC6-6464	13718
2	2	2	5-3/4	0.060	std	6	CCAC6-6464-R060	14645
2	2	2	5-3/4	0.090	std	6	CCAC6-6464-R090	14646
2	2	2	5-3/4	0.120	std	6	CCAC6-6464-R120	15187
2	2	3	6-3/4	CH .040	med	6	CCAC6-6464-M	13342
2	2	3	6-3/4	0.060	med	6	CCAC6-6464-R060M	14625
2	2	3	6-3/4	0.090	med	6	CCAC6-6464-R090M	14626
2	2	3	6-3/4	0.120	med	6	CCAC6-6464-R120M	14627
2	2	3	6-3/4	0.190	med	6	CCAC6-6464-R190M	14628
2	2	3	6-3/4	0.250	med	6	CCAC6-6464-R250M	14629
2	2	4	7-3/4	CH .040	long	6	CCAC6-6464-L	13343
2	2	4	7-3/4	0.060	long	6	CCAC6-6464-R060L	14639
2	2	4	7-3/4	0.090	long	6	CCAC6-6464-R090L	14640
2	2	4	7-3/4	0.120	long	6	CCAC6-6464-R120L	14641
2	2	4	7-3/4	0.190	long	6	CCAC6-6464-R190L	14642
2	2	4	7-3/4	0.250	long	6	CCAC6-6464-R250L	14643

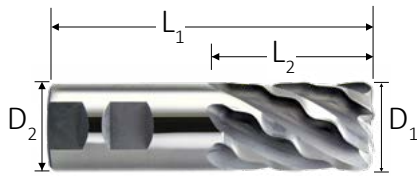
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Series: **CCAC**

# TITANIUM ALLOYS & HIGH TEMP ALLOYS



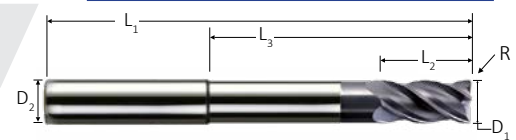
4 OR 6 FLUTE • COBALT AEROCUT ROUGHING END MILL

sizes continued from previous page

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	LENGTH	Flutes	PART NAME	Bright EDP
2	2	6	9-3/4	CH .040	xl	6	CCAC6-6464-E	13344
2	2	6	9-3/4	0.060	xl	6	CCAC6-6464-R060E	14652
2	2	6	9-3/4	0.090	xl	6	CCAC6-6464-R090E	14653
2	2	6	9-3/4	0.120	xl	6	CCAC6-6464-R120E	14654
2	2	6	9-3/4	0.190	xl	6	CCAC6-6464-R190E	14655
2	2	6	9-3/4	0.250	xl	6	CCAC6-6464-R250E	14656
2	2	8	11-3/4	CH .040	xx-long	6	CCAC6-6464-EE	14657
2	2	8	11-3/4	0.060	xx-long	6	CCAC6-6464-R060EE	14659
2	2	8	11-3/4	0.090	xx-long	6	CCAC6-6464-R090EE	14660
2	2	8	11-3/4	0.120	xx-long	6	CCAC6-6464-R120EE	14661
2	2	8	11-3/4	0.190	xx-long	6	CCAC6-6464-R190EE	14662

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## 4 FLUTE • VARIABLE FLUTE FOR HP ROUGHING APPLICATIONS



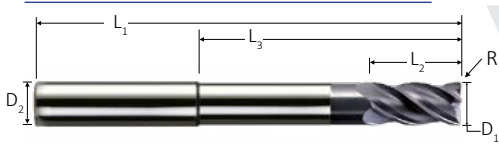
- ▶ Geometry designed for reducing chatter, universal machining operations
- ▶ Ideal for use on Steel and Stainless Alloys and Cast Iron
- ▶ Proprietary nACo coating provides extended tool life over conventional coatings
- ▶ Excellent for heavy cuts, deep slotting and long axial depth profiling

Carbide		Center Cutting	variable	nACo	+0.000 -0.002	+0.0005 -0.0005 <1/8	Square	Radius	Chamfer		HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nACo EDP
1/16	1/8	1/8		1-1/2	SQ	4	VXMG4-402-NR	H6001
1/16	1/8	1/8		1-1/2	0.010	4	VXMG4-402-R010	H6002
3/32	1/8	3/16		1-1/2	SQ	4	VXMG4-403-NR	H6003
3/32	1/8	3/16		1-1/2	0.010	4	VXMG4-403-R010	H6004
1/8	1/8	3/16	7/8	2	0.015	4	VXMG4-404-R015N2	15735
1/8	1/8	3/16	no neck	2	0.015	4	VXMG4-404-R015NN	15715
1/8	1/8	1/4		1-1/2	SQ	4	VXMG4-404-NRS	15697
1/8	1/8	1/4		1-1/2	0.015	4	VXMG4-404-R015S	15699
1/8	1/8	1/2		1-1/2	CH.011	4	VXMG4-404	13105
1/8	1/8	1/2		1-1/2	SQ	4	VXMG4-404-NR	15729
1/8	1/8	1/2		1-1/2	0.015	4	VXMG4-404-R015	15731
3/16	3/16	1/4		1-1/2	SQ	4	VXMG4-606-NRS	15737
3/16	3/16	1/4		1-1/2	0.015	4	VXMG4-606-R015S	15739
3/16	3/16	1/4	3/4	3	0.015	4	VXMG4-606-R015N2	15747
3/16	3/16	1/4	no neck	3	0.015	4	VXMG4-606-R015NN	15717
3/16	3/16	5/8		2	CH.011	4	VXMG4-606	13106
3/16	3/16	5/8		2	SQ	4	VXMG4-606-NR	15741
3/16	3/16	5/8		2	0.015	4	VXMG4-606-R015	15743
1/4	1/4	3/8		2	SQ	4	VXMG4-808-NRS	15749
1/4	1/4	3/8		2	0.015	4	VXMG4-808-R015S	15751
1/4	1/4	3/8		2	0.030	4	VXMG4-808-R030S	15753
1/4	1/4	3/8	3/4	3	0.015	4	VXMG4-808-R015N1	15765
1/4	1/4	3/8	3/4	3	0.030	4	VXMG4-808-R030N1	15767
1/4	1/4	3/8	1-1/8	3	0.015	4	VXMG4-808-R015N2	15768
1/4	1/4	3/8	1-1/8	3	0.030	4	VXMG4-808-R030N2	15769
1/4	1/4	3/8	2-1/8	4	0.015	4	VXMG4-808-R015N3	15770
1/4	1/4	3/8	2-1/8	4	0.030	4	VXMG4-808-R030N3	15771
1/4	1/4	3/8	no neck	4	0.015	4	VXMG4-808-R015NN	15719
1/4	1/4	3/8	no neck	4	0.030	4	VXMG4-808-R030NN	15721
1/4	1/4	1/2		2	CH.011	4	VXMG4-808-S	13107
1/4	1/4	3/4		2-1/2	CH.011	4	VXMG4-808	13108
1/4	1/4	3/4		2-1/2	SQ	4	VXMG4-808-NR	15755
1/4	1/4	3/4		2-1/2	0.015	4	VXMG4-808-R015	15757
1/4	1/4	3/4		2-1/2	0.030	4	VXMG4-808-R030	15759
1/4	1/4	1-1/8		3	SQ	4	VXMG4-808-NRL	15761
1/4	1/4	1-1/8		3	0.015	4	VXMG4-808-R015L	15762
1/4	1/4	1-1/8		3	0.030	4	VXMG4-808-R030L	15763
5/16	5/16	1/2		2	SQ	4	VXMG4-1010-NRS	15772
5/16	5/16	1/2		2	0.015	4	VXMG4-1010-R015S	15773
5/16	5/16	1/2		2	0.030	4	VXMG4-1010-R030S	15774

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**4 FLUTE • VARIABLE FLUTE FOR HP ROUGHING APPLICATIONS**

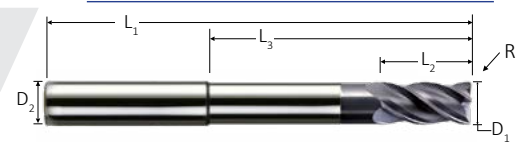
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nACo EDP
5/16	5/16	13/16		2-1/2	CH.011	4	VXMG4-1010	13109
5/16	5/16	13/16		2-1/2	SQ	4	VXMG4-1010-NR	15775
5/16	5/16	13/16		2-1/2	0.015	4	VXMG4-1010-R015	15777
5/16	5/16	13/16		2-1/2	0.030	4	VXMG4-1010-R030	15779
5/16	5/16	1-1/8		3	SQ	4	VXMG4-1010-NRL	15781
5/16	5/16	1-1/8		3	0.015	4	VXMG4-1010-R015L	15783
5/16	5/16	1-1/8		3	0.030	4	VXMG4-1010-R030L	15785
3/8	3/8	1/2		2	SQ	4	VXMG4-1212-NRS	15787
3/8	3/8	1/2		2	0.015	4	VXMG4-1212-R015S	15789
3/8	3/8	1/2		2	0.030	4	VXMG4-1212-R030S	15791
3/8	3/8	1/2	1-1/8	3	0.015	4	VXMG4-1212-R015N1	15803
3/8	3/8	1/2	1-1/8	3	0.030	4	VXMG4-1212-R030N1	15804
3/8	3/8	1/2	2-1/8	4	0.015	4	VXMG4-1212-R015N2	15805
3/8	3/8	1/2	2-1/8	4	0.030	4	VXMG4-1212-R030N2	15807
3/8	3/8	1/2	3-1/8	6	0.015	4	VXMG4-1212-R015N3	15809
3/8	3/8	1/2	3-1/8	6	0.030	4	VXMG4-1212-R030N3	15811
3/8	3/8	1/2	no neck	6	0.015	4	VXMG4-1212-R015NN	19112
3/8	3/8	1/2	no neck	6	0.030	4	VXMG4-1212-R030NN	19113
3/8	3/8	5/8		2	CH.011	4	VXMG4-1212-S	13110
3/8	3/8	1		2-1/2	CH.011	4	VXMG4-1212	13111
3/8	3/8	1		2-1/2	SQ	4	VXMG4-1212-NR	15793
3/8	3/8	1		2-1/2	0.015	4	VXMG4-1212-R015	15795
3/8	3/8	1		2-1/2	0.030	4	VXMG4-1212-R030	15797
3/8	3/8	1-1/8		3	SQ	4	VXMG4-1212-NRL	15799
3/8	3/8	1-1/8		3	0.015	4	VXMG4-1212-R015L	15800
3/8	3/8	1-1/8		3	0.030	4	VXMG4-1212-R030L	15801
7/16	7/16	1		2-3/4	0.015	4	VXMG4-1414-R015	15813
7/16	7/16	1		2-3/4	0.030	4	VXMG4-1414-R030	15815
1/2	1/2	5/8		2-1/2	SQ	4	VXMG4-1616-NRS	15817
1/2	1/2	5/8		2-1/2	0.015	4	VXMG4-1616-R015S	15819
1/2	1/2	5/8		2-1/2	0.030	4	VXMG4-1616-R030S	15821
1/2	1/2	5/8		2-1/2	0.060	4	VXMG4-1616-R060S	15822
1/2	1/2	5/8		2-1/2	CH.011	4	VXMG4-1616-S	13112
1/2	1/2	5/8	1-1/2	4	0.015	4	VXMG4-1616-R015N1	15847
1/2	1/2	5/8	1-1/2	4	0.030	4	VXMG4-1616-R030N1	15849
1/2	1/2	5/8	1-1/2	4	0.060	4	VXMG4-1616-R060N1	15851
1/2	1/2	5/8	2-1/4	4	0.015	4	VXMG4-1616-R015N2	15853
1/2	1/2	5/8	2-1/4	4	0.030	4	VXMG4-1616-R030N2	15855
1/2	1/2	5/8	3-3/8	6	0.015	4	VXMG4-1616-R015N3	15858
1/2	1/2	5/8	3-3/8	6	0.030	4	VXMG4-1616-R030N3	15859
1/2	1/2	5/8	3-3/8	6	0.060	4	VXMG4-1616-R060N3	15860
1/2	1/2	5/8	no neck	6	0.015	4	VXMG4-1616-R015NN	19114
1/2	1/2	5/8	no neck	6	0.030	4	VXMG4-1616-R030NN	19115
1/2	1/2	5/8	no neck	6	0.060	4	VXMG4-1616-R060NN	19116
1/2	1/2	1		3	SQ	4	VXMG4-1616-NR	15823
1/2	1/2	1		3	CH.011	4	VXMG4-1616	13113

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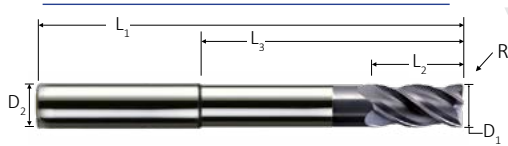


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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nAco EDP
1/2	1/2	1		3	0.015	4	VXMG4-1616-R015	15825
1/2	1/2	1		3	0.030	4	VXMG4-1616-R030	15827
1/2	1/2	1		3	0.060	4	VXMG4-1616-R060	15829
1/2	1/2	1-1/4		3	CH.011	4	VXMG4-1616-M	19787
1/2	1/2	1-1/4		3	SQ	4	VXMG4-1616-NRM	15831
1/2	1/2	1-1/4		3	0.015	4	VXMG4-1616-R015M	15833
1/2	1/2	1-1/4		3	0.030	4	VXMG4-1616-R030M	15835
1/2	1/2	1-1/4		3	0.060	4	VXMG4-1616-R060M	15837
1/2	1/2	1-1/4		3	0.120	4	VXMG4-1616-R120M	11819
1/2	1/2	1-1/2		4	CH.011	4	VXMG4-1616-ML	11657
1/2	1/2	1-1/2		4	SQ	4	VXMG4-1616-NRML	19345
1/2	1/2	1-1/2		4	0.030	4	VXMG4-1616-R030ML	19346
1/2	1/2	1-1/2		4	0.060	4	VXMG4-1616-R060ML	19347
1/2	1/2	2		4	SQ	4	VXMG4-1616-NRL	15839
1/2	1/2	2		4	0.015	4	VXMG4-1616-R015L	15841
1/2	1/2	2		4	0.030	4	VXMG4-1616-R030L	15843
1/2	1/2	2		4	0.060	4	VXMG4-1616-R060L	15845
5/8	5/8	3/4		3	CH.022	4	VXMG4-2020-S	13114
5/8	5/8	3/4		3	SQ	4	VXMG4-2020-NRS	15861
5/8	5/8	3/4		3	0.030	4	VXMG4-2020-R030S	15862
5/8	5/8	3/4		3	0.060	4	VXMG4-2020-R060S	15863
5/8	5/8	3/4	1-5/8	5	0.030	4	VXMG4-2020-R030N1	15874
5/8	5/8	1-1/4		3-1/2	SQ	4	VXMG4-2020-NR	15865
5/8	5/8	1-1/4		3-1/2	0.030	4	VXMG4-2020-R030	15866
5/8	5/8	1-1/4		3-1/2	0.060	4	VXMG4-2020-R060	15867
5/8	5/8	2-1/4		5	SQ	4	VXMG4-2020-NRL	15869
5/8	5/8	2-1/4		5	0.030	4	VXMG4-2020-R030L	15870
5/8	5/8	2-1/4		5	0.060	4	VXMG4-2020-R060L	15871
5/8	5/8	3-1/4		6	0.030	4	VXMG4-2020-R030E	15872
5/8	5/8	3-1/4		6	0.060	4	VXMG4-2020-R060E	15873
3/4	3/4	7/8		3	CH.022	4	VXMG4-2424-S	13116
3/4	3/4	7/8		3	SQ	4	VXMG4-2424-NRS	15879
3/4	3/4	7/8		3	0.030	4	VXMG4-2424-R030S	15880
3/4	3/4	7/8		3	0.060	4	VXMG4-2424-R060S	15881
3/4	3/4	7/8		3	0.120	4	VXMG4-2424-R120S	15885
3/4	3/4	7/8	2	5	0.030	4	VXMG4-2424-R030N1	16051
3/4	3/4	1-1/2		4	CH.022	4	VXMG4-2424	13117
3/4	3/4	1-1/2		4	SQ	4	VXMG4-2424-NR	15887
3/4	3/4	1-1/2		4	0.030	4	VXMG4-2424-R030	15889
3/4	3/4	1-1/2		4	0.060	4	VXMG4-2424-R060	15891
3/4	3/4	1-1/2		4	0.120	4	VXMG4-2424-R120	16015
3/4	3/4	2-1/4		5	SQ	4	VXMG4-2424-NRL	16016
3/4	3/4	2-1/4		5	0.030	4	VXMG4-2424-R030L	16018
3/4	3/4	2-1/4		5	0.060	4	VXMG4-2424-R060L	16019
3/4	3/4	2-1/4		5	0.120	4	VXMG4-2424-R120L	16021

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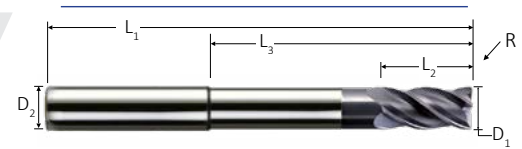
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nACo EDP
3/4	3/4	3		6	SQ	4	VXMG4-2424-NRE	16022
3/4	3/4	3		6	0.030	4	VXMG4-2424-R030E	16024
3/4	3/4	3		6	0.060	4	VXMG4-2424-R060E	16030
3/4	3/4	3		6	0.120	4	VXMG4-2424-R120E	16049
1	1	1-1/2		4	SQ	4	VXMG4-3232-NR	16280
1	1	1-1/2		4	0.030	4	VXMG4-3232-R030	16313
1	1	1-1/2		4	0.060	4	VXMG4-3232-R060	16314
1	1	2-1/4		5	SQ	4	VXMG4-3232-NRL	16437
1	1	2-1/4		5	0.030	4	VXMG4-3232-R030L	16438
1	1	2-1/4		5	0.060	4	VXMG4-3232-R060L	16439
1	1	2-1/4		5	0.120	4	VXMG4-3232-R120L	16459
1	1	3		6	0.030	4	VXMG4-3232-R030E	16464
1	1	3		6	0.060	4	VXMG4-3232-R060E	16467

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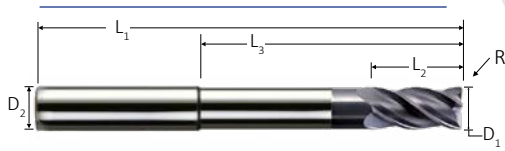


- › Geometry designed for reducing chatter, universal machining operations
- › Ideal for use on Steel and Stainless Alloys and Cast Iron
- › Proprietary nACo coating provides extended tool life over conventional coatings
- › Excellent for heavy cuts, deep slotting and long axial depth profiling



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nACo EDP
1.5mm	3mm	3mm		38mm	0.25mm	4	VXMG4-M3M1.5-R0.25	H6006
2mm	3mm	4mm		38mm	SQ	4	VXMG4-M3M2-NR	H6007
2mm	3mm	4mm		38mm	0.25mm	4	VXMG4-M3M2-R0.25	H6008
2.5mm	3mm	5mm		38mm	0.25mm	4	VXMG4-M3M2.5-R0.25	H6010
3mm	3mm	6mm		38mm	SQ	4	VXMG4-M3M3-NRS	H6011
3mm	3mm	12mm		38mm	SQ	4	VXMG4-M3M3-NR	H6013
3mm	3mm	12mm		38mm	0.25mm	4	VXMG4-M3M3-R0.25	H6014
3mm	6mm	12mm		63mm	SQ	4	VXMG4-M6M3-NR	14680
3mm	6mm	12mm		63mm	CH.25mm	4	VXMG4-M6M3	11682
3mm	6mm	12mm		63mm	0.25mm	4	VXMG4-M6M3-R0.25	H6015
4mm	4mm	14mm		51mm	SQ	4	VXMG4-M4M4-NR	14681
4mm	4mm	14mm		51mm	CH.25mm	4	VXMG4-M4M4	13416
4mm	4mm	14mm		51mm	0.25mm	4	VXMG4-M4M4-R0.25	H6017
4mm	4mm	14mm		51mm	0.5mm	4	VXMG4-M4M4-R0.5	14450
4mm	6mm	14mm		63mm	CH.25mm	4	VXMG4-M6M4	11683
4mm	6mm	14mm		63mm	0.25mm	4	VXMG4-M6M4-R0.25	H6018
4mm	6mm	14mm		63mm	0.5mm	4	VXMG4-M6M4-R0.5	H6019
5mm	5mm	20mm		51mm	SQ	4	VXMG4-M5M5-NR	14682
5mm	5mm	20mm		51mm	CH.25mm	4	VXMG4-M5M5	13417
5mm	5mm	20mm		51mm	0.5mm	4	VXMG4-M5M5-R0.5	14451
6mm	6mm	12mm	30mm	100mm	0.25mm	4	VXMG4-M6M6-R0.25N1	H6021
6mm	6mm	12mm	30mm	100mm	0.50mm	4	VXMG4-M6M6-R0.5N1	H6022
6mm	6mm	12mm	30mm	100mm	1.0mm	4	VXMG4-M6M6-R1.0N1	H6023
6mm	6mm	20mm		63mm	SQ	4	VXMG4-M6M6-NR	14683
6mm	6mm	20mm		63mm	CH.25mm	4	VXMG4-M6M6	13418
6mm	6mm	20mm		63mm	0.5mm	4	VXMG4-M6M6-R0.5	14452
6mm	6mm	20mm	32mm	75mm	0.5mm	4	VXMG4-M6M6-R0.5N	14453
6mm	6mm	24mm		75mm	0.5mm	4	VXMG4-M6M6-R0.5L	14454
8mm	8mm	16mm	40mm	100mm	0.5mm	4	VXMG4-M8M8-R0.5N1	H6026
8mm	8mm	20mm		63mm	SQ	4	VXMG4-M8M8-NR	14684
8mm	8mm	20mm		63mm	CH.25mm	4	VXMG4-M8M8	13419
8mm	8mm	20mm		63mm	0.5mm	4	VXMG4-M8M8-R0.5	14455
8mm	8mm	20mm		63mm	1.0mm	4	VXMG4-M8M8-R1.0	H6029
8mm	8mm	20mm		63mm	1.5mm	4	VXMG4-M8M8-R1.5	H6030
8mm	8mm	20mm	32mm	75mm	0.5mm	4	VXMG4-M8M8-R0.5N	14456
8mm	8mm	32mm		75mm	0.5mm	4	VXMG4-M8M8-R0.5L	14457
10mm	10mm	20mm		127mm	0.5mm	4	VXMG4-M10M10-R0.5N1	H6032
10mm	10mm	25mm		70mm	SQ	4	VXMG4-M10M10-NR	14685
10mm	10mm	25mm		70mm	CH.25mm	4	VXMG4-M10M10	13420
10mm	10mm	25mm		70mm	0.5mm	4	VXMG4-M10M10-R0.5	14458
10mm	10mm	25mm		70mm	2.0mm	4	VXMG4-M10M10-R2.0	H6037

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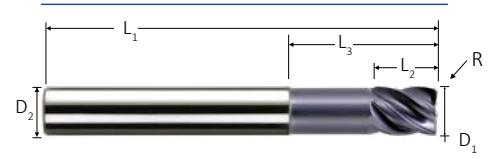
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nACo EDP
10mm	10mm	25mm	50mm	100mm	0.5mm	4	VXMG4-M10M10-R0.5N	14459
10mm	10mm	40mm		100mm	0.5mm	4	VXMG4-M10M10-R0.5L	14460
12mm	12mm	25mm		76mm	SQ	4	VXMG4-M12M12-NR	14686
12mm	12mm	25mm		76mm	CH.25mm	4	VXMG4-M12M12	13421
12mm	12mm	25mm		76mm	0.5mm	4	VXMG4-M12M12-R0.5	14461
12mm	12mm	25mm		76mm	1.0mm	4	VXMG4-M12M12-R1.0	14462
12mm	12mm	25mm		76mm	1.5mm	4	VXMG4-M12M12-R1.5	H6038
12mm	12mm	25mm	50mm	100mm	0.5mm	4	VXMG4-M12M12-R0.5N	14463
12mm	12mm	25mm	60mm	150mm	0.5mm	4	VXMG4-M12M12-R0.5N1	H6041
12mm	12mm	48mm		100mm	0.5mm	4	VXMG4-M12M12-R0.5L	14464
14mm	14mm	32mm		89mm	CH.5mm	4	VXMG4-M14M14	13422
14mm	14mm	32mm		89mm	0.5mm	4	VXMG4-M14M14-R0.5	14465
16mm	16mm	32mm		89mm	SQ	4	VXMG4-M16M16-NR	14687
16mm	16mm	32mm		89mm	CH.5mm	4	VXMG4-M16M16	13423
16mm	16mm	32mm		89mm	0.5mm	4	VXMG4-M16M16-R0.5	14466
16mm	16mm	32mm		89mm	1.0mm	4	VXMG4-M16M16-R1.0	14467
16mm	16mm	32mm		89mm	1.5mm	4	VXMG4-M16M16-R1.5	14677
16mm	16mm	32mm		89mm	2.0mm	4	VXMG4-M16M16-R2.0	14678
16mm	16mm	32mm	65mm	127mm	0.5mm	4	VXMG4-M16M16-R0.5N	14468
16mm	16mm	32mm	80mm	150mm	0.5mm	4	VXMG4-M16M16-R0.5N1	H6047
16mm	16mm	48mm		127mm	0.5mm	4	VXMG4-M16M16-R0.5L	14469
18mm	18mm	38mm		100mm	CH.5mm	4	VXMG4-M18M18	13424
18mm	18mm	38mm		100mm	0.5mm	4	VXMG4-M18M18-R0.5	14470
20mm	20mm	38mm		100mm	SQ	4	VXMG4-M20M20-NR	14688
20mm	20mm	38mm		100mm	CH.5mm	4	VXMG4-M20M20	13425
20mm	20mm	38mm		100mm	0.5mm	4	VXMG4-M20M20-R0.5	14471
20mm	20mm	38mm	65mm	127mm	0.5mm	4	VXMG4-M20M20-R0.5N	14472
20mm	20mm	38mm	100mm	150mm	0.5mm	4	VXMG4-M20M20-R0.5N1	H6057

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## 5 FLUTE • VARIABLE FLUTE FOR HP ROUGHING APPLICATIONS



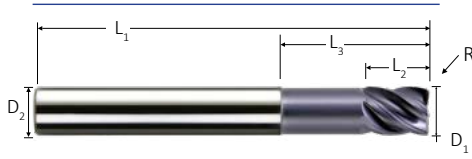
- › Geometry designed for reducing chatter, universal machining operations
- › Ideal for use on Steel and Stainless Alloys and Cast Iron
- › Proprietary nACo coating provides extended tool life over conventional coatings
- › Excellent for heavy cuts, deep slotting and long axial depth profiling



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nACo EDP
1/8	1/8	1/4		1-1/2	SQ	5	VXMG5-404-NRS	19348
1/8	1/8	1/4		1-1/2	0.015	5	VXMG5-404-R015S	19349
1/8	1/8	1/2	3/4	2	SQ	5	VXMG5-404-NR	19350
1/8	1/8	1/2	3/4	2	0.015	5	VXMG5-404-R015	19351
3/16	3/16	1/4		1-1/2	SQ	5	VXMG5-606-NRS	19353
3/16	3/16	1/4		1-1/2	0.015	5	VXMG5-606-R015S	19354
3/16	3/16	5/8	7/8	2	SQ	5	VXMG5-606-NR	19355
3/16	3/16	5/8	7/8	2	0.015	5	VXMG5-606-R015	19356
1/4	1/4	3/8		2	SQ	5	VXMG5-808-NRS	19358
1/4	1/4	3/8		2	0.015	5	VXMG5-808-R015S	19359
1/4	1/4	3/8		2	0.030	5	VXMG5-808-R030S	19361
1/4	1/4	3/4	1	2-1/2	SQ	5	VXMG5-808-NR	19362
1/4	1/4	3/4	1	2-1/2	0.015	5	VXMG5-808-R015	19363
1/4	1/4	3/4	1	2-1/2	0.030	5	VXMG5-808-R030	19364
5/16	5/16	1/2		2	SQ	5	VXMG5-1010-NRS	19369
5/16	5/16	1/2		2	0.015	5	VXMG5-1010-R015S	19370
5/16	5/16	1/2		2	0.030	5	VXMG5-1010-R030S	19371
5/16	5/16	13/16	1-1/16	2-1/2	SQ	5	VXMG5-1010-NR	19372
5/16	5/16	13/16	1-1/16	2-1/2	0.015	5	VXMG5-1010-R015	19373
5/16	5/16	13/16	1-1/16	2-1/2	0.030	5	VXMG5-1010-R030	19374
3/8	3/8	1/2		2	SQ	5	VXMG5-1212-NRS	19375
3/8	3/8	1/2		2	0.015	5	VXMG5-1212-R015S	19376
3/8	3/8	1/2		2	0.030	5	VXMG5-1212-R030S	19377
3/8	3/8	1/2	1-7/8	3	0.015	5	VXMG5-1212-R015N1	19381
3/8	3/8	1/2	1-7/8	3	0.030	5	VXMG5-1212-R030N1	19382
3/8	3/8	1		2-1/2	SQ	5	VXMG5-1212-NR	19378
3/8	3/8	1		2-1/2	0.015	5	VXMG5-1212-R015	19379
3/8	3/8	1		2-1/2	0.030	5	VXMG5-1212-R030	19380
1/2	1/2	5/8		2-1/2	SQ	5	VXMG5-1616-NRS	19385
1/2	1/2	5/8		2-1/2	0.015	5	VXMG5-1616-R015S	19386
1/2	1/2	5/8		2-1/2	0.030	5	VXMG5-1616-R030S	11653
1/2	1/2	5/8		2-1/2	0.060	5	VXMG5-1616-R060S	19388
1/2	1/2	5/8	1-1/2	4	0.015	5	VXMG5-1616-R015N1	19397
1/2	1/2	5/8	1-1/2	4	0.030	5	VXMG5-1616-R030N1	19398
1/2	1/2	5/8	2-1/4	4	0.015	5	VXMG5-1616-R015N2	19400
1/2	1/2	5/8	2-1/4	4	0.030	5	VXMG5-1616-R030N2	19401
1/2	1/2	5/8	2-1/4	4	0.060	5	VXMG5-1616-R060N2	19402
1/2	1/2	5/8	no neck	6	0.030	5	VXMG5-1616-R030NN	19404
1/2	1/2	1	1-1/4	3	SQ	5	VXMG5-1616-NR	19389
1/2	1/2	1	1-1/4	3	0.015	5	VXMG5-1616-R015	19390

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**5 FLUTE • VARIABLE FLUTE FOR HP ROUGHING APPLICATIONS**

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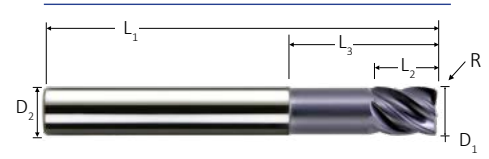
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nACo EDP
1/2	1/2	1	1-1/4	3	0.030	5	VXMG5-1616-R030	11654
1/2	1/2	1	1-1/4	3	0.060	5	VXMG5-1616-R060	19392
1/2	1/2	1-1/4		3	SQ	5	VXMG5-1616-NRM	19393
1/2	1/2	1-1/4		3	0.015	5	VXMG5-1616-R015M	11809
1/2	1/2	1-1/4		3	0.030	5	VXMG5-1616-R030M	19395
1/2	1/2	1-1/4		3	0.060	5	VXMG5-1616-R060M	19396
5/8	5/8	3/4	1-5/8	5	0.030	5	VXMG5-2020-R030N1	19414
5/8	5/8	3/4	2-3/8	5	0.060	5	VXMG5-2020-R060N2	19417
5/8	5/8	1-1/4	1-1/2	3-1/2	SQ	5	VXMG5-2020-NR	19410
5/8	5/8	1-1/4	1-1/2	3-1/2	0.030	5	VXMG5-2020-R030	19411
5/8	5/8	1-1/4	1-1/2	3-1/2	0.060	5	VXMG5-2020-R060	19412
3/4	3/4	7/8		3	SQ	5	VXMG5-2424-NRS	19419
3/4	3/4	7/8		3	0.030	5	VXMG5-2424-R030S	19421
3/4	3/4	7/8	2	5	0.120	5	VXMG5-2424-R120N1	19435
3/4	3/4	7/8	3-3/8	6	0.030	5	VXMG5-2424-R030N3	19436
3/4	3/4	1-1/2	1-3/4	4	SQ	5	VXMG5-2424-NR	19425
3/4	3/4	1-1/2	1-3/4	4	0.030	5	VXMG5-2424-R030	19426
3/4	3/4	1-1/2	1-3/4	4	0.060	5	VXMG5-2424-R060	19427
3/4	3/4	1-1/2	1-3/4	4	0.120	5	VXMG5-2424-R120	19429
1	1	1-1/2	1-3/4	4	0.030	5	VXMG5-3232-R030	19445
1	1	1-1/2	1-3/4	4	0.060	5	VXMG5-3232-R060	19446
1	1	1-1/2	3-3/8	6	0.030	5	VXMG5-3232-R030N3	19453
1	1	1-1/2	no neck	6	0.060	5	VXMG5-3232-R060NN	19458

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## 5 FLUTE • VARIABLE FLUTE FOR HP ROUGHING APPLICATIONS

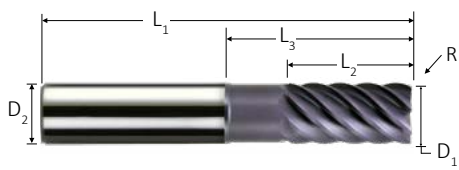


- > Geometry designed for reducing chatter, universal machining operations
- > Ideal for use on Steel and Stainless Alloys and Cast Iron
- > Proprietary nACo coating provides extended tool life over conventional coatings
- > Excellent for heavy cuts, deep slotting and long axial depth profiling

Carbide	5	Non - Center Cutting	variable	nACo	+0.000mm -0.050mm	+0.012mm -0.012mm <3mm	Square	Radius						HRC <54	P M S	K S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nACo EDP
2mm	3mm	4mm		38mm	SQ	5	VXMG5-M3M2-NR	H6403
2.5mm	3mm	5mm		38mm	SQ	5	VXMG5-M3M2.5-NR	H6405
2.5mm	3mm	5mm		38mm	0.25mm	5	VXMG5-M3M2.5-R0.25	H6406
3mm	3mm	6mm		38mm	SQ	5	VXMG5-M3M3-NRS	H6407
3mm	3mm	6mm		38mm	0.25mm	5	VXMG5-M3M3-R0.25S	H6408
3mm	3mm	12mm		38mm	0.25mm	5	VXMG5-M3M3-R0.25	H6410
4mm	4mm	14mm	20mm	51mm	SQ	5	VXMG5-M4M4-NR	H6411
4mm	4mm	14mm	20mm	51mm	0.25mm	5	VXMG5-M4M4-R0.25	15100
5mm	5mm	16mm	22mm	51mm	0.25mm	5	VXMG5-M5M5-R0.25	15101
6mm	6mm	20mm	26mm	63mm	0.5mm	5	VXMG5-M6M6-R0.5	15103
6mm	6mm	20mm	26mm	63mm	1.0mm	5	VXMG5-M6M6-R1.0	H6414
6mm	6mm	20mm	no neck	100mm	0.5mm	5	VXMG5-M6M6-NN	15104
8mm	8mm	20mm	26mm	63mm	0.5mm	5	VXMG5-M8M8-R0.5	15105
8mm	8mm	20mm	no neck	100mm	0.5mm	5	VXMG5-M8M8-NN	15107
10mm	10mm	24mm	30mm	70mm	0.5mm	5	VXMG5-M10M10-R0.5	15109
10mm	10mm	24mm	30mm	70mm	1.0mm	5	VXMG5-M10M10-R1.0	H6416
10mm	10mm	24mm	no neck	100mm	0.5mm	5	VXMG5-M10M10-NN	15110
12mm	12mm	25mm	31mm	76mm	0.5mm	5	VXMG5-M12M12-R0.5	15111
12mm	12mm	25mm	31mm	76mm	1.0mm	5	VXMG5-M12M12-R1.0	H6417
12mm	12mm	25mm	no neck	100mm	0.5mm	5	VXMG5-M12M12-NN	15112
14mm	14mm	32mm	38mm	89mm	0.5mm	5	VXMG5-M14M14-R0.5	15113
16mm	16mm	32mm	38mm	89mm	0.5mm	5	VXMG5-M16M16-R0.5	15114
16mm	16mm	32mm	38mm	89mm	1.0mm	5	VXMG5-M16M16-R1.0	H6421
16mm	16mm	32mm	no neck	100mm	0.5mm	5	VXMG5-M16M16-NN	15115

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**7 FLUTE • VARIABLE FL HIGH EFFICIENCY ROUGHING & FINISHING**

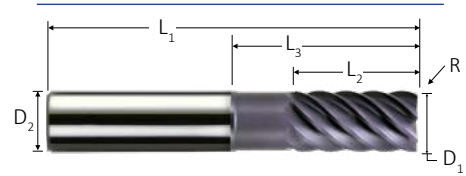
- ▶ Geometry designed for reducing chatter, utilizing maximum metal removal rates
- ▶ Additional flutes provide over 40% higher metal removal rates over 4 & 5 flute tools
- ▶ Extreme metal removal rates delivered at full flute length & 15% x D radial depth
- ▶ Proprietary nACo coating provides extended tool life over conventional coatings

Carbide		Non - Center Cutting		nACo	+ .000 - .002						HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	nACo EDP
1/8	1/8	3/16		1-1/2	SQ	7	VXMG7-404-NRS	H6571
1/8	1/8	3/16		1-1/2	0.010	7	VXMG7-404-R010S	H6572
1/8	1/8	3/8		1-1/2	SQ	7	VXMG7-404-NR	H6573
1/8	1/8	3/8		1-1/2	0.010	7	VXMG7-404-R010	H6574
3/16	3/16	9/32		1-1/2	SQ	7	VXMG7-606-NRS	14720
3/16	3/16	9/32		1-1/2	0.010	7	VXMG7-606-R010S	H6575
3/16	3/16	9/16		2	SQ	7	VXMG7-606-NR	H6576
3/16	3/16	9/16		2	0.010	7	VXMG7-606-R010	H6577
1/4	1/4	3/8		2	SQ	7	VXMG7-808-NRS	12241
1/4	1/4	3/8		2	0.015	7	VXMG7-808-R015S	12242
1/4	1/4	3/8	2-1/8	4	0.015	7	VXMG7-808-R015N3	12246
1/4	1/4	3/8	no neck	4	0.015	7	VXMG7-808-R015NN	12247
1/4	1/4	3/4	1	2-1/2	SQ	7	VXMG7-808-NR	12244
1/4	1/4	3/4	1	2-1/2	0.015	7	VXMG7-808-R015	12245
3/8	3/8	1/2		2	SQ	7	VXMG7-1212-NRS	12248
3/8	3/8	1/2		2	0.015	7	VXMG7-1212-R015S	12249
3/8	3/8	1/2	1-1/8	3	0.015	7	VXMG7-1212-R015N1	12252
3/8	3/8	1/2	2-1/8	4	0.015	7	VXMG7-1212-R015N2	12253
3/8	3/8	1		2-1/2	SQ	7	VXMG7-1212-NR	12250
3/8	3/8	1		2-1/2	0.015	7	VXMG7-1212-R015	12251
3/8	3/8	1-1/4		3	0.015	7	VXMG7-1212-R015L	H7518
1/2	1/2	5/8		2-1/2	SQ	7	VXMG7-1616-NRS	12254
1/2	1/2	5/8		2-1/2	0.015	7	VXMG7-1616-R015S	12255
1/2	1/2	5/8	1-1/2	4	0.015	7	VXMG7-1616-R015N1	12260
1/2	1/2	5/8	2-1/4	4	0.015	7	VXMG7-1616-R015N2	12261
1/2	1/2	1	1-1/4	3	SQ	7	VXMG7-1616-NR	12256
1/2	1/2	1	1-1/4	3	0.015	7	VXMG7-1616-R015	11805
1/2	1/2	1	1-1/4	3	0.030	7	VXMG7-1616-R030	11797
1/2	1/2	1-1/4		3	SQ	7	VXMG7-1616-NRM	12257
1/2	1/2	1-1/4		3	0.015	7	VXMG7-1616-R015M	12258
1/2	1/2	1-1/4		3	0.030	7	VXMG7-1616-R030M	12259
5/8	5/8	3/4		3	SQ	7	VXMG7-2020-NRS	12262
5/8	5/8	3/4		3	0.030	7	VXMG7-2020-R030S	12263
5/8	5/8	3/4	1-5/8	5	0.030	7	VXMG7-2020-R030N1	12267
5/8	5/8	1-1/4	1-1/2	3-1/2	SQ	7	VXMG7-2020-NR	12264
5/8	5/8	1-1/4	1-1/2	3-1/2	0.030	7	VXMG7-2020-R030	12265
3/4	3/4	7/8		3	SQ	7	VXMG7-2424-NRS	12269
3/4	3/4	7/8		3	0.030	7	VXMG7-2424-R030S	12271
3/4	3/4	7/8	2	5	0.030	7	VXMG7-2424-R030N1	12277
3/4	3/4	1-1/2	1-3/4	4	SQ	7	VXMG7-2424-NR	12273
3/4	3/4	1-1/2	1-3/4	4	0.030	7	VXMG7-2424-R030	12275
1	1	1-1/2	1-3/4	4	SQ	7	VXMG7-3232-NR	12283
1	1	1-1/2	1-3/4	4	0.030	7	VXMG7-3232-R030	12287

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## 7 FLUTE • VARIABLE FL HIGH EFFICIENCY ROUGHING & FINISHING

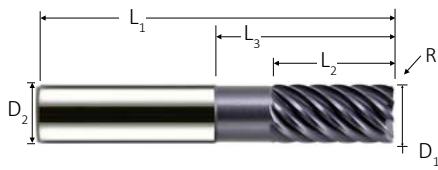


- ▶ Geometry designed for reducing chatter, utilizing maximum metal removal rates
- ▶ Additional flutes provide over 40% higher metal removal rates over 4 & 5 flute tools
- ▶ Extreme metal removal rates delivered at full flute length & 15% x D radial depth

Carbide		Non-Center Cutting	variable	nAco	+0.000mm -0.050mm	Square	Radius			HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTE	PART NAME	nAco EDP
3mm	3mm	6mm		38mm	SQ	7	VXMG7-M3M3-NRS	H6578
3mm	3mm	6mm		38mm	0.25mm	7	VXMG7-M3M3-R0.25S	H6579
3mm	3mm	12mm		38mm	SQ	7	VXMG7-M3M3-NR	H6580
3mm	3mm	12mm		38mm	0.25mm	7	VXMG7-M3M3-R0.25	H6581
4mm	4mm	12mm		51mm	SQ	7	VXMG7-M4M4-NR	H6582
4mm	4mm	12mm		51mm	0.25mm	7	VXMG7-M4M4-R0.25	H6583
6mm	6mm	20mm	26mm	63mm	SQ	7	VXMG7-M6M6-NR	15169
6mm	6mm	20mm	26mm	63mm	0.5mm	7	VXMG7-M6M6-R0.5	15120
6mm	6mm	20mm	no neck	100mm	0.5mm	7	VXMG7-M6M6-NN	15121
8mm	8mm	20mm	26mm	63mm	SQ	7	VXMG7-M8M8-NR	15171
8mm	8mm	20mm	26mm	63mm	0.5mm	7	VXMG7-M8M8-R0.5	15122
8mm	8mm	20mm	26mm	63mm	1.0mm	7	VXMG7-M8M8-R1.0	H6584
8mm	8mm	20mm	no neck	100mm	0.5mm	7	VXMG7-M8M8-NN	15123
10mm	10mm	24mm	30mm	70mm	SQ	7	VXMG7-M10M10-NR	15173
10mm	10mm	24mm	30mm	70mm	0.5mm	7	VXMG7-M10M10-R0.5	15124
10mm	10mm	24mm	30mm	70mm	1.0mm	7	VXMG7-M10M10-R1.0	H6585
10mm	10mm	24mm	30mm	70mm	2.0mm	7	VXMG7-M10M10-R2.0	H6658
10mm	10mm	24mm	no neck	100mm	0.5mm	7	VXMG7-M10M10-NN	15125
12mm	12mm	25mm	31mm	76mm	SQ	7	VXMG7-M12M12-NR	15175
12mm	12mm	25mm	31mm	76mm	0.5mm	7	VXMG7-M12M12-R0.5	15126
12mm	12mm	25mm	31mm	76mm	1.0mm	7	VXMG7-M12M12-R1.0	15605
12mm	12mm	25mm	31mm	76mm	2.0mm	7	VXMG7-M12M12-R2.0	14795
12mm	12mm	25mm	no neck	100mm	0.5mm	7	VXMG7-M12M12-NN	15127
14mm	14mm	32mm	38mm	89mm	SQ	7	VXMG7-M14M14-NR	15177
14mm	14mm	32mm	38mm	89mm	0.5mm	7	VXMG7-M14M14-R0.5	15128
14mm	14mm	32mm	38mm	89mm	1.0mm	7	VXMG7-M14M14-R1.0	H6586
16mm	16mm	32mm	38mm	89mm	SQ	7	VXMG7-M16M16-NR	15179
16mm	16mm	32mm	38mm	89mm	0.5mm	7	VXMG7-M16M16-R0.5	15129
16mm	16mm	32mm	38mm	89mm	1.0mm	7	VXMG7-M16M16-R1.0	H6587
16mm	16mm	32mm	38mm	89mm	2.0mm	7	VXMG7-M16M16-R2.0	H6588
16mm	16mm	32mm	no neck	100mm	0.5mm	7	VXMG7-M16M16-NN	15130
18mm	18mm	36mm	42mm	100mm	SQ	7	VXMG7-M18M18-NR	15181
18mm	18mm	36mm	42mm	100mm	0.5mm	7	VXMG7-M18M18-R0.5	15131
18mm	18mm	36mm	42mm	100mm	1.0mm	7	VXMG7-M18M18-R1.0	H6589
20mm	20mm	36mm	42mm	100mm	SQ	7	VXMG7-M20M20-NR	15183
20mm	20mm	36mm	42mm	100mm	0.5mm	7	VXMG7-M20M20-R0.5	H6590
20mm	20mm	36mm	42mm	100mm	1.0mm	7	VXMG7-M20M20-R1.0	15132
20mm	20mm	36mm	42mm	100mm	2.0mm	7	VXMG7-M20M20-R2.0	H6591
20mm	20mm	36mm	42mm	100mm	3.0mm	7	VXMG7-M20M20-R3.0	H6592
25mm	25mm	36mm	42mm	100mm	SQ	7	VXMG7-M25M25-NR	15185
25mm	25mm	36mm	42mm	100mm	0.5mm	7	VXMG7-M25M25-R0.5	H6593
25mm	25mm	36mm	42mm	100mm	1.0mm	7	VXMG7-M25M25-R1.0	15133
25mm	25mm	36mm	42mm	100mm	3.0mm	7	VXMG7-M25M25-R3.0	H6594

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**9 FLUTE • VARIABLE FL FOR OPTIMUM FINE FINISH PROFILING APPLICATION**

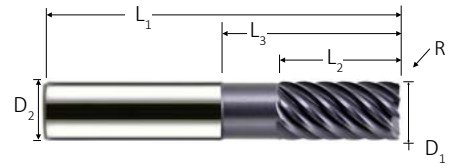
- Designed to deliver outstanding surface finishes, utilizing maximum metal removal rates
- Extreme metal removal rates delivered at full flute length & 5% x D radial depth
- Proprietary nACo coating provides extended tool life over conventional coatings
- Ideal for finishing tight tolerance walls

Carbide	9	Non - Center Cutting	variable	nACo	+0.000 -0.002	Square	Radius				HRC <54	<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr></table>	P	K	M	S
P	K															
M	S															

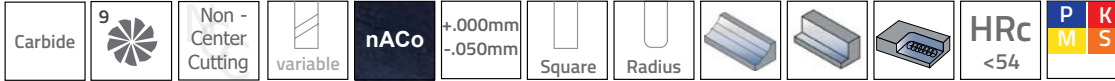
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTE	PART NAME	nACo EDP
3/16	3/16	9/32		1-1/2	SQ	9	VXMG9-606-NRS	H6595
3/16	3/16	9/32		1-1/2	0.010	9	VXMG9-606-R010S	H6596
3/16	3/16	9/16		2	SQ	9	VXMG9-606-NR	H6597
3/16	3/16	9/16		2	0.010	9	VXMG9-606-R010	H6598
1/4	1/4	3/8		2	SQ	9	VXMG9-808-NRS	12288
1/4	1/4	3/8		2	0.015	9	VXMG9-808-R015S	12289
1/4	1/4	3/8	2-1/8	4	0.015	9	VXMG9-808-R015N3	12302
1/4	1/4	3/8	no neck	4	0.015	9	VXMG9-808-R015NN	12303
1/4	1/4	3/4	1	2-1/2	SQ	9	VXMG9-808-NR	12290
1/4	1/4	3/4	1	2-1/2	0.015	9	VXMG9-808-R015	12291
3/8	3/8	1/2		2	SQ	9	VXMG9-1212-NRS	12304
3/8	3/8	1/2		2	0.015	9	VXMG9-1212-R015S	12305
3/8	3/8	1/2	1-1/8	3	0.015	9	VXMG9-1212-R015N1	12317
3/8	3/8	1/2	2-1/8	4	0.015	9	VXMG9-1212-R015N2	12325
3/8	3/8	1		2-1/2	SQ	9	VXMG9-1212-NR	12315
3/8	3/8	1		2-1/2	0.015	9	VXMG9-1212-R015	12316
1/2	1/2	5/8		2-1/2	SQ	9	VXMG9-1616-NRS	12327
1/2	1/2	5/8		2-1/2	0.015	9	VXMG9-1616-R015S	12328
1/2	1/2	5/8	1-1/2	4	0.015	9	VXMG9-1616-R015N1	12377
1/2	1/2	5/8	2-1/4	4	0.015	9	VXMG9-1616-R015N2	12405
1/2	1/2	1	1-1/4	3	SQ	9	VXMG9-1616-NR	12329
1/2	1/2	1	1-1/4	3	0.015	9	VXMG9-1616-R015	11801
1/2	1/2	1	1-1/4	3	0.030	9	VXMG9-1616-R030	11799
1/2	1/2	1-1/4		3	SQ	9	VXMG9-1616-NRM	12330
1/2	1/2	1-1/4		3	0.015	9	VXMG9-1616-R015M	12373
1/2	1/2	1-1/4		3	0.030	9	VXMG9-1616-R030M	12376
5/8	5/8	3/4		3	SQ	9	VXMG9-2020-NRS	12406
5/8	5/8	3/4		3	0.030	9	VXMG9-2020-R030S	12407
5/8	5/8	3/4	1-5/8	5	0.030	9	VXMG9-2020-R030N1	12410
5/8	5/8	1-1/4	1-1/2	3-1/2	SQ	9	VXMG9-2020-NR	12408
5/8	5/8	1-1/4	1-1/2	3-1/2	0.030	9	VXMG9-2020-R030	12409
3/4	3/4	7/8		3	SQ	9	VXMG9-2424-NRS	12411
3/4	3/4	7/8		3	0.030	9	VXMG9-2424-R030S	12412
3/4	3/4	7/8	2	5	0.030	9	VXMG9-2424-R030N1	12415
3/4	3/4	1-1/2	1-3/4	4	SQ	9	VXMG9-2424-NR	12413
3/4	3/4	1-1/2	1-3/4	4	0.030	9	VXMG9-2424-R030	12414
1	1	1-1/2	1-3/4	4	SQ	9	VXMG9-3232-NR	12416
1	1	1-1/2	1-3/4	4	0.030	9	VXMG9-3232-R030	12417

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## 9 FLUTE • VARIABLE FL FOR OPTIMUM FINE FINISH PROFILING APPLICATION



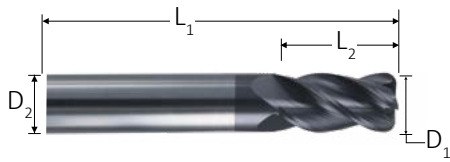
- > Designed to deliver outstanding surface finishes, utilizing maximum metal removal rates
- > Extreme metal removal rates delivered at full flute length & 5% x D radial depth
- > Proprietary nACo coating provides extended tool life over conventional coatings
- > Ideal for finishing tight tolerance walls



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	FLUTE	PART NAME	nACo EDP
4mm	4mm	12mm		51mm	SQ	9	VXMG9-M4M4-NR	H6599
4mm	4mm	12mm		51mm	0.25mm	9	VXMG9-M4M4-R0.25	H6600
6mm	6mm	20mm	26mm	63mm	SQ	9	VXMG9-M6M6-NR	15151
6mm	6mm	20mm	26mm	63mm	0.5mm	9	VXMG9-M6M6-R0.5	15134
6mm	6mm	20mm	no neck	100mm	0.5mm	9	VXMG9-M6M6-NN	15135
8mm	8mm	20mm	26mm	63mm	SQ	9	VXMG9-M8M8-NR	15153
8mm	8mm	20mm	26mm	63mm	0.5mm	9	VXMG9-M8M8-R0.5	15136
8mm	8mm	20mm	26mm	63mm	1.0mm	9	VXMG9-M8M8-R1.0	H6601
8mm	8mm	20mm	no neck	100mm	0.5mm	9	VXMG9-M8M8-NN	15137
10mm	10mm	24mm	30mm	70mm	SQ	9	VXMG9-M10M10-NR	15155
10mm	10mm	24mm	30mm	70mm	0.5mm	9	VXMG9-M10M10-R0.5	15138
10mm	10mm	24mm	30mm	70mm	1.0mm	9	VXMG9-M10M10-R1.0	H6602
10mm	10mm	24mm	no neck	100mm	0.5mm	9	VXMG9-M10M10-NN	15139
12mm	12mm	25mm	31mm	76mm	SQ	9	VXMG9-M12M12-NR	15157
12mm	12mm	25mm	31mm	76mm	0.5mm	9	VXMG9-M12M12-R0.5	15140
12mm	12mm	25mm	31mm	76mm	1.0mm	9	VXMG9-M12M12-R1.0	H6603
12mm	12mm	25mm	31mm	76mm	2.0mm	9	VXMG9-M12M12-R2.0	H6604
12mm	12mm	25mm	no neck	100mm	0.5mm	9	VXMG9-M12M12-NN	15141
14mm	14mm	32mm	38mm	89mm	SQ	9	VXMG9-M14M14-NR	15159
14mm	14mm	32mm	38mm	89mm	0.5mm	9	VXMG9-M14M14-R0.5	15142
14mm	14mm	32mm	38mm	89mm	1.0mm	9	VXMG9-M14M14-R1.0	H6605
16mm	16mm	32mm	38mm	89mm	SQ	9	VXMG9-M16M16-NR	15161
16mm	16mm	32mm	38mm	89mm	0.5mm	9	VXMG9-M16M16-R0.5	15143
16mm	16mm	32mm	38mm	89mm	1.0mm	9	VXMG9-M16M16-R1.0	H6606
16mm	16mm	32mm	38mm	89mm	2.0mm	9	VXMG9-M16M16-R2.0	H6607
16mm	16mm	32mm	no neck	100mm	0.5mm	9	VXMG9-M16M16-NN	15144
18mm	18mm	36mm	42mm	100mm	SQ	9	VXMG9-M18M18-NR	15163
18mm	18mm	36mm	42mm	100mm	0.5mm	9	VXMG9-M18M18-R0.5	15145
18mm	18mm	36mm	42mm	100mm	1.0mm	9	VXMG9-M18M18-R1.0	H6608
20mm	20mm	36mm	42mm	100mm	SQ	9	VXMG9-M20M20-NR	15165
20mm	20mm	36mm	42mm	100mm	0.5mm	9	VXMG9-M20M20-R0.5	H6609
20mm	20mm	36mm	42mm	100mm	1.0mm	9	VXMG9-M20M20-R1.0	15147
20mm	20mm	36mm	42mm	100mm	2.0mm	9	VXMG9-M20M20-R2.0	H6610
20mm	20mm	36mm	42mm	100mm	3.0mm	9	VXMG9-M20M20-R3.0	H6611
25mm	25mm	36mm	42mm	100mm	SQ	9	VXMG9-M25M25-NR	15167
25mm	25mm	36mm	42mm	100mm	0.5mm	9	VXMG9-M25M25-R0.5	H6612
25mm	25mm	36mm	42mm	100mm	1.0mm	9	VXMG9-M25M25-R1.0	15149
25mm	25mm	36mm	42mm	100mm	3.0mm	9	VXMG9-M25M25-R3.0	H6613

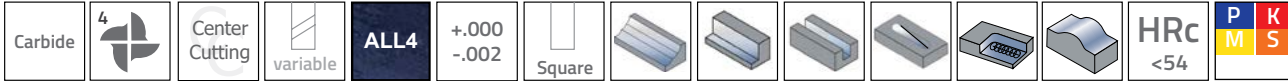
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**4 FLUTE • MID PERFORMANCE END MILL**

- For wide variety of materials: Tool steel, Stainless, Cast, Iron, Titanium & Nickel based
- 37° Variable Index for reducing vibration while cutting
- HIGH PERFORMANCE geometry at an affordable price point
- Proprietary All4 coating allows for extended tool life



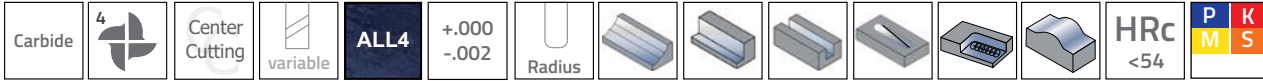
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	ALL4 EDP
1/8	1/8	1/4	1-1/2	SQ	4	MPMG-404-S	07550
1/8	1/8	1/2	1-1/2	SQ	4	MPMG-404	07558
1/8	1/8	3/4	2-1/4	SQ	4	MPMG-404-L	07569
1/8	1/8	1	3	SQ	4	MPMG-404-E	07580
3/16	3/16	3/8	2	SQ	4	MPMG-606-S	07551
3/16	3/16	5/8	2	SQ	4	MPMG-606	07559
3/16	3/16	3/4	2-1/2	SQ	4	MPMG-606-L	07570
3/16	3/16	1-1/8	3	SQ	4	MPMG-606-E	07581
1/4	1/4	7/16	2	SQ	4	MPMG-808-S	07552
1/4	1/4	3/4	2-1/2	SQ	4	MPMG-808	07560
1/4	1/4	1-1/8	3	SQ	4	MPMG-808-L	07571
1/4	1/4	1-1/2	4	SQ	4	MPMG-808-E	07582
5/16	5/16	1/2	2	SQ	4	MPMG-1010-S	07553
5/16	5/16	13/16	2-1/2	SQ	4	MPMG-1010	07561
5/16	5/16	1-1/8	3	SQ	4	MPMG-1010-L	07572
5/16	5/16	1-5/8	4	SQ	4	MPMG-1010-E	07583
3/8	3/8	5/8	2	SQ	4	MPMG-1212-S	07554
3/8	3/8	1	2-1/2	SQ	4	MPMG-1212	07562
3/8	3/8	1-1/8	3	SQ	4	MPMG-1212-L	07573
3/8	3/8	1-3/4	4	SQ	4	MPMG-1212-E	07584
7/16	7/16	1	2-3/4	SQ	4	MPMG-1414	07563
7/16	7/16	2	4	SQ	4	MPMG-1414-L	07574
7/16	7/16	3	6	SQ	4	MPMG-1414-E	07585
1/2	1/2	5/8	2-1/2	SQ	4	MPMG-1616-S	07555
1/2	1/2	1	3	SQ	4	MPMG-1616	07564
1/2	1/2	1-1/4	3	SQ	4	MPMG-1616-M	07565
1/2	1/2	1-1/2	4	SQ	4	MPMG-1616-ML	07575
1/2	1/2	2	4	SQ	4	MPMG-1616-L	07576
1/2	1/2	3	6	SQ	4	MPMG-1616-E	07586
5/8	5/8	3/4	3	SQ	4	MPMG-2020-S	07556
5/8	5/8	1-1/4	3-1/2	SQ	4	MPMG-2020	07566
5/8	5/8	2-1/4	5	SQ	4	MPMG-2020-L	07577
5/8	5/8	3	6	SQ	4	MPMG-2020-E	07587
3/4	3/4	1	3	SQ	4	MPMG-2424-S	07557
3/4	3/4	1-1/2	4	SQ	4	MPMG-2424	07567
3/4	3/4	2-1/4	5	SQ	4	MPMG-2424-L	07578
3/4	3/4	3	6	SQ	4	MPMG-2424-E	07588
3/4	3/4	4	7	SQ	4	MPMG-2424-EE	07589
1	1	1-1/2	4	SQ	4	MPMG-3232	07568
1	1	2-1/4	5	SQ	4	MPMG-3232-L	07579
1	1	3	6	SQ	4	MPMG-3232-E	07590
1	1	4	7	SQ	4	MPMG-3232-EE	07591

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## 4 FLUTE • MID PERFORMANCE END MILL



- ▶ For wide variety of materials: Tool steel, Stainless, Cast, Iron, Titanium & Nickel based
- ▶ 37° Variable Index for reducing vibration while cutting
- ▶ HIGH PERFORMANCE geometry at an affordable price point
- ▶ Proprietary All4 coating allows for extended tool life



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	FLUTE	PART NAME	ALL4 EDP
1/8	1/8	1/4	1-1/2	0.010	4	MPMG-404-R010S	07592
1/8	1/8	1/2	1-1/2	0.010	4	MPMG-404-R010	07609
1/8	1/8	1/2	1-1/2	0.015	4	MPMG-404-R015	07530
1/8	1/8	1/2	1-1/2	0.020	4	MPMG-404-R020	07531
1/8	1/8	1/2	1-1/2	0.030	4	MPMG-404-R030	07610
1/8	1/8	3/4	2-1/4	0.015	4	MPMG-404-R015L	07637
1/8	1/8	1	3	0.015	4	MPMG-404-R015E	07656
3/16	3/16	3/8	2	0.010	4	MPMG-606-R010S	07593
3/16	3/16	5/8	2	0.010	4	MPMG-606-R010	07611
3/16	3/16	5/8	2	0.020	4	MPMG-606-R020	07532
3/16	3/16	5/8	2	0.030	4	MPMG-606-R030	07612
3/16	3/16	3/4	2-1/2	0.015	4	MPMG-606-R015L	07638
3/16	3/16	1 -1/8	3	0.015	4	MPMG-606-R015E	07657
1/4	1/4	7/16	2	0.015	4	MPMG-808-R015S	07594
1/4	1/4	3/4	2-1/2	0.015	4	MPMG-808-R015	07613
1/4	1/4	3/4	2-1/2	0.020	4	MPMG-808-R020	07533
1/4	1/4	3/4	2-1/2	0.030	4	MPMG-808-R030	07614
1/4	1/4	3/4	2-1/2	0.045	4	MPMG-808-R045	07534
1/4	1/4	3/4	2-1/2	0.060	4	MPMG-808-R060	07615
1/4	1/4	1- 1/8	3	0.015	4	MPMG-808-R015L	07639
1/4	1/4	1- 1/8	3	0.030	4	MPMG-808-R030L	07640
1/4	1/4	1 -1/2	4	0.015	4	MPMG-808-R015E	07658
1/4	1/4	1 -1/2	4	0.030	4	MPMG-808-R030E	07659
1/4	1/4	1 -1/2	6	0.030	4	MPMG-808-R030EL	07685
1/4	1/4	1 -1/2	6	0.060	4	MPMG-808-R060EL	07686
5/16	5/16	1/2	2	0.015	4	MPMG-1010-R015S	07595
5/16	5/16	13/16	2-1/2	0.015	4	MPMG-1010-R015	07616
5/16	5/16	13/16	2-1/2	0.030	4	MPMG-1010-R030	07617
5/16	5/16	13/16	2-1/2	0.060	4	MPMG-1010-R060	07618
5/16	5/16	1- 1/8	3	0.015	4	MPMG-1010-R015L	07641
5/16	5/16	1- 1/8	3	0.030	4	MPMG-1010-R030L	07642
5/16	5/16	1 -5/8	4	0.015	4	MPMG-1010-R015E	07660
5/16	5/16	1 -5/8	4	0.030	4	MPMG-1010-R030E	07661
3/8	3/8	5/8	2	0.015	4	MPMG-1212-R015S	07596
3/8	3/8	1	2-1/2	0.015	4	MPMG-1212-R015	07619
3/8	3/8	1	2-1/2	0.020	4	MPMG-1212-R020	07535
3/8	3/8	1	2-1/2	0.030	4	MPMG-1212-R030	07620
3/8	3/8	1	2-1/2	0.060	4	MPMG-1212-R060	07621
3/8	3/8	1- 1/8	3	0.015	4	MPMG-1212-R015L	07643
3/8	3/8	1- 1/8	3	0.030	4	MPMG-1212-R030L	07644
3/8	3/8	1- 1/8	3	0.060	4	MPMG-1212-R060L	07645
3/8	3/8	1-1/2	6	0.030	4	MPMG-1212-R030EL	07687
3/8	3/8	1-1/2	6	0.060	4	MPMG-1212-R060EL	07688

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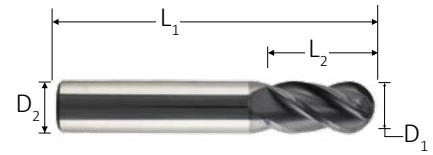
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**4 FLUTE • MID PERFORMANCE END MILL**

DIA $D_1$	SHK $D_2$	LOC $L_2$	OAL $L_1$	CORNER R	FLUTE	PART NAME	ALL4 EDP
3/8	3/8	1-3/4	4	0.015	4	MPMG-1212-R015E	07662
3/8	3/8	1-3/4	4	0.030	4	MPMG-1212-R030E	07663
7/16	7/16	1	2-3/4	0.030	4	MPMG-1414-R030	07622
7/16	7/16	1	2-3/4	0.060	4	MPMG-1414-R060	07623
1/2	1/2	5/8	2-1/2	0.030	4	MPMG-1616-R030S	07597
1/2	1/2	1	3	0.020	4	MPMG-1616-R020	07536
1/2	1/2	1	3	0.030	4	MPMG-1616-R030	07624
1/2	1/2	1	3	0.060	4	MPMG-1616-R060	07625
1/2	1/2	1	3	0.090	4	MPMG-1616-R090	07626
1/2	1/2	1	3	0.125	4	MPMG-1616-R125	07627
1/2	1/2	1-1/4	3	0.015	4	MPMG-1616-R015M	07540
1/2	1/2	1-1/4	3	0.030	4	MPMG-1616-R030M	07519
1/2	1/2	1-1/4	3	0.060	4	MPMG-1616-R060M	07523
1/2	1/2	1-1/2	4	0.030	4	MPMG-1616-R030ML	07646
1/2	1/2	1-1/2	4	R.060	4	MPMG-1616-R060ML	07647
1/2	1/2	1-1/2	6	0.030	4	MPMG-1616-R030EL	07537
1/2	1/2	1-1/2	6	0.060	4	MPMG-1616-R060EL	07538
1/2	1/2	2	4	0.030	4	MPMG-1616-R030L	07648
1/2	1/2	2	4	0.060	4	MPMG-1616-R060L	07649
1/2	1/2	3	6	0.030	4	MPMG-1616-R030E	07664
1/2	1/2	3	6	0.060	4	MPMG-1616-R060E	07665
5/8	5/8	3/4	3	0.030	4	MPMG-2020-R030S	07598
5/8	5/8	1-1/4	3-1/2	0.030	4	MPMG-2020-R030	07628
5/8	5/8	1-1/4	3-1/2	0.060	4	MPMG-2020-R060	07629
5/8	5/8	2-1/4	5	0.030	4	MPMG-2020-R030L	07650
5/8	5/8	2-1/4	5	0.060	4	MPMG-2020-R060L	07651
5/8	5/8	3	6	0.030	4	MPMG-2020-R030E	07666
5/8	5/8	3	6	0.060	4	MPMG-2020-R060E	07667
3/4	3/4	1	3	0.030	4	MPMG-2424-R030S	07599
3/4	3/4	1-1/2	4	0.030	4	MPMG-2424-R030	07630
3/4	3/4	1-1/2	4	0.060	4	MPMG-2424-R060	07631
3/4	3/4	1-1/2	4	0.090	4	MPMG-2424-R090	07632
3/4	3/4	1-1/2	4	0.125	4	MPMG-2424-R125	07539
3/4	3/4	2-1/4	5	0.030	4	MPMG-2424-R030L	07652
3/4	3/4	2-1/4	5	0.060	4	MPMG-2424-R060L	07653
3/4	3/4	3	6	0.030	4	MPMG-2424-R030E	07668
3/4	3/4	3	6	0.060	4	MPMG-2424-R060E	07669
3/4	3/4	4	7	0.030	4	MPMG-2424-R030EE	07670
3/4	3/4	4	7	0.060	4	MPMG-2424-R060EE	07671
1	1	1-1/2	4	0.030	4	MPMG-3232-R030	07633
1	1	1-1/2	4	0.060	4	MPMG-3232-R060	07634
1	1	1-1/2	4	0.090	4	MPMG-3232-R090	07635
1	1	1-1/2	4	0.125	4	MPMG-3232-R125	07636
1	1	2-1/4	5	0.030	4	MPMG-3232-R030L	07654
1	1	2-1/4	5	0.060	4	MPMG-3232-R060L	07655
1	1	3	6	0.030	4	MPMG-3232-R030E	07672
1	1	4	7	0.030	4	MPMG-3232-R030EE	07673
1	1	4	7	0.060	4	MPMG-3232-R060EE	07674

Speed &amp; Feed: page 204

## 4 FLUTE • BALL NOSE - MID PERFORMANCE END MILL

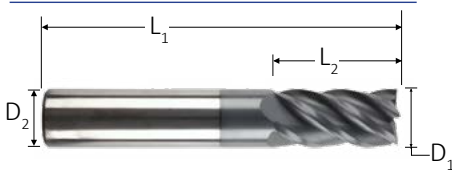


- > For wide variety of materials from Tool steel, Stainless, Cast, Iron, Titanium & Nickel based
- > 37° Variable Index for reducing vibration while cutting
- > HIGH PERFORMANCE geometry at an affordable price point
- > Proprietary All4 coating allows for extended tool life

Carbide		Center Cutting		<b>ALL4</b>	+0.000 -0.002			HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	ALL4 EDP
1/8	1/8	1/4	1-1/2	Ball	4	MPMG-404-SB	02708
1/8	1/8	1/2	1-1/2	Ball	4	MPMG-404-B	02709
1/8	1/8	3/4	2-1/4	Ball	4	MPMG-404-LB	02710
3/16	3/16	3/8	2	Ball	4	MPMG-606-SB	02711
3/16	3/16	5/8	2	Ball	4	MPMG-606-B	02712
3/16	3/16	3/4	2-1/2	Ball	4	MPMG-606-LB	02713
1/4	1/4	7/16	2	Ball	4	MPMG-808-SB	02714
1/4	1/4	3/4	2-1/2	Ball	4	MPMG-808-B	02715
1/4	1/4	1-1/8	3	Ball	4	MPMG-808-LB	02716
1/4	1/4	1-1/2	4	Ball	4	MPMG-808-EB	02501
5/16	5/16	13/16	2-1/2	Ball	4	MPMG-1010-B	02717
3/8	3/8	5/8	2	Ball	4	MPMG-1212-SB	02718
3/8	3/8	1	2-1/2	Ball	4	MPMG-1212-B	02719
3/8	3/8	1-1/8	3	Ball	4	MPMG-1212-LB	02721
1/2	1/2	1	3	Ball	4	MPMG-1616-B	02722
1/2	1/2	1-1/4	3	Ball	4	MPMG-1616-MB	02723
1/2	1/2	2	4	Ball	4	MPMG-1616-LB	02724
5/8	5/8	1-1/4	3-1/2	Ball	4	MPMG-2020-B	02725
5/8	5/8	2-1/4	5	Ball	4	MPMG-2020-LB	02726
3/4	3/4	1-1/2	4	Ball	4	MPMG-2424-B	02727
3/4	3/4	2-1/4	5	Ball	4	MPMG-2424-LB	02728
1	1	1-1/2	4	Ball	4	MPMG-3232-B	02729
1	1	2-1/4	5	Ball	4	MPMG-3232-LB	02730

Speed & Feed: page 204



**5 FLUTE • MID PERFORMANCE END MILL**

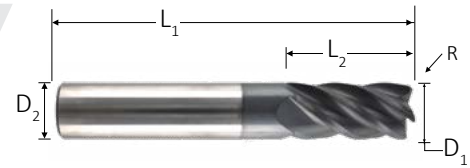
- Designed for aggressive HEM tool paths with up to 35% or less radial step-over
- Long/extra long should be limited to 25% or less radial step-over
- Designed for wide variety of materials from Tool steel, Stainless, Cast, Iron, Titanium & Nickel
- 37° Variable Index for reducing vibration while cutting
- High performance geometry at an affordable price point
- Proprietary All4 coating allows for extended tool life

Carbide	5	Center Cutting	variable	<b>ALL4</b>	+0.000 -0.002	Square							HRC <54	P M S	K S
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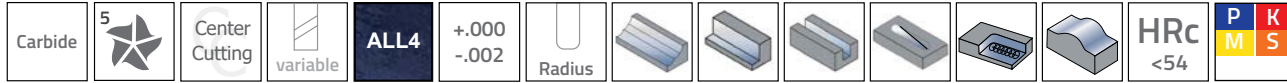
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	ALL4 EDP
1/8	1/8	1/4	1-1/2	SQ	5	MPMG5-404-S	02550
1/8	1/8	1/2	1-1/2	SQ	5	MPMG5-404	02558
1/8	1/8	3/4	2-1/4	SQ	5	MPMG5-404-L	02569
1/8	1/8	1	3	SQ	5	MPMG5-404-E	02580
3/16	3/16	3/8	2	SQ	5	MPMG5-606-S	02551
3/16	3/16	5/8	2	SQ	5	MPMG5-606	02559
3/16	3/16	3/4	2-1/2	SQ	5	MPMG5-606-L	02570
3/16	3/16	1-1/8	3	SQ	5	MPMG5-606-E	02581
1/4	1/4	7/16	2	SQ	5	MPMG5-808-S	02552
1/4	1/4	3/4	2-1/2	SQ	5	MPMG5-808	02560
1/4	1/4	1-1/8	3	SQ	5	MPMG5-808-L	02571
1/4	1/4	1-1/2	4	SQ	5	MPMG5-808-E	02582
5/16	5/16	1/2	2	SQ	5	MPMG5-1010-S	02553
5/16	5/16	13/16	2-1/2	SQ	5	MPMG5-1010	02561
5/16	5/16	1-1/8	3	SQ	5	MPMG5-1010-L	02572
5/16	5/16	1-5/8	4	SQ	5	MPMG5-1010-E	02583
3/8	3/8	5/8	2	SQ	5	MPMG5-1212-S	02554
3/8	3/8	1	2-1/2	SQ	5	MPMG5-1212	02562
3/8	3/8	1-1/8	3	SQ	5	MPMG5-1212-L	02573
3/8	3/8	1-3/4	4	SQ	5	MPMG5-1212-E	02584
7/16	7/16	1	2-3/4	SQ	5	MPMG5-1414	02563
7/16	7/16	2	4	SQ	5	MPMG5-1414-L	02574
7/16	7/16	3	6	SQ	5	MPMG5-1414-E	02585
1/2	1/2	5/8	2-1/2	SQ	5	MPMG5-1616-S	02555
1/2	1/2	1	3	SQ	5	MPMG5-1616	02564
1/2	1/2	1-1/4	3	SQ	5	MPMG5-1616-M	02565
1/2	1/2	1-1/2	4	SQ	5	MPMG5-1616-ML	02575
1/2	1/2	2	4	SQ	5	MPMG5-1616-L	02576
1/2	1/2	3	6	SQ	5	MPMG5-1616-E	02586
5/8	5/8	3/4	3	SQ	5	MPMG5-2020-S	02556
5/8	5/8	1-1/4	3-1/2	SQ	5	MPMG5-2020	02566
5/8	5/8	2-1/4	5	SQ	5	MPMG5-2020-L	02577
5/8	5/8	3	6	SQ	5	MPMG5-2020-E	02587
3/4	3/4	1	3	SQ	5	MPMG5-2424-S	02557
3/4	3/4	1-1/2	4	SQ	5	MPMG5-2424	02567
3/4	3/4	2-1/4	5	SQ	5	MPMG5-2424-L	02578
3/4	3/4	3	6	SQ	5	MPMG5-2424-E	02588
3/4	3/4	4	7	SQ	5	MPMG5-2424-EE	02589
1	1	1-1/2	4	SQ	5	MPMG5-3232	02568
1	1	2-1/4	5	SQ	5	MPMG5-3232-L	02579
1	1	3	6	SQ	5	MPMG5-3232-E	02590
1	1	4	7	SQ	5	MPMG5-3232-EE	02591

Speed & Feed: page 205

## 5 FLUTE • MID PERFORMANCE END MILL



- > Designed for aggressive HEM tool-paths with up to 35% or less radial step-over
- > Long/extra long should be limited to 25% or less radial step-over
- > Designed for wide variety of materials from Tool steel, Stainless, Cast, Iron, Titanium & Nickel
- > 37° Variable Index for reducing vibration while cutting
- > High performance geometry at an affordable price point
- > Proprietary All4 coating allows for extended tool life



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	FLUTE	PART NAME	ALL4 EDP
1/8	1/8	1/4	1-1/2	0.010	5	MPMG5-404-R010S	02592
1/8	1/8	1/2	1-1/2	0.010	5	MPMG5-404-R010	02609
1/8	1/8	1/2	1-1/2	0.015	5	MPMG5-404-R015	02530
1/8	1/8	1/2	1-1/2	0.020	5	MPMG5-404-R020	02531
1/8	1/8	1/2	1-1/2	0.030	5	MPMG5-404-R030	02610
1/8	1/8	3/4	2-1/4	0.015	5	MPMG5-404-R015L	02637
1/8	1/8	1	3	0.015	5	MPMG5-404-R015E	02656
3/16	3/16	3/8	2	0.010	5	MPMG5-606-R010S	02593
3/16	3/16	5/8	2	0.010	5	MPMG5-606-R010	02611
3/16	3/16	5/8	2	0.020	5	MPMG5-606-R020	02532
3/16	3/16	5/8	2	0.030	5	MPMG5-606-R030	02612
3/16	3/16	3/4	2-1/2	0.015	5	MPMG5-606-R015L	02638
3/16	3/16	1-1/8	3	0.015	5	MPMG5-606-R015E	02657
1/4	1/4	7/16	2	0.015	5	MPMG5-808-R015S	02594
1/4	1/4	3/4	2-1/2	0.015	5	MPMG5-808-R015	02613
1/4	1/4	3/4	2-1/2	0.020	5	MPMG5-808-R020	02533
1/4	1/4	3/4	2-1/2	0.030	5	MPMG5-808-R030	02614
1/4	1/4	3/4	2-1/2	0.045	5	MPMG5-808-R045	02534
1/4	1/4	3/4	2-1/2	0.060	5	MPMG5-808-R060	02615
1/4	1/4	1-1/8	3	0.015	5	MPMG5-808-R015L	02639
1/4	1/4	1-1/8	3	0.030	5	MPMG5-808-R030L	02640
1/4	1/4	1-1/2	4	0.015	5	MPMG5-808-R015E	02658
1/4	1/4	1-1/2	4	0.030	5	MPMG5-808-R030E	02659
1/4	1/4	1-1/2	6	0.030	5	MPMG5-808-R030EL	02685
1/4	1/4	1-1/2	6	0.060	5	MPMG5-808-R060EL	02686
5/16	5/16	1/2	2	0.015	5	MPMG5-1010-R015S	02595
5/16	5/16	13/16	2-1/2	0.015	5	MPMG5-1010-R015	02616
5/16	5/16	13/16	2-1/2	0.030	5	MPMG5-1010-R030	02617
5/16	5/16	13/16	2-1/2	0.060	5	MPMG5-1010-R060	02618
5/16	5/16	1-1/8	3	0.015	5	MPMG5-1010-R015L	02641
5/16	5/16	1-1/8	3	0.030	5	MPMG5-1010-R030L	02642
5/16	5/16	1-5/8	4	0.015	5	MPMG5-1010-R015E	02660
5/16	5/16	1-5/8	4	0.030	5	MPMG5-1010-R030E	02661
3/8	3/8	5/8	2	0.015	5	MPMG5-1212-R015S	02596
3/8	3/8	1	2-1/2	0.015	5	MPMG5-1212-R015	02619
3/8	3/8	1	2-1/2	0.020	5	MPMG5-1212-R020	02535
3/8	3/8	1	2-1/2	0.030	5	MPMG5-1212-R030	02620
3/8	3/8	1	2-1/2	0.060	5	MPMG5-1212-R060	02621
3/8	3/8	1-1/8	3	0.015	5	MPMG5-1212-R015L	02643
3/8	3/8	1-1/8	3	0.030	5	MPMG5-1212-R030L	02644
3/8	3/8	1-1/8	3	0.060	5	MPMG5-1212-R060L	02645
3/8	3/8	1-3/4	4	0.015	5	MPMG5-1212-R015E	02662

sizes continued on next page



**5 FLUTE • MID PERFORMANCE END MILL**

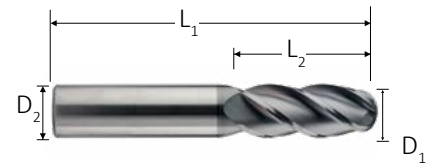
sizes continued from previous page

DIA $D_1$	SHK $D_2$	LOC $L_2$	OAL $L_1$	CORNER R	FLUTE	PART NAME	ALL4 EDP
3/8	3/8	1-3/4	4	0.030	5	MPMG5-1212-R030E	02663
3/8	3/8	1-1/2	6	0.030	5	MPMG5-1212-R030EL	02687
3/8	3/8	1-1/2	6	0.060	5	MPMG5-1212-R060EL	02688
7/16	7/16	1	2-3/4	0.030	5	MPMG5-1414-R030	02622
7/16	7/16	1	2-3/4	0.060	5	MPMG5-1414-R060	02623
1/2	1/2	5/8	2-1/2	0.030	5	MPMG5-1616-R030S	02597
1/2	1/2	1	3	0.020	5	MPMG5-1616-R020	02536
1/2	1/2	1	3	0.030	5	MPMG5-1616-R030	02624
1/2	1/2	1	3	0.060	5	MPMG5-1616-R060	02625
1/2	1/2	1	3	0.090	5	MPMG5-1616-R090	02626
1/2	1/2	1	3	0.125	5	MPMG5-1616-R125	02627
1/2	1/2	1-1/4	3	0.015	5	MPMG5-1616-R015M	02540
1/2	1/2	1-1/4	3	0.030	5	MPMG5-1616-R030M	02519
1/2	1/2	1-1/4	3	0.060	5	MPMG5-1616-R060M	02523
1/2	1/2	1-1/2	4	0.030	5	MPMG5-1616-R030ML	02646
1/2	1/2	1-1/2	4	0.060	5	MPMG5-1616-R060ML	02647
1/2	1/2	1-1/2	6	0.030	5	MPMG5-1616-R030EL	02537
1/2	1/2	1-1/2	6	0.060	5	MPMG5-1616-R060EL	02538
1/2	1/2	2	4	0.030	5	MPMG5-1616-R030L	02648
1/2	1/2	2	4	0.060	5	MPMG5-1616-R060L	02649
1/2	1/2	3	6	0.030	5	MPMG5-1616-R030E	02664
1/2	1/2	3	6	0.060	5	MPMG5-1616-R060E	02665
5/8	5/8	3/4	3	0.030	5	MPMG5-2020-R030S	02598
5/8	5/8	1-1/4	3-1/2	0.030	5	MPMG5-2020-R030	02628
5/8	5/8	1-1/4	3-1/2	0.060	5	MPMG5-2020-R060	02629
5/8	5/8	2-1/4	5	0.030	5	MPMG5-2020-R030L	02650
5/8	5/8	2-1/4	5	0.060	5	MPMG5-2020-R060L	02651
5/8	5/8	3	6	0.030	5	MPMG5-2020-R030E	02666
5/8	5/8	3	6	0.060	5	MPMG5-2020-R060E	02667
3/4	3/4	1	3	0.030	5	MPMG5-2424-R030S	02599
3/4	3/4	1-1/2	4	0.030	5	MPMG5-2424-R030	02630
3/4	3/4	1-1/2	4	0.060	5	MPMG5-2424-R060	02631
3/4	3/4	1-1/2	4	0.090	5	MPMG5-2424-R090	02632
3/4	3/4	1-1/2	4	0.125	5	MPMG5-2424-R125	02539
3/4	3/4	2-1/4	5	0.030	5	MPMG5-2424-R030L	02652
3/4	3/4	2-1/4	5	0.060	5	MPMG5-2424-R060L	02653
3/4	3/4	3	6	0.030	5	MPMG5-2424-R030E	02668
3/4	3/4	3	6	0.060	5	MPMG5-2424-R060E	02669
3/4	3/4	4	7	0.030	5	MPMG5-2424-R030EE	02670
3/4	3/4	4	7	0.060	5	MPMG5-2424-R060EE	02671
1	1	1-1/2	4	0.030	5	MPMG5-3232-R030	02633
1	1	1-1/2	4	0.060	5	MPMG5-3232-R060	02634
1	1	1-1/2	4	0.090	5	MPMG5-3232-R090	02635
1	1	1-1/2	4	0.125	5	MPMG5-3232-R125	02636
1	1	2-1/4	5	0.030	5	MPMG5-3232-R030L	02654
1	1	2-1/4	5	0.060	5	MPMG5-3232-R060L	02655
1	1	3	6	0.030	5	MPMG5-3232-R030E	02672
1	1	4	7	0.030	5	MPMG5-3232-R030EE	02673
1	1	4	7	0.060	5	MPMG5-3232-R060EE	02674

Speed & Feed: page 205



## 5 FLUTE • BALL NOSE - MID PERFORMANCE END MILL

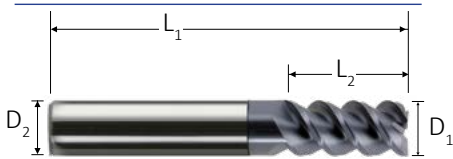


- > 3D profile roughing & finishing
- > Designed for wide variety of materials
- > High Performance geometry at affordable price
- > All4 coated for exceptional tool life

Carbide	5	Center Cutting	variable	ALL4	+0.000 -0.002	Ball				HRC <54	P M K S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	ALL4 EDP
1/8	1/8	1/4	1-1/2	Ball	5	MPMG5-404-SB	02808
1/8	1/8	1/2	1-1/2	Ball	5	MPMG5-404-B	02809
1/8	1/8	3/4	2-1/4	Ball	5	MPMG5-404-LB	02810
3/16	3/16	3/8	2	Ball	5	MPMG5-606-SB	02811
3/16	3/16	5/8	2	Ball	5	MPMG5-606-B	02812
3/16	3/16	3/4	2-1/2	Ball	5	MPMG5-606-LB	02813
1/4	1/4	7/16	2	Ball	5	MPMG5-808-SB	02814
1/4	1/4	3/4	2-1/2	Ball	5	MPMG5-808-B	02815
1/4	1/4	1-1/8	3	Ball	5	MPMG5-808-LB	02816
5/16	5/16	13/16	2-1/2	Ball	5	MPMG5-1010-B	02817
3/8	3/8	5/8	2	Ball	5	MPMG5-1212-SB	02818
3/8	3/8	1	2-1/2	Ball	5	MPMG5-1212-B	02819
3/8	3/8	1-1/8	3	Ball	5	MPMG5-1212-LB	02821
1/2	1/2	1	3	Ball	5	MPMG5-1616-B	02822
1/2	1/2	1-1/4	3	Ball	5	MPMG5-1616-MB	02823
1/2	1/2	2	4	Ball	5	MPMG5-1616-LB	02824
5/8	5/8	1-1/4	3-1/2	Ball	5	MPMG5-2020-B	02825
5/8	5/8	2-1/4	5	Ball	5	MPMG5-2020-LB	02826
3/4	3/4	1-1/2	4	Ball	5	MPMG5-2424-B	02827
3/4	3/4	2-1/4	5	Ball	5	MPMG5-2424-LB	02828
1	1	1-1/2	4	Ball	5	MPMG5-3232-B	02829
1	1	2-1/4	5	Ball	5	MPMG5-3232-LB	02830

Speed & Feed: page 205



**3 FLUTE • 60° GENERAL MACHINING APPLICATION IN STAINLESS STEELS**

- > Extra High Helix keeps a cutting edge in the material throughout the machining process
- > Produces outstanding surface finishes
- > Requires minimum horsepower

Carbide	3	Center Cutting	60°	Bright ALTiN	+0.000 -0.002	Square			HRC <54	P M K S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTE	PART NAME	BRIGHT EDP	ALTiN EDP
1/8	1/8	1/2	1-1/2	3	EMG60-404	10256	50256
3/16	3/16	5/8	2	3	EMG60-606	10797	50797
1/4	1/4	3/4	2-1/2	3	EMG60-808	14238	54238
5/16	5/16	13/16	2-1/2	3	EMG60-1010	14240	54240
3/8	3/8	1	2-1/2	3	EMG60-1212	14242	54242
7/16	7/16	1	3	3	EMG60-1414	14246	54246
1/2	1/2	1	3	3	EMG60-1616	14248	54248
9/16	9/16	1-1/4	3-1/2	3	EMG60-1818	14250	54250
5/8	5/8	1-1/4	3-1/2	3	EMG60-2020	14252	54252
3/4	3/4	1-1/2	4	3	EMG60-2424	14254	54254

**Speed & Feed:** page 203



**COMPLETE  
MANUFACTURING**

TURNING  
MILLING  
GRINDING  
EDGE PREP



**IN HOUSE COATING**

MELIN OFFERS MAINTAINS A STATE OF THE ART COATING ROOM THAT ALLOWS FOR QUICK TURN AROUND ON ALL COATINGS.

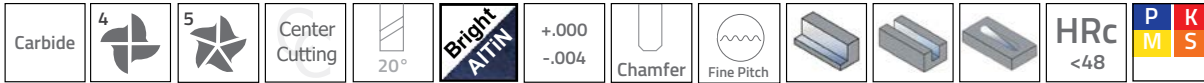
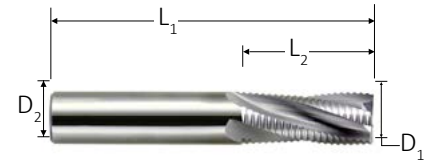


**CUSTOMIZATION**

WITH OVER 42,000 SQ.FT OF MANUFACTURING SPACE, MELIN HAS THE CAPACITY TO MAKE CUSTOM TOOLING FAST.

## MULTI FLUTE • FINE PROFILE ROUGHING END MILL

- > Sinusoidal ground profile enables maximum metal removal rates
- > Provides outstanding heat resistance and minimum tool wear
- > Effective on all medium hardness Ferrous Materials



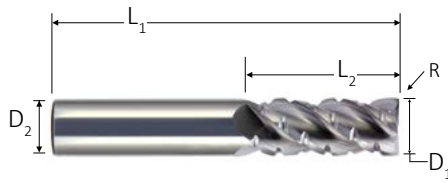
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	LENGTH	FLUTES	PART NAME	BRIGHT EDP	ALTIN EDP
3/16	3/16	5/8	2	std	4	CRMG-606	10276	50276
1/4	1/4	3/4	2-1/2	std	4	CRMG-808	15960	55960
1/4	1/4	1-1/8	3	long	4	CRMG-808-L	13751	53751
5/16	5/16	13/16	2-1/2	std	4	CRMG-1010	15961	55961
3/8	3/8	1/2	2	stub	4	CRMGS-1212	14205	54205
3/8	3/8	1	2-1/2	std	4	CRMG-1212	15962	55962
3/8	3/8	1-1/8	3	long	4	CRMG-1212-L	10234	50234
1/2	1/2	5/8	2-1/2	stub	4	CRMGS-1616	14201	54201
1/2	1/2	1-1/4	3	std	4	CRMG-1616	15963	55963
1/2	1/2	2	4	long	4	CRMG-1616-L	13750	53750
5/8	5/8	1-1/4	3-1/2	std	4	CRMG-2020	15964	55964
5/8	5/8	2-1/4	5	long	4	CRMG-2020-L	15725	55725
3/4	3/4	3/4	3	stub	4	CRMGS-2424	14203	54203
3/4	3/4	1-1/2	4	std	4	CRMG-2424	15965	55965
3/4	3/4	2-1/4	5	long	4	CRMG-2424-L	15727	55727
1	1	1-1/2	4	std	5	CRMG-3232	15966	55966
1	1	2-1/4	5	long	5	CRMG-3232-L	13960	53960

Speed & Feed: page 206



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTES	PART NAME	BRIGHT EDP	ALTIN EDP
6mm	6mm	20mm	63mm	4	CRMG-M6M6	13427	53427
8mm	8mm	20mm	63mm	4	CRMG-M8M8	13428	53428
10mm	10mm	25mm	70mm	4	CRMG-M10M10	13429	53429
12mm	12mm	25mm	76mm	4	CRMG-M12M12	13430	53430
16mm	16mm	32mm	89mm	4	CRMG-M16M16	13432	53432
20mm	20mm	38mm	100mm	4	CRMG-M20M20	13434	53434

Speed & Feed: page 206



**MULTI FLUTE • ROUGHER FINISHER**

- > A single tool for roughing and semi-finishing in a single pass
- > Truncated, ground profile enables optimum chip evacuation
- > Enables heavy cutting while still leaving good finishes

Carbide			Center Cutting			+ .000 - .002						HRC <48	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	BRIGHT EDP	ALTiN EDP
3/16	3/16	5/8	2	.0225	4	CRFMG-606	10280	50280
1/4	1/4	3/4	2-1/2	.0225	4	CRFMG-808	13477	53477
5/16	5/16	13/16	2-1/2	.0225	4	CRFMG-1010	13478	53478
3/8	3/8	1	2-1/2	.0225	4	CRFMG-1212	13479	53479
1/2	1/2	1-1/4	3	.0225	4	CRFMG-1616	13480	53480
1/2	1/2	1-5/8	4	.0225	4	CRFMG-1616-M	15836	55836
5/8	5/8	1-1/4	3-1/2	.0325	4	CRFMG-2020	13481	53481
3/4	3/4	1-1/2	4	.0325	4	CRFMG-2424	13482	53482
3/4	3/4	2-1/4	5	.0325	4	CRFMG-2424-L	15802	55802
1	1	1-1/2	4	.0325	5	CRFMG-3232	13483	53483

**Speed & Feed:** page 207

Carbide		Center Cutting			+ .000mm - .050mm						HRC <48	
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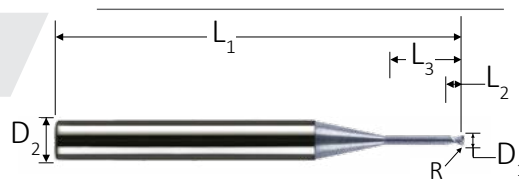
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	FLUTES	PART NAME	BRIGHT EDP	ALTiN EDP
6mm	6mm	20mm	63mm	0.5mm	4	CRFMG-M6M6	13436	53436
8mm	8mm	20mm	63mm	0.5mm	4	CRFMG-M8M8	13437	53437
10mm	10mm	25mm	70mm	0.5mm	4	CRFMG-M10M10	13438	53438
12mm	12mm	25mm	76mm	0.5mm	4	CRFMG-M12M12	13439	53439
16mm	16mm	32mm	89mm	0.75mm	4	CRFMG-M16M16	13441	53441
20mm	20mm	38mm	100mm	0.75mm	4	CRFMG-M20M20	13443	53443

**Speed & Feed:** page 207

## 2 FLUTE • CORNER RADIUS FOR MULTI AXIS MACHINING



- ▶ Designed for use with multi axis machines on die & mold steels
- ▶ Short Flute and reinforced core provide added strength
- ▶ Proprietary coatings provide extended tool life over conventional coatings



### CORNER RADIUS

Carbide Center Cutting  $+0.0004$   $-0.0004$   $<1/4$   $+0.000$   $-0.001$   $=1/4$  Radius HRC TiXCo  $> 56$  HRC nACO  $< 56$

DIA $D_1$	SHK $D_2$	LOC $L_2$	LBS $L_3$	OAL $L_1$	CORNER R	PART NAME	TiXCo EDP	nACO EDP
0.031	1/4	0.025	0.093	2-1/2	0.005	HMG1-.031-SF3-R005	H7114	H6789
0.031	1/4	0.025	0.156	2-1/2	0.005	HMG1-.031-SF5-R005	H7115	H6790
0.031	1/4	0.025	0.250	2-1/2	0.005	HMG1-.031-SF8-R005	H7116	H6791
0.031	1/4	0.025	0.375	2-1/2	0.005	HMG1-.031-SF12-R005	H7177	H7184
0.0469	1/4	0.038	0.141	2-1/2	0.008	HMG1-.047-SF3-R008	H7120	H6795
0.0469	1/4	0.038	0.250	2-1/2	0.008	HMG1-.047-SF5-R008	H7121	H6796
0.0469	1/4	0.038	0.375	2-1/2	0.008	HMG1-.047-SF8-R008	H7122	H6797
0.0469	1/4	0.038	0.564	2-1/2	0.008	HMG1-.047-SF12-R008	H7178	H7185
0.0625	1/4	0.050	0.187	2-1/2	0.010	HMG1-.062-SF3-R010	H7123	H6798
0.0625	1/4	0.050	0.312	2-1/2	0.010	HMG1-.062-SF5-R010	H7124	H6799
0.0625	1/4	0.050	0.500	2-1/2	0.010	HMG1-.062-SF8-R010	H7125	H6801
0.0625	1/4	0.050	0.750	3	0.010	HMG1-.062-SF12-R010	H7179	H7186
0.1250	1/4	0.100	0.375	2-1/2	0.015	HMG1-.125-SF3-R015	H7132	H6809
0.1250	1/4	0.100	0.625	2-1/2	0.015	HMG1-.125-SF5-R015	H7133	H6810
0.1250	1/4	0.100	1.000	2-1/2	0.015	HMG1-.125-SF8-R015	H7134	H6811
0.2500	1/4	0.200	0.750	2-1/2	0.015	HMG1-.250-SF3-R015	H7137	H6814
0.2500	1/4	0.200	1.250	2-1/2	0.015	HMG1-.250-SF5-R015	H7138	H6815

Speed & Feed: page 208

Carbide Center Cutting  $+0.01mm$   $-0.01mm$   $+0.000mm$   $-0.025mm$   $=6mm$  Radius HRC TiXCo  $> 56$  HRC nACO  $< 56$

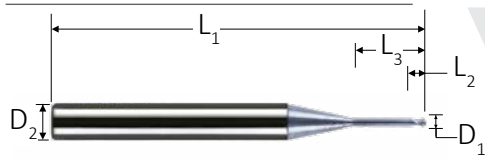
DIA $D_1$	SHK $D_2$	LOC $L_2$	LBS $L_3$	OAL $L_1$	CORNER R	PART NAME	TiXCo EDP	nACO EDP
1mm	4mm	0.8mm	3mm	50mm	0.2mm	HMG1-M1-SF3-R0.2	H7143	H7022
1mm	4mm	0.8mm	5mm	50mm	0.2mm	HMG1-M1-SF5-R0.2	H7144	H7023
1mm	4mm	0.8mm	8mm	50mm	0.2mm	HMG1-M1-SF8-R0.2	H7145	H7024
1mm	4mm	0.8mm	12mm	63mm	0.2mm	HMG1-M1-SF12-R0.2	H7146	H7025
1.5mm	4mm	1.35mm	4.5mm	50mm	0.2mm	HMG1-M1.5-SF3-R0.2	H7147	H7026
1.5mm	4mm	1.35mm	7.5mm	50mm	0.2mm	HMG1-M1.5-SF5-R0.2	H7148	H7027
1.5mm	4mm	1.35mm	12mm	63mm	0.2mm	HMG1-M1.5-SF8-R0.2	H7149	H7028
1.5mm	4mm	1.35mm	18mm	63mm	0.2mm	HMG1-M1.5-SF12-R0.2	H7150	H7029
2mm	4mm	1.7mm	6mm	50mm	0.3mm	HMG1-M2-SF3-R0.3	H7151	H7030
2mm	4mm	1.7mm	10mm	50mm	0.3mm	HMG1-M2-SF5-R0.3	H7152	H7031
2mm	4mm	1.7mm	16mm	63mm	0.3mm	HMG1-M2-SF8-R0.3	H7153	H7032
2mm	4mm	1.7mm	24mm	63mm	0.3mm	HMG1-M2-SF12-R0.3	H7154	H7033
3mm	6mm	2.5mm	9mm	63mm	0.5mm	HMG1-M3-SF3-R0.5	H7159	H7038
3mm	6mm	2.5mm	15mm	63mm	0.5mm	HMG1-M3-SF5-R0.5	H7160	H7039
3mm	6mm	2.5mm	24mm	75mm	0.5mm	HMG1-M3-SF8-R0.5	H7161	H7040
4mm	6mm	3mm	12mm	63mm	0.5mm	HMG1-M4-SF3-R0.5	H7162	H7041
4mm	6mm	3mm	20mm	63mm	0.5mm	HMG1-M4-SF5-R0.5	H7163	H7042
4mm	6mm	3mm	32mm	75mm	0.5mm	HMG1-M4-SF8-R0.5	H7164	H7043

Speed & Feed: page 208

Series: **HMG1**

# DIE & MOLD STEELS

## 2 FLUTE • BALL NOSE FOR Z-AXIS MACHINING



- › Designed for use with multi axis machines on die & mold steels
- › Short Flute and reinforced core provide added strength
- › Proprietary coatings provide extended tool life over conventional coatings



BALL NOSE

Carbide	2	Center Cutting	30°	TiXCo nACo	+0.0004 -0.0004 <1/4	+0.000 -0.001 =1/4	Ball				HRC TiXCo > 56	HRC nACo < 56	P M H
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	TiXCo EDP	nACo EDP
0.0200	1/4	0.016	0.062	2-1/2	HMG1-.020-SF3-B	H6847	H6749
0.0200	1/4	0.016	0.100	2-1/2	HMG1-.020-SF5-B	H6848	H6750
0.0313	1/4	0.025	0.093	2-1/2	HMG1-.031-SF3-B	H6849	H6751
0.0313	1/4	0.025	0.156	2-1/2	HMG1-.031-SF5-B	H6851	H6752
0.0313	1/4	0.025	0.250	2-1/2	HMG1-.031-SF8-B	H6853	H6753
0.0313	1/4	0.025	0.375	2-1/2	HMG1-.031-SF12-B	H7181	H7188
0.0625	1/4	0.050	0.187	2-1/2	HMG1-.062-SF3-B	H6861	H6761
0.0625	1/4	0.050	0.312	2-1/2	HMG1-.062-SF5-B	H7175	H6762
0.0625	1/4	0.050	0.500	2-1/2	HMG1-.062-SF8-B	H7176	H6763
0.0625	1/4	0.050	0.750	3	HMG1-.062-SF12-B	H7183	H7190

Speed & Feed: page 208

Carbide	2	Center Cutting	30°	TiXCo nACo	+0.01mm -0.01mm	+0.000mm -0.025mm =6mm	Ball				HRC TiXCo > 56	HRC nACo < 56	P M H
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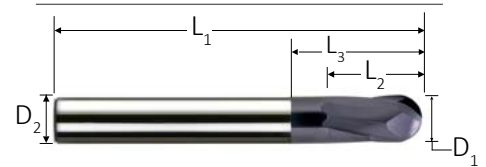
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	TiXCo EDP	nACo EDP
1mm	4mm	0.8mm	3mm	50mm	HMG1-M1-SF3-B	H7057	H6994
1mm	4mm	0.8mm	5mm	50mm	HMG1-M1-SF5-B	H7058	H6995
1mm	4mm	0.8mm	8mm	50mm	HMG1-M1-SF8-B	H7059	H6996
1mm	4mm	0.8mm	12mm	63mm	HMG1-M1-SF12-B	H7093	H6997
2mm	4mm	1.7mm	6mm	50mm	HMG1-M2-SF3-B	H7098	H7002
2mm	4mm	1.7mm	10mm	50mm	HMG1-M2-SF5-B	H7099	H7003
2.5mm	4mm	2mm	7.5mm	50mm	HMG1-M2.5-SF3-B	H7102	H7006
2.5mm	4mm	2mm	12.5mm	63mm	HMG1-M2.5-SF5-B	H7103	H7007
3mm	6mm	2.5mm	9mm	63mm	HMG1-M3-SF3-B	H7106	H7010
3mm	6mm	2.5mm	15mm	63mm	HMG1-M3-SF5-B	H7107	H7011
4mm	6mm	3mm	20mm	63mm	HMG1-M4-SF5-B	H7110	H7014
4mm	6mm	3mm	32mm	75mm	HMG1-M4-SF8-B	H7111	H7015
5mm	6mm	4mm	15mm	63mm	HMG1-M5-SF3-B	H7173	H7171
6mm	6mm	5mm	18mm	63mm	HMG1-M6-SF3-B	H7112	H7016
6mm	6mm	5mm	30mm	75mm	HMG1-M6-SF5-B	H7113	H7017

Speed & Feed: page 208

# DIE & MOLD STEELS

Series: **HMG**

## 2 FL • BALL NOSE FOR HARD MILLING IN DIE & MOLD



- > Designed for use with multi axis machines on hardened materials
- > Short Flute and reinforced core provide added strength
- > Proprietary nACo coating provides extended tool life over conventional coatings

Carbide		Center Cutting		nACo	+0.0005 -0.0005 <1/8	+0.000 -0.002 ≥1/8	Ball				HRC >56	<table border="1"><tr><td>P</td></tr><tr><td>M</td></tr><tr><td>H</td></tr></table>	P	M	H
P															
M															
H															

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	nACo EDP
1/32	1/8	1/32	1/16	3	HMG-401-B	13484
1/16	1/8	1/16	1/8	3	HMG-402-B	13485
3/32	1/8	3/32	3/16	3	HMG-403-B	13486
1/8	1/8	1/8	1/4	1-1/2	HMGS-404-B	H6672
1/8	1/8	1/8	1/4	3	HMG-404-B	13136
3/16	3/16	3/16	3/8	2	HMGS-606-B	H6673
3/16	3/16	3/16	3/8	3	HMG-606-B	13137
1/4	1/4	1/4	1/2	2-1/2	HMGS-808-B	H6674
1/4	1/4	1/4	1/2	3	HMG-808-B	13138
5/16	5/16	5/16	5/8	3	HMG-1010-B	13139
3/8	3/8	3/8	3/4	2-1/2	HMGS-1212-B	H6676
3/8	3/8	3/8	3/4	4	HMG-1212-B	13140
1/2	1/2	1/2	1	3	HMGS-1616-B	H6677
1/2	1/2	1/2	1	4	HMG-1616-B	13141

Speed & Feed: page 209

Carbide		Center Cutting		nACo	+0.013 -0.013mm ≥3mm	+0.000 -0.050mm <3mm	Ball				HRC >56	<table border="1"><tr><td>P</td></tr><tr><td>M</td></tr><tr><td>H</td></tr></table>	P	M	H
P															
M															
H															

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	nACo EDP
1mm	3mm	1mm	2mm	75mm	HMG-M3M1-B	13455
2mm	3mm	2mm	4mm	75mm	HMG-M3M2-B	13456
3mm	3mm	3mm	6mm	75mm	HMG-M3M3-B	13457
4mm	4mm	4mm	8mm	75mm	HMG-M4M4-B	13458
6mm	6mm	6mm	12mm	89mm	HMG-M6M6-B	13459
8mm	8mm	8mm	16mm	100mm	HMG-M8M8-B	13460
10mm	10mm	10mm	20mm	100mm	HMG-M10M10-B	13461
12mm	12mm	12mm	24mm	100mm	HMG-M12M12-B	13462

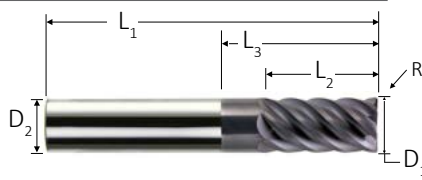
Speed & Feed: page 209



Series: **CCMG45**

# DIE & MOLD STEELS

## 6 FLUTE • 45° PROFILING END MILL



- › Designed for machining at high metal removal rates in light to medium finishing applications
- › Maximized core diameter provides exceptional rigidity and strength
- › Proprietary nACo coating provides extended tool life over conventional coatings

Carbide		Center Cutting		nACo	+0.000 -0.002			HRC >55-63	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	nACo EDP
1/8	1/8	1/4	1/2	1-1/2	0.010	CCMG45-404-S	H6840
1/8	1/8	1/2		1-1/2	0.010	CCMG45-404	16794
3/16	3/16	5/8		2	0.010	CCMG45-606	16786
1/4	1/4	3/8	3/4	2-1/2	0.015	CCMG45-808-S	H6841
1/4	1/4	3/4		2-1/2	0.015	CCMG45-808	16787
5/16	5/16	13/16		2-1/2	0.020	CCMG45-1010	16788
3/8	3/8	1/2	1	2-1/2	0.020	CCMG45-1212-S	H6842
3/8	3/8	1		2-1/2	0.020	CCMG45-1212	16789
1/2	1/2	5/8	1	3	0.025	CCMG45-1616-S	H6843
1/2	1/2	1		3	0.025	CCMG45-1616	16790
5/8	5/8	1-1/4		3-1/2	0.030	CCMG45-2020	16791
3/4	3/4	1	1-1/2	4	0.035	CCMG45-2424-S	H6844
3/4	3/4	1-1/2		4	0.035	CCMG45-2424	16792
1	1	1-1/2		4	0.035	CCMG45-3232	16793

**Speed & Feed:** page 210

Carbide		Center Cutting		nACo	+0.000mm -0.050mm			HRC >55-63	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER R	PART NAME	nACo EDP
3mm	3mm	12mm	38mm	0.25mm	CCMG45-M3M3	13445
4mm	4mm	14mm	51mm	0.25mm	CCMG45-M4M4	13446
6mm	6mm	20mm	63mm	0.40mm	CCMG45-M6M6	13447
8mm	8mm	20mm	63mm	0.50mm	CCMG45-M8M8	13448
10mm	10mm	25mm	70mm	0.50mm	CCMG45-M10M10	13449
12mm	12mm	25mm	76mm	0.60mm	CCMG45-M12M12	13450
16mm	16mm	32mm	89mm	0.75mm	CCMG45-M16M16	13452
20mm	20mm	38mm	100mm	0.90mm	CCMG45-M20M20	13454

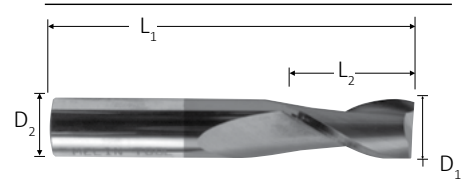
**Speed & Feed:** page 210

# GRAPHITE & COMPOSITES

Series: **AMG**

## 2 FLUTE • CVD DIAMOND COATING

- > For optimum productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS
- > Ideal for slotting, pocketing, Z-axis machining and taking heavy radial depth of cuts
- > Special carbide substrate with 6% cobalt binder enables proper adhesion of coating
- > Up to 20 micron thickness of pure crystalline diamond structure provides maximum tool life

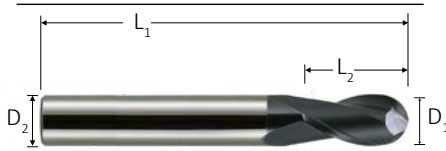


Carbide	2	Center Cutting	30°	CVD Diamond	Square	+0.0005 -0.0005 <1/8	+0.000 -0.002 >1/8				
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DIAMOND EDP
1/32	1/8	3/32	1-1/2	AMG-401-DIA	10093
1/16	1/8	3/16	1-1/2	AMG-402-DIA	10095
3/32	1/8	3/8	1-1/2	AMG-403-DIA	10097
1/8	1/8	1/2	1-1/2	AMG-404-DIA	10099
3/16	3/16	5/8	2	AMG-606-DIA	10101
1/4	1/4	3/4	2-1/2	AMG-808-DIA	10103
5/16	5/16	13/16	2-1/2	AMG-1010-DIA	10105
3/8	3/8	1	2-1/2	AMG-1212-DIA	10107

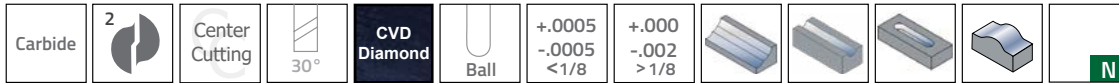
**Speed & Feed:** page 211

Series: **AMG**



## 2 FLUTE • BALL NOSE CVD DIAMOND COATING

- ▶ For optimum productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS
- ▶ Ideal for slotting, pocketing, Z-axis machining and taking heavy radial depth of cuts
- ▶ Special carbide substrate with 6% cobalt binder enables proper adhesion of coating
- ▶ Up to 20 micron thickness of pure crystalline diamond structure provides maximum tool life



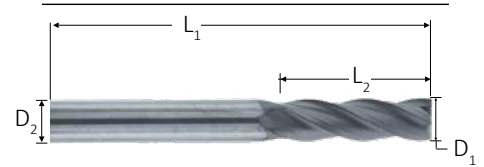
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DIAMOND EDP
1/32	1/8	3/32	1-1/2	AMG-401-B-DIA	10109
1/16	1/8	3/16	1-1/2	AMG-402-B-DIA	10111
3/32	1/8	3/8	1-1/2	AMG-403-B-DIA	10113
1/8	1/8	1/2	1-1/2	AMG-404-B-DIA	10115
3/16	3/16	5/8	2	AMG-606-B-DIA	10117
1/4	1/4	3/4	2-1/2	AMG-808-B-DIA	10119
5/16	5/16	13/16	2-1/2	AMG-1010-B-DIA	10121
3/8	3/8	1	2-1/2	AMG-1212-B-DIA	10123

**Speed & Feed:** page 211

# GRAPHITE & COMPOSITES

Series: **CCMG**

## 4 FLUTE • CVD DIAMOND COATING



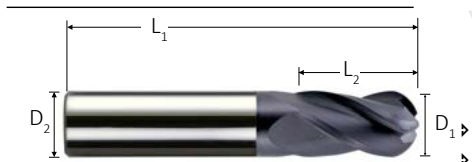
- > Optimum productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS
- > Ideal for finishing applications and long axial depths of cut
- > Special carbide substrate with 6% cobalt binder enables proper adhesion of coating
- > Up to 20 micron thickness of pure crystalline diamond structure provides maximum tool life

Carbide		Center Cutting	30°	CVD Diamond	Square	+0.0005 -0.0005 <1/8	+0.000 -0.002 >1/8		
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DIAMOND EDP
0.015	1/8	.045	1-1/2	CCMG-.015-DIA	H6678
0.02	1/8	.060	1-1/2	CCMG-.020-DIA	H6679
1/32	1/8	3/32	1-1/2	CCMG-401-DIA	10061
0.04	1/8	.120	1-1/2	CCMG-.040-DIA	H6680
0.047	1/8	.141	1-1/2	CCMG-.047-DIA	H6681
0.05	1/8	.150	1-1/2	CCMG-.050-DIA	H6682
0.06	1/8	.180	1-1/2	CCMG-.060-DIA	H6683
1/16	1/8	3/16	1-1/2	CCMG-402-DIA	10063
0.078	1/8	.234	1-1/2	CCMG-.078-DIA	H6684
3/32	1/8	3/8	1-1/2	CCMG-403-DIA	10065
0.10	1/8	.300	1-1/2	CCMG-.100-DIA	H6685
1/8	1/8	1/2	1-1/2	CCMG-404-DIA	10067
0.156	3/16	.470	2	CCMG-.156-DIA	H6686
3/16	3/16	5/8	2	CCMG-606-DIA	10069
1/4	1/4	3/4	2-1/2	CCMG-808-DIA	10071
5/16	5/16	13/16	2-1/2	CCMG-1010-DIA	10073
3/8	3/8	1	2-1/2	CCMG-1212-DIA	10075
1/2	1/2	1	3	CCMG-1616-DIA	14594

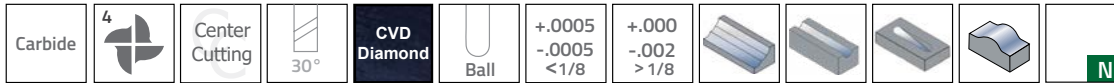
Speed & Feed: page 211

Series: **CCMG**



## 4 FLUTE • BALL NOSE CVD DIAMOND COATING

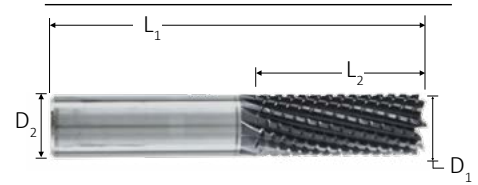
- ▶ Optimum productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS
- ▶ Ideal for finishing applications and long axial depths of cut
- ▶ Special carbide substrate with 6% cobalt binder enables proper adhesion of coating
- ▶ Up to 20 micron thickness of pure crystalline diamond structure provides maximum tool life



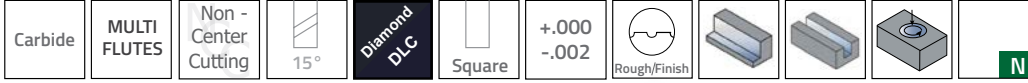
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DIAMOND EDP
.015	1/8	.045	1-1/2	CCMG-.015-B-DIA	H6687
.020	1/8	.060	1-1/2	CCMG-.020-B-DIA	H6688
1/32	1/8	3/32	1-1/2	CCMG-401-B-DIA	10077
.040	1/8	.120	1-1/2	CCMG-.040-B-DIA	H6689
.047	1/8	.141	1-1/2	CCMG-.047-B-DIA	H6690
.050	1/8	.150	1-1/2	CCMG-.050-B-DIA	H6691
.060	1/8	.180	1-1/2	CCMG-.060-B-DIA	H6692
1/16	1/8	3/16	1-1/2	CCMG-402-B-DIA	10079
.078	1/8	.234	1-1/2	CCMG-.078-B-DIA	H6693
3/32	1/8	3/8	1-1/2	CCMG-403-B-DIA	10081
.100	1/8	.300	1-1/2	CCMG-.100-B-DIA	H6694
1/8	1/8	1/2	1-1/2	CCMG-404-B-DIA	10083
.156	3/16	.470	2	CCMG-.156-B-DIA	H6695
3/16	3/16	5/8	2	CCMG-606-B-DIA	10085
1/4	1/4	3/4	2-1/2	CCMG-808-B-DIA	10087
5/16	5/16	13/16	2-1/2	CCMG-1010-B-DIA	10089
3/8	3/8	1	2-1/2	CCMG-1212-B-DIA	10091

**Speed & Feed:** page 211

## MULTI FLUTE • COMPOSITE ROUTER FOR CARBON FIBER

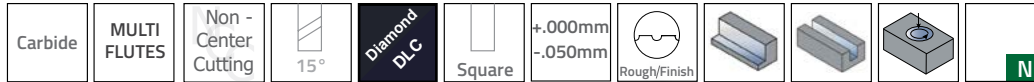


- > Designed for high productivity results in machining CRFP composite materials
- > Eliminates fiber breakout and delamination
- > Provides improved edge finishes
- > Ideal for work on airplane skins and other honeycomb work pieces



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTES	PART NAME	DIAMOND EDP	DLC EDP
1/8	1/8	1/4	1-1/2	6	CRMGD-404-S	H6963	H7280
1/8	1/8	1/2	1-1/2	6	CRMGD-404	H6964	H7281
3/16	3/16	3/8	2	8	CRMGD-606-S	H6965	H7282
3/16	3/16	3/4	2	8	CRMGD-606	H6966	H7283
1/4	1/4	1/2	2-1/2	10	CRMGD-808-S	H6967	H7284
1/4	1/4	3/4	2-1/2	10	CRMGD-808	H6968	H7285
1/4	1/4	1	3	10	CRMGD-808-L	H6969	H7286
5/16	5/16	1	2-1/2	10	CRMGD-1010	H6970	H7287
3/8	3/8	3/4	2-1/2	12	CRMGD-1212	H6971	H7288
3/8	3/8	1-1/8	3	12	CRMGD-1212-L	H6972	H7289
1/2	1/2	1	3	14	CRMGD-1616	H6973	H7290
1/2	1/2	2	4	14	CRMGD-1616-L	H6974	H7291

Speed & Feed: page 212



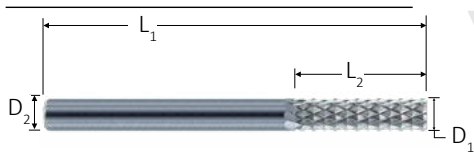
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTES	PART NAME	DIAMOND EDP	DLC EDP
3mm	3mm	6mm	38mm	6	CRMGD-M3M3-S	H6975	H7292
3mm	3mm	12mm	38mm	6	CRMGD-M3M3	H6976	H7293
5mm	5mm	10mm	50mm	8	CRMGD-M5M5-S	H6977	H7294
5mm	5mm	20mm	50mm	8	CRMGD-M5M5	H6978	H7295
6mm	6mm	12mm	63mm	10	CRMGD-M6M6-S	H6979	H7296
6mm	6mm	20mm	63mm	10	CRMGD-M6M6	H6980	H7297
8mm	8mm	20mm	63mm	10	CRMGD-M8M8	H6981	H7298
10mm	10mm	20mm	70mm	12	CRMGD-M10M10	H6982	H7299
10mm	10mm	30mm	70mm	12	CRMGD-M10M10-L	H6983	H7300
12mm	12mm	25mm	75mm	14	CRMGD-M12M12	H6984	H7301
12mm	12mm	50mm	100mm	14	CRMGD-M12M12-L	H6985	H7302

Speed & Feed: page 212

# GRAPHITE & COMPOSITES

## FIBERGLASS ROUTERS • NO END CUT

Series: **FRMG**



- Designed for machining COMPOSITES, GRAPHITE, CARBON FIBER, HONEYCOMB & FIBERGLASS MATERIALS
- NE - **No End Cut**: For use where end of fiberglass router is not in contact with work piece
- SQ - **Square Cut**: For use where square corners or smooth surfaces are required for work piece
- DP - **Drill Point Cut**: For use where plunging applications are required before routing operations



Carbide

MULTI FLUTES

Non - Center Cutting

Bright DLC

Square

+0.000  
-0.005



N

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	BRIGHT EDP	DLC EDP
1/8	1/8	1/2	1-1/2	No End	FRMG-404-NE	16465	76465
3/16	3/16	5/8	2	No End	FRMG-606-NE	19534	79534
1/4	1/4	3/4	2-1/2	No End	FRMG-808-NE	19531	79531
1/4	1/4	1	3	No End	FRMG-808-LNE	15526	75526
3/8	3/8	1	2-1/2	No End	FRMG-1212-NE	11921	71921
1/2	1/2	1	3	No End	FRMG-1616-NE	11923	71923

Speed & Feed: 213

## FIBERGLASS ROUTERS • SQUARE END CUT



Carbide

MULTI FLUTES

Center Cutting

Bright DLC

Square

+0.000  
-0.005



N

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	BRIGHT EDP	DLC EDP
1/8	1/8	1/2	1-1/2	SQ	FRMG-404	11924	71924
3/16	3/16	5/8	2	SQ	FRMG-606	11925	71925
1/4	1/4	3/4	2-1/2	SQ	FRMG-808	11926	71926
1/4	1/4	1	3	SQ	FRMG-808-L	11927	71927
3/8	3/8	1	2-1/2	SQ	FRMG-1212	11928	71928
1/2	1/2	1	3	SQ	FRMG-1616	11929	71929

Speed & Feed: 213

## FIBERGLASS ROUTERS • 135° DRILL POINT END CUT



Carbide

MULTI FLUTES

Center Cutting

Bright DLC

135°

+0.000  
-0.005



N

DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	CORNER	PART NAME	BRIGHT EDP	DLC EDP
1/8	1/8	1/2	1-1/2	drill point	FRMG-404-DP	11930	71930
3/16	3/16	5/8	2	drill point	FRMG-606-DP	11931	71931
1/4	1/4	3/4	2-1/2	drill point	FRMG-808-DP	11932	71932
1/4	1/4	1	3	drill point	FRMG-808-LDP	12069	72069
3/8	3/8	1	2-1/2	drill point	FRMG-1212-DP	12071	72071
1/2	1/2	1	3	drill point	FRMG-1616-DP	12178	72178

Speed & Feed: 213

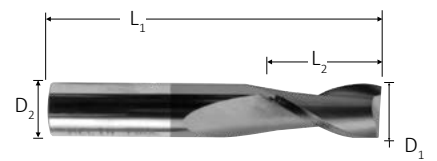


# GRAPHITE & COMPOSITES

Series: **AMG**

## 2 FLUTE • DLC AMORPHOUS DIAMOND COATING

- > For enhanced productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS
- > Ideal for slotting, pocketing and taking heavy radial depth of cuts
- > Hydrogen free diamond-like carbon (DLC) provides extended tool life at lower tool cost

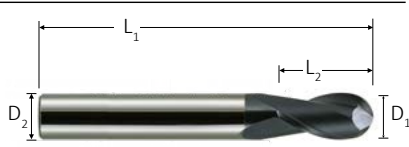


DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DLC EDP
1/32	1/8	3/32	1-1/2	AMG-401-DLC	13587
1/16	1/8	3/16	1-1/2	AMG-402-DLC	13588
3/32	1/8	3/8	1-1/2	AMG-403-DLC	13589
1/8	1/8	1/2	1-1/2	AMG-404-DLC	13590
5/32	3/16	9/16	2	AMG-605-DLC	74020
3/16	3/16	5/8	2	AMG-606-DLC	13591
7/32	1/4	5/8	2-1/2	AMG-807-DLC	74024
1/4	1/4	3/4	2-1/2	AMG-808-DLC	13592
9/32	5/16	3/4	2-1/2	AMG-1009-DLC	75898
5/16	5/16	13/16	2-1/2	AMG-1010-DLC	13593
11/32	3/8	7/8	2-1/2	AMG-1211-DLC	75900
3/8	3/8	1	2-1/2	AMG-1212-DLC	13594
7/16	7/16	1	2-3/4	AMG-1414-DLC	74040
1/2	1/2	1	3	AMG-1616-DLC	74042

**Speed & Feed: 211**

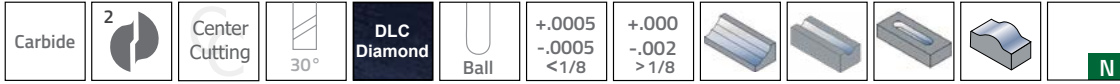
Series: **AMG**

# GRAPHITE & COMPOSITES



## 2 FLUTE • BALL NOSE DLC AMORPHOUS DIAMOND COATING

For enhanced productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS  
 Ideal for slotting, pocketing, Z-axis machining and taking heavy radial depth of cuts



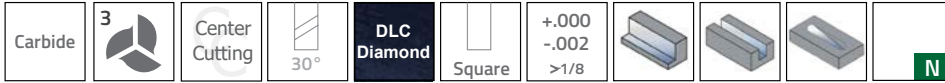
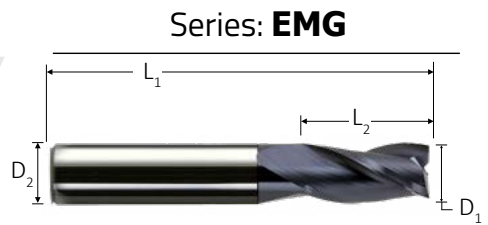
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DLC EDP
1/32	1/8	3/32	1-1/2	AMG-401-B-DLC	13604
1/16	1/8	3/16	1-1/2	AMG-402-B-DLC	13605
3/32	1/8	3/8	1-1/2	AMG-403-B-DLC	13606
1/8	1/8	1/2	1-1/2	AMG-404-B-DLC	13607
5/32	3/16	9/16	2	AMG-605-B-DLC	75910
3/16	3/16	5/8	2	AMG-606-B-DLC	13608
7/32	1/4	5/8	2-1/2	AMG-807-B-DLC	75911
1/4	1/4	3/4	2-1/2	AMG-808-B-DLC	13609
9/32	5/16	3/4	2-1/2	AMG-1009-B-DLC	75912
5/16	5/16	13/16	2-1/2	AMG-1010-B-DLC	13610
11/32	3/8	7/8	2-1/2	AMG-1211-B-DLC	76133
3/8	3/8	1	2-1/2	AMG-1212-B-DLC	13611
7/16	7/16	1	2-3/4	AMG-1414-B-DLC	75913
1/2	1/2	1	3	AMG-1616-B-DLC	74068

**Speed & Feed: 211**

# GRAPHITE & COMPOSITES

## 3 FLUTE • DLC AMORPHOUS DIAMOND COATING

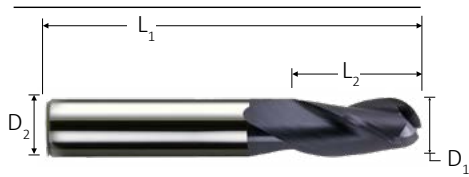
- > For enhanced productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS
- > Ideal for finishing applications and long axial depths of cut
- > Hydrogen free diamond-like carbon (DLC) provides extended tool life at lower tool cost



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DLC EDP
1/8	1/8	1/2	1-1/2	EMG-404-DLC	77640
5/32	3/16	9/16	2	EMG-605-DLC	77641
3/16	3/16	5/8	2	EMG-606-DLC	77642
7/32	1/4	5/8	2-1/2	EMG-807-DLC	73744
1/4	1/4	3/4	2-1/2	EMG-808-DLC	77644
9/32	5/16	3/4	2-1/2	EMG-1009-DLC	73746
5/16	5/16	13/16	2-1/2	EMG-1010-DLC	77646
3/8	3/8	1	2-1/2	EMG-1212-DLC	77648
7/16	7/16	1	2-3/4	EMG-1414-DLC	77650
1/2	1/2	1	3	EMG-1616-DLC	77652

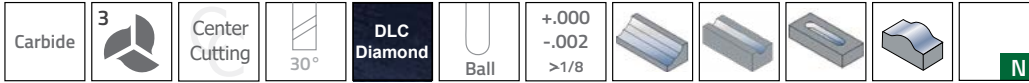
Speed & Feed: 211

Series: **EMG**



## 3 FLUTE • BALL NOSE DLC AMORPHOUS DIAMOND COATING

► For enhanced productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS  
 ► Ideal for slotting, pocketing, Z-axis machining and taking heavy radial depth of cuts



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DLC EDP
1/8	1/8	1/2	1-1/2	EMG-404-B-DLC	77825
5/32	3/16	9/16	2	EMG-605-B-DLC	77827
3/16	3/16	5/8	2	EMG-606-B-DLC	77829
7/32	1/4	5/8	2-1/2	EMG-807-B-DLC	74061
1/4	1/4	3/4	2-1/2	EMG-808-B-DLC	77832
9/32	5/16	3/4	2-1/2	EMG-1009-B-DLC	79587
5/16	5/16	13/16	2-1/2	EMG-1010-B-DLC	77835
11/32	3/8	7/8	2-1/2	EMG-1211-B-DLC	79591
3/8	3/8	1	2-1/2	EMG-1212-B-DLC	77838
7/16	7/16	1	2-3/4	EMG-1414-B-DLC	77840
1/2	1/2	1	3	EMG-1616-B-DLC	77842

**Speed & Feed: 211**

# GRAPHITE & COMPOSITES

Series: **CCMG**

## 4 FLUTE • DLC AMORPHOUS DIAMOND COATING



- > For enhanced productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS
- > Ideal for finishing applications and long axial depths of cut
- > Hydrogen free diamond-like carbon (DLC) provides extended tool life at lower tool cost

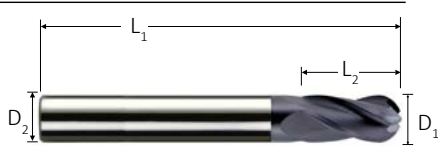
Carbide		Center Cutting	30°	DLC Diamond	Square	+0.0005 -0.0005 < 1/8	+0.000 -0.002 > 1/8		
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DLC EDP
1/32	1/8	3/32	1-1/2	CCMG-401-DLC	13595
0.031 (1/32)	1/8	0.093	1-1/2	CCMG-.031-DLC	77489
0.047 (3/64)	1/8	0.071	1-1/2	CCMG-.047-DLC	H1427
0.047 (3/64)	1/8	0.141	1-1/2	CCMG-.047-DLC	H1653
0.062 (1/16)	1/8	0.093	1-1/2	CCMG-.062-DLC	H1430
1/16	1/8	3/16	1-1/2	CCMG-402-DLC	13596
0.062 (1/16)	1/8	0.186	1-1/2	CCMG-.062-DLC	H1699
0.078 (5/64)	1/8	0.117	1-1/2	CCMG-.078-DLC	H1433
0.078 (5/64)	1/8	0.234	1-1/2	CCMG-.078-DLC	H1705
0.093 (3/32)	1/8	0.14	1-1/2	CCMG-.093-DLC	H1438
3/32	1/8	3/8	1-1/2	CCMG-403-DLC	13597
0.093 (3/32)	1/8	0.279	1-1/2	CCMG-.093-DLC	H1711
0.125 (1/8)	1/8	0.187	1-1/2	CCMG-.125-DLC	H2001
0.125 (1/8)	1/8	0.375	1-1/2	CCMG-.125-DLC	H2004
0.125 (1/8)	1/8	0.75	2-1/2	CCMG-.1250-LF-DLC	72391
1/8	1/8	1/2	1-1/2	CCMG-404-DLC	13598
5/32	3/16	9/16	2	CCMG-605-DLC	74136
3/16	3/16	5/8	2	CCMG-606-DLC	13599
7/32	1/4	5/8	2	CCMG-807-DLC	74140
1/4	1/4	3/4	2-1/2	CCMG-808-DLC	13600
9/32	5/16	3/4	2-1/2	CCMG-1009-DLC	74148
5/16	5/16	13/16	2-1/2	CCMG-1010-DLC	13601
11/32	3/8	7/8	2-1/2	CCMG-1211-DLC	75924
3/8	3/8	1	2-1/2	CCMG-1212-DLC	13602
7/16	7/16	1	2-3/4	CCMG-1414-DLC	74158
1/2	1/2	1	3	CCMG-1616-DLC	74160

**Speed & Feed: 211**

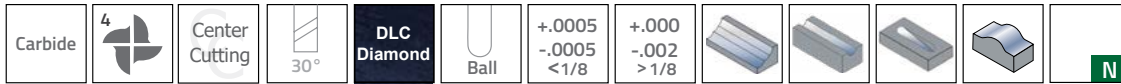
Series: **CCMG**

# GRAPHITE & COMPOSITES



## 4 FLUTE • BALL NOSE DLC AMORPHOUS DIAMOND COATING

- For enhanced productivity in machining GRAPHITE, HIGH SILICON ALUMINUM & COMPOSITE MATERIALS
- Ideal for finishing applications and long axial depths of cut
- Hydrogen free diamond-like carbon (DLC) provides extended tool life at lower tool cost



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	PART NAME	DLC EDP
0.015 (1/64)	1/8	0.023	1-1/2	CCMGS-.015-B-DLC	78869
0.015 (1/64)	1/8	0.045	1-1/2	CCMG-.015-B-DLC	73155
0.015 (1/64)	1/8	0.075	2-1/2	CCMG-.0150-LF-B-DLC	72392
0.031 (1/32)	1/8	0.047	1-1/2	CCMGS-.031-B-DLC	78927
0.031 (1/32)	1/8	0.093	1-1/2	CCMG-.031-B-DLC	78928
1/32	1/8	3/32	1-1/2	CCMG-401-B-DLC	13612
0.047 (3/64)	1/8	0.071	1-1/2	CCMGS-.047-B-DLC	H1601
0.047 (3/64)	1/8	0.141	1-1/2	CCMG-.047-B-DLC	H1652
0.062 (1/16)	1/8	0.093	1-1/2	CCMGS-.062-B-DLC	H1698
0.062 (1/16)	1/8	0.186	1-1/2	CCMG-.062-B-DLC	H2013
1/16	1/8	3/16	1-1/2	CCMG-402-B-DLC	13613
0.078 (5/64)	1/8	0.117	1-1/2	CCMGS-.078-B-DLC	H1743
0.078 (5/64)	1/8	0.234	1-1/2	CCMG-.078-B-DLC	H1704
0.093 (3/32)	1/8	0.14	1-1/2	CCMGS-.093-B-DLC	H1746
0.093 (3/32)	1/8	0.279	1-1/2	CCMG-.093-B-DLC	H1710
3/32	1/8	3/8	1-1/2	CCMG-403-B-DLC	13614
1/8	1/8	1/2	1-1/2	CCMG-404-B-DLC	13615
0.125 (1/8)	1/8	0.75	2-1/2	CCMG-.1250-LF-B-DLC	72404
5/32	3/16	9/16	2	CCMG-605-B-DLC	75852
3/16	3/16	5/8	2	CCMG-606-B-DLC	13616
7/32	1/4	5/8	2	CCMG-807-B-DLC	75934
1/4	1/4	3/4	2-1/2	CCMG-808-B-DLC	13617
9/32	5/16	3/4	2-1/2	CCMG-1009-B-DLC	75935
5/16	5/16	13/16	2-1/2	CCMG-1010-B-DLC	13618
11/32	3/8	7/8	2-1/2	CCMG-1211-B-DLC	76211
3/8	3/8	1	2-1/2	CCMG-1212-B-DLC	13619
7/16	7/16	1	2-3/4	CCMG-1414-B-DLC	75936
1/2	1/2	1	3	CCMG-1616-B-DLC	74186

**Speed & Feed: 211**

# VARIOUS MATERIAL

Series: **VBMG2**

## 2 FLUTE • 220° SPHERICAL BALL END MILLS



- > Designed for multi axis cavity work in die & mold applications
- > For undercutting & deburring applications on multi-axis CNC machines
- > Effective on hardened materials

Carbide	2	Center Cutting	15°	nAco	+0.000 -0.002	+0.0005 -0.0005 <1/8	SPHERICAL BALL		HRC <54	P M K S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL	CORNER	FLUTE	PART NAME	nAco EDP
1/16	1/8	0.040	0.190	1-1/2	Ball 220°	2	VBMG2-402	12231
3/32	1/8	0.060	0.210	1-1/2	Ball 220°	2	VBMG2-403	12233
1/8	1/8	3/32	0.244	1-1/2	Ball 220°	2	VBMG2-404	10041
1/8	1/8	3/32	0.244	3	Ball 220°	2	VBMG2-404-L	10321
3/16	3/16	9/64	0.291	2	Ball 220°	2	VBMG2-606	10043
3/16	3/16	9/64	0.291	3	Ball 220°	2	VBMG2-606-L	10323
1/4	1/4	3/16	0.388	2-1/2	Ball 220°	2	VBMG2-808	10045
1/4	1/4	3/16	0.388	4	Ball 220°	2	VBMG2-808-L	10325
3/8	3/8	9/32	0.481	2-1/2	Ball 220°	2	VBMG2-1212	10047
3/8	3/8	9/32	0.481	4	Ball 220°	2	VBMG2-1212-L	10327
1/2	1/2	3/8	0.625	3	Ball 220°	2	VBMG2-1616	10049
1/2	1/2	3/8	0.625	6	Ball 220°	2	VBMG2-1616-L	10329

Speed & Feed: page 214

Carbide	2	Center Cutting	15°	nAco	+0.000mm -0.050mm	SPHERICAL BALL		HRC <54	P M K S
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL	CORNER	FLUTE	PART NAME	nAco EDP
4mm	4mm	3mm	6.8mm	51mm	Ball 220°	2	VBMG2-M4M4	11477
6mm	6mm	5mm	8.8mm	63mm	Ball 220°	2	VBMG2-M6M6	11479
8mm	8mm	6mm	11.1mm	63mm	Ball 220°	2	VBMG2-M8M8	11481
10mm	10mm	8mm	13.1mm	70mm	Ball 220°	2	VBMG2-M10M10	11483
12mm	12mm	9mm	15.3mm	76mm	Ball 220°	2	VBMG2-M12M12	11485

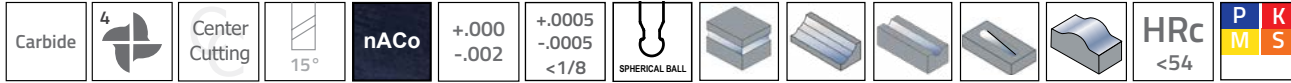
Speed & Feed: page 214





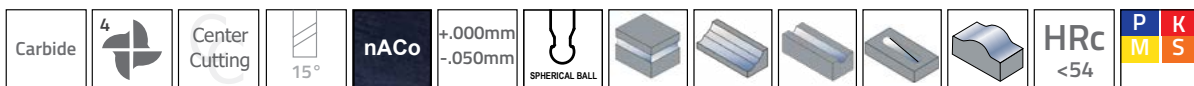
**4 FLUTE • 220° SPHERICAL BALL END MILLS**

- Designed for multi axis cavity work in die & mold applications
- For undercutting & deburring applications on multi-axis CNC machines
- Effective on hardened materials



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL	CORNER	FLUTE	PART NAME	nA Co EDP
1/16	1/8	0.042	0.192	1-1/2	Ball 220°	4	VBMG4-402	11942
3/32	1/8	0.063	0.213	1-1/2	Ball 220°	4	VBMG4-403	11943
1/8	1/8	0.084	0.234	1-1/2	Ball 220°	4	VBMG4-404	10051
1/8	1/8	0.084	0.584	1-1/2	Ball 220°	4	VBMG4-404-M	H7167
1/8	1/8	0.084	0.234	3	Ball 220°	4	VBMG4-404-L	10331
1/8	1/8	0.084	1.084	3	Ball 220°	4	VBMG4-404-L1	H7357
1/8	1/8	0.084	1.584	3	Ball 220°	4	VBMG4-404-L2	H7358
3/16	3/16	0.126	0.276	2	Ball 220°	4	VBMG4-606	10053
3/16	3/16	0.126	0.626	2	Ball 220°	4	VBMG4-606-M	H7168
3/16	3/16	0.126	0.276	3	Ball 220°	4	VBMG4-606-L	10333
3/16	3/16	0.126	1.126	3	Ball 220°	4	VBMG4-606-L1	H7359
1/4	1/4	0.168	0.368	2-1/2	Ball 220°	4	VBMG4-808	10055
1/4	1/4	0.168	0.918	2-1/2	Ball 220°	4	VBMG4-808-M	H7169
1/4	1/4	0.168	0.368	4	Ball 220°	4	VBMG4-808-L	10335
1/4	1/4	0.168	1.668	4	Ball 220°	4	VBMG4-808-L1	H7356
1/4	1/4	0.168	2.418	4	Ball 220°	4	VBMG4-808-L2	H7368
5/16	5/16	0.210	0.960	2-1/2	Ball 220°	4	VBMG4-1010-L1	H7362
5/16	5/16	0.210	1.710	4	Ball 220°	4	VBMG4-1010-L2	H7363
3/8	3/8	0.252	0.452	2-1/2	Ball 220°	4	VBMG4-1212	10057
3/8	3/8	0.252	1.002	2-1/2	Ball 220°	4	VBMG4-1212-M	H7170
3/8	3/8	0.252	0.452	4	Ball 220°	4	VBMG4-1212-L	10337
3/8	3/8	0.252	1.752	4	Ball 220°	4	VBMG4-1212-L1	H7364
3/8	3/8	0.252	2.502	4	Ball 220°	4	VBMG4-1212-L2	H7365
1/2	1/2	0.336	0.586	3	Ball 220°	4	VBMG4-1616	10059
1/2	1/2	0.336	1.336	3	Ball 220°	4	VBMG4-1616-M	H7366
1/2	1/2	0.336	0.586	6	Ball 220°	4	VBMG4-1616-L	10339
1/2	1/2	0.336	2.336	6	Ball 220°	4	VBMG4-1616-L1	H7367

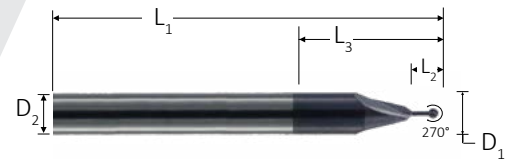
Speed & Feed: page 214



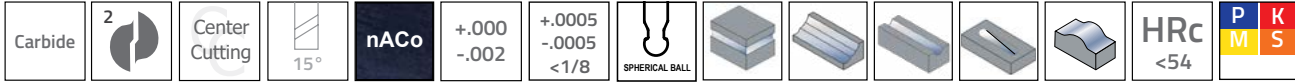
DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL	CORNER	FLUTE	PART NAME	nA Co EDP
4mm	4mm	3mm	6.8mm	51mm	Ball 220°	4	VBMG4-M4M4	11423
6mm	6mm	5mm	8.8mm	63mm	Ball 220°	4	VBMG4-M6M6	11425
8mm	8mm	6mm	11.1mm	63mm	Ball 220°	4	VBMG4-M8M8	11427
10mm	10mm	8mm	13.1mm	70mm	Ball 220°	4	VBMG4-M10M10	11428
12mm	12mm	9mm	15.3mm	76mm	Ball 220°	4	VBMG4-M12M12	11429

Speed & Feed: page 214

## 2 FLUTE • 270° SPHERICAL BALL END MILLS

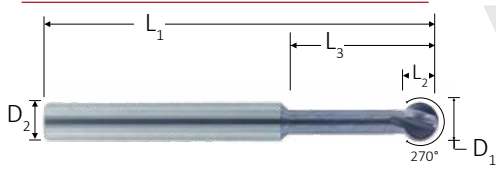


- › Designed for multi axis cavity work in die & mold applications
- › For undercutting & deburring applications on multi-axis CNC machines
- › Effective on hardened materials



DIA D <sub>1</sub>	SHK D <sub>2</sub>	NECK DIA	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL	CORNER	FLUTE	PART NAME	nAco EDP
1/32	1/8	0.016	0.027	0.058	1-1/2	Ball 270°	2	VBMG2-401-270L4	H7541
1/32	1/8	0.016	0.027	0.089	1-1/2	Ball 270°	2	VBMG2-401-270	H7322
1/32	1/8	0.016	0.027	0.120	1-1/2	Ball 270°	2	VBMG2-401-270L1	H7323
1/32	1/8	0.016	0.027	0.152	1-1/2	Ball 270°	2	VBMG2-401-270L2	H7324
1/32	1/8	0.016	0.027	0.214	1-1/2	Ball 270°	2	VBMG2-401-270L3	H7325
3/64	1/8	0.029	0.040	0.133	1-1/2	Ball 270°	2	VBMG2-401-1/2-270	H7060
3/64	1/8	0.029	0.040	0.196	1-1/2	Ball 270°	2	VBMG2-401-1/2-270L2	H7542
3/64	1/8	0.029	0.040	0.290	1-1/2	Ball 270°	2	VBMG2-401-1/2-270L3	H7543
1/16	1/8	0.037	0.053	0.115	1-1/2	Ball 270°	2	VBMG2-402-270L5	H7544
1/16	1/8	0.037	0.053	0.146	1-1/2	Ball 270°	2	VBMG2-402-270	H7061
1/16	1/8	0.037	0.053	0.178	1-1/2	Ball 270°	2	VBMG2-402-270L2	H7326
1/16	1/8	0.037	0.053	0.240	1-1/2	Ball 270°	2	VBMG2-402-270L3	H7327
1/16	1/8	0.037	0.053	0.303	1-1/2	Ball 270°	2	VBMG2-402-270L1	H7062
1/16	1/8	0.037	0.053	0.365	1-1/2	Ball 270°	2	VBMG2-402-270L4	H7328
5/64	1/8	0.045	0.067	0.129	1-1/2	Ball 270°	2	VBMG2-402-1/2-270L1	H7545
5/64	1/8	0.045	0.067	0.192	1-1/2	Ball 270°	2	VBMG2-402-1/2-270	H7063
5/64	1/8	0.045	0.067	0.254	1-1/2	Ball 270°	2	VBMG2-402-1/2-270L2	H7546
5/64	1/8	0.045	0.067	0.317	1-1/2	Ball 270°	2	VBMG2-402-1/2-270L3	H7547
3/32	1/8	0.054	0.079	0.141	1-1/2	Ball 270°	2	VBMG2-403-270L6	H7548
3/32	1/8	0.054	0.079	0.204	1-1/2	Ball 270°	2	VBMG2-403-270	H7064
3/32	1/8	0.054	0.079	0.329	1-1/2	Ball 270°	2	VBMG2-403-270L1	H7065
3/32	1/8	0.054	0.079	0.391	1-1/2	Ball 270°	2	VBMG2-403-270L3	H7329
3/32	1/8	0.054	0.079	0.454	1-1/2	Ball 270°	2	VBMG2-403-270L2	H7066
3/32	1/8	0.054	0.079	0.579	1-1/2	Ball 270°	2	VBMG2-403-270L4	H7330
3/32	1/8	0.054	0.079	0.704	1-1/2	Ball 270°	2	VBMG2-403-270L5	H7331

Speed & Feed: page 214



**4 FLUTE • 270° SPHERICAL BALL END MILLS**

- Designed for multi axis cavity work in die & mold applications
- For undercutting & deburring applications on multi-axis CNC machines
- Effective on hardened materials

Carbide		Center Cutting		nACo	+0.000 -0.002	+0.0005 -0.0005 <1/8				
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	NECK DIA	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL	CORNER	FLUTE	PART NAME	nACo EDP
1/8	1/8	0.076	0.107	0.169	1-1/2	Ball 270°	4	VBMG4-404-270L9	H7549
1/8	1/8	0.076	0.107	0.232	1-1/2	Ball 270°	4	VBMG4-404-270	H7067
1/8	1/8	0.076	0.107	0.357	1-1/2	Ball 270°	4	VBMG4-404-270L8	H7689
1/8	1/8	0.076	0.107	0.482	1-1/2	Ball 270°	4	VBMG4-404-270L3	H7332
1/8	1/8	0.076	0.107	0.607	1-1/2	Ball 270°	4	VBMG4-404-270L1	H7068
1/8	1/8	0.076	0.107	0.732	2	Ball 270°	4	VBMG4-404-270L4	H7333
1/8	1/8	0.076	0.107	0.857	2	Ball 270°	4	VBMG4-404-270L5	H7334
1/8	1/8	0.076	0.107	1.107	3	Ball 270°	4	VBMG4-404-270L2	H7069
1/8	1/8	0.076	0.107	1.357	3	Ball 270°	4	VBMG4-404-270L6	H7335
1/8	1/8	0.076	0.107	1.607	3	Ball 270°	4	VBMG4-404-270L7	H7336
9/64	3/16	0.084	0.119	0.369	2	Ball 270°	4	VBMG4-604-1/2-270	H7337
9/64	3/16	0.084	0.119	0.619	2	Ball 270°	4	VBMG4-604-1/2-270L1	H7338
5/32	3/16	0.098	0.133	0.258	2	Ball 270°	4	VBMG4-605-270	H7690
5/32	3/16	0.098	0.133	0.508	2	Ball 270°	4	VBMG4-605-270L1	H7691
5/32	3/16	0.098	0.133	0.633	2	Ball 270°	4	VBMG4-605-270L2	H7692
5/32	3/16	0.098	0.133	0.883	2	Ball 270°	4	VBMG4-605-270L3	H7693
5/32	3/16	0.098	0.133	1.133	3	Ball 270°	4	VBMG4-605-270L4	H7694
3/16	3/16	0.117	0.160	0.285	2	Ball 270°	4	VBMG4-606-270	H7070
3/16	3/16	0.117	0.160	0.41	2	Ball 270°	4	VBMG4-606-270L9	H7695
3/16	3/16	0.117	0.160	0.535	2	Ball 270°	4	VBMG4-606-270L3	H7339
3/16	3/16	0.117	0.160	0.660	2	Ball 270°	4	VBMG4-606-270L1	H7071
3/16	3/16	0.117	0.160	0.910	2	Ball 270°	4	VBMG4-606-270L4	H7340
3/16	3/16	0.117	0.160	1.160	3	Ball 270°	4	VBMG4-606-270L5	H7341
3/16	3/16	0.117	0.160	1.410	3	Ball 270°	4	VBMG4-606-270L6	H7342
3/16	3/16	0.117	0.160	1.660	3	Ball 270°	4	VBMG4-606-270L7	H7343
3/16	3/16	0.117	0.160	1.910	3	Ball 270°	4	VBMG4-606-270L8	H7344
7/32	1/4	0.138	0.186	0.436	2-1/2	Ball 270°	4	VBMG4-807-270	H7696
7/32	1/4	0.138	0.186	0.686	2-1/2	Ball 270°	4	VBMG4-807-270L1	H7697
1/4	1/4	0.158	0.213	0.291	2-1/2	Ball 270°	4	VBMG4-808-270L9	H7698
1/4	1/4	0.158	0.213	0.338	2-1/2	Ball 270°	4	VBMG4-808-270L10	H7699
1/4	1/4	0.158	0.213	0.588	2-1/2	Ball 270°	4	VBMG4-808-270	H6850
1/4	1/4	0.158	0.213	0.713	2-1/2	Ball 270°	4	VBMG4-808-270L3	H7345
1/4	1/4	0.158	0.213	0.838	2-1/2	Ball 270°	4	VBMG4-808-270L4	H7346
1/4	1/4	0.158	0.213	0.963	2-1/2	Ball 270°	4	VBMG4-808-270L1	H6852
1/4	1/4	0.158	0.213	1.338	2-1/2	Ball 270°	4	VBMG4-808-270L5	H7347
1/4	1/4	0.158	0.213	1.713	4	Ball 270°	4	VBMG4-808-270L2	H6854
1/4	1/4	0.158	0.213	2.213	4	Ball 270°	4	VBMG4-808-270L6	H7348
1/4	1/4	0.158	0.213	2.463	4	Ball 270°	4	VBMG4-808-270L7	H7349
1/4	1/4	0.158	0.213	2.713	4	Ball 270°	4	VBMG4-808-270L8	H7350
9/32	5/16	0.180	0.240	0.615	2-1/2	Ball 270°	4	VBMG4-1009-270	H7704
9/32	5/16	0.180	0.240	0.990	2-1/2	Ball 270°	4	VBMG4-1009-270L1	H7705

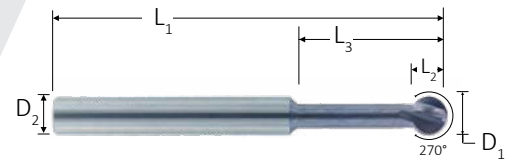
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# VARIOUS MATERIAL

## 4 FLUTE • 270° SPHERICAL BALL END MILLS

Series: **VBMG4**



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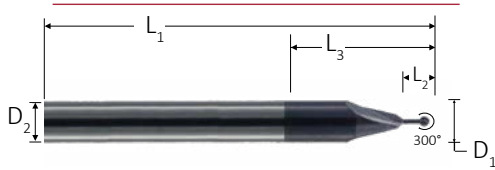
DIA D <sub>1</sub>	SHK D <sub>2</sub>	NECK DIA	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL	CORNER	FLUTE	PART NAME	nACo EDP
5/16	5/16	0.201	0.266	0.453	2-1/2	Ball 270°	4	VBMG4-1010-270L6	H7706
5/16	5/16	0.201	0.266	0.641	2-1/2	Ball 270°	4	VBMG4-1010-270	H7072
5/16	5/16	0.201	0.266	1.016	2-1/2	Ball 270°	4	VBMG4-1010-270L2	H7351
5/16	5/16	0.201	0.266	1.391	4	Ball 270°	4	VBMG4-1010-270L3	H7352
5/16	5/16	0.201	0.266	1.766	4	Ball 270°	4	VBMG4-1010-270L1	H7073
5/16	5/16	0.201	0.266	2.266	4	Ball 270°	4	VBMG4-1010-270L4	H7353
5/16	5/16	0.201	0.266	2.516	4	Ball 270°	4	VBMG4-1010-270L5	H7354
3/8	3/8	0.241	0.320	0.413	2-1/2	Ball 270°	4	VBMG4-1212-270L8	H7707
3/8	3/8	0.241	0.320	0.507	2-1/2	Ball 270°	4	VBMG4-1212-270	H7074
3/8	3/8	0.241	0.320	0.695	2-1/2	Ball 270°	4	VBMG4-1212-270L4	H7708
3/8	3/8	0.241	0.320	1.070	2-1/2	Ball 270°	4	VBMG4-1212-270L1	H7075
3/8	3/8	0.241	0.320	1.445	4	Ball 270°	4	VBMG4-1212-270L6	H7709
3/8	3/8	0.241	0.320	1.820	4	Ball 270°	4	VBMG4-1212-270L2	H7076
3/8	3/8	0.241	0.320	2.320	4	Ball 270°	4	VBMG4-1212-270L3	H7355
3/8	3/8	0.241	0.320	2.57	4	Ball 270°	4	VBMG4-1212-270L7	H7710
1/2	1/2	0.323	0.427	0.614	3	Ball 270°	4	VBMG4-1616-270L5	H7711
1/2	1/2	0.323	0.427	0.927	3	Ball 270°	4	VBMG4-1616-270	H7077
1/2	1/2	0.323	0.427	1.427	3	Ball 270°	4	VBMG4-1616-270L2	H7712
1/2	1/2	0.323	0.427	1.927	6	Ball 270°	4	VBMG4-1616-270L1	H7078
1/2	1/2	0.323	0.427	2.427	6	Ball 270°	4	VBMG4-1616-270L3	H7713
1/2	1/2	0.323	0.427	3.427	6	Ball 270°	4	VBMG4-1616-270L4	H7714
5/8	5/8	0.412	0.533	1.533	3-1/2	Ball 270°	4	VBMG4-2020-270	H7715
5/8	5/8	0.412	0.533	2.033	3-1/2	Ball 270°	4	VBMG4-2020-270L1	H7716

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Series: **VBMG2**

**VARIOUS MATERIAL**

**2 FLUTE • 300° SPHERICAL BALL END MILLS**



- Designed for multi axis cavity work in die & mold applications
- For undercutting & deburring applications on multi-axis CNC machines
- Effective on hardened materials

Carbide	2	Center Cutting	15°	nAco	+0.000 -0.002	+0.0005 -0.0005 <1/8	SPHERICAL BALL		Hrc <54	P M K S
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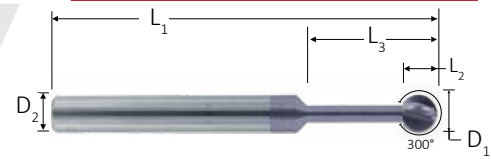
DIA D <sub>1</sub>	SHK D <sub>2</sub>	NECK DIA	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL	CORNER	FLUTE	PART NAME	nAco EDP
1/16	1/8	0.024	0.057	0.088	1-1/2	Ball 300°	2	VBMG2-402-300L1	H7717
1/16	1/8	0.024	0.057	0.135	1-1/2	Ball 300°	2	VBMG2-402-300	H7079
5/64	1/8	0.031	0.072	0.119	1-1/2	Ball 300°	2	VBMG2-402-1/2-300L1	H7718
5/64	1/8	0.031	0.072	0.165	1-1/2	Ball 300°	2	VBMG2-402-1/2-300	H7080
3/32	1/8	0.038	0.086	0.148	1-1/2	Ball 300°	2	VBMG2-403-300L1	H7719
3/32	1/8	0.038	0.086	0.211	1-1/2	Ball 300°	2	VBMG2-403-300	H7081
3/32	1/8	0.038	0.086	0.304	1-1/2	Ball 300°	2	VBMG2-403-300L2	H7720

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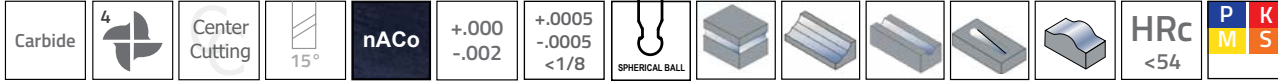
# VARIOUS MATERIAL

Series: **VBMG2**

## 4 FLUTE • 300° SPHERICAL BALL END MILLS

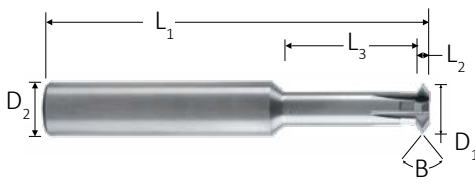


- > Designed for multi axis cavity work in die & mold applications
- > For undercutting & deburring applications on multi-axis CNC machines
- > Effective on hardened materials



DIA D <sub>1</sub>	SHK D <sub>2</sub>	NECK DIA	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL	CORNER	FLUTE	PART NAME	nAco EDP
1/8	1/8	0.053	0.116	0.209	1-1/2	Ball 300°	4	VBMG4-404-300	H7082
1/8	1/8	0.053	0.116	0.241	1-1/2	Ball 300°	4	VBMG4-404-300L3	H7721
1/8	1/8	0.053	0.116	0.397	1-1/2	Ball 300°	4	VBMG4-404-300L1	H7083
1/8	1/8	0.053	0.116	0.491	1-1/2	Ball 300°	4	VBMG4-404-300L5	H7722
1/8	1/8	0.053	0.116	0.616	1-1/2	Ball 300°	4	VBMG4-404-300L6	H7723
5/32	3/16	0.071	0.145	0.27	2	Ball 300°	4	VBMG4-605-300L1	H7724
5/32	3/16	0.071	0.145	0.395	2	Ball 300°	4	VBMG4-605-300	H7084
5/32	3/16	0.071	0.145	0.52	2	Ball 300°	4	VBMG4-605-300L2	H7725
3/16	3/16	0.082	0.174	0.299	2	Ball 300°	4	VBMG4-606-300	H7085
3/16	3/16	0.082	0.174	0.424	2	Ball 300°	4	VBMG4-606-300L2	H7726
3/16	3/16	0.082	0.174	0.486	2	Ball 300°	4	VBMG4-606-300L3	H7727
3/16	3/16	0.082	0.174	0.611	2	Ball 300°	4	VBMG4-606-300L1	H7086
3/16	3/16	0.082	0.174	0.799	2	Ball 300°	4	VBMG4-606-300L4	H7728
3/16	3/16	0.082	0.174	0.924	2	Ball 300°	4	VBMG4-606-300L5	H7729
1/4	1/4	0.112	0.233	0.420	2-1/2	Ball 300°	4	VBMG4-808-300	H6800
1/4	1/4	0.112	0.233	0.483	2-1/2	Ball 300°	4	VBMG4-808-300L2	H7730
1/4	1/4	0.112	0.233	0.608	2-1/2	Ball 300°	4	VBMG4-808-300L3	H7731
1/4	1/4	0.112	0.233	0.733	2-1/2	Ball 300°	4	VBMG4-808-300L4	H7732
1/4	1/4	0.112	0.233	0.858	2-1/2	Ball 300°	4	VBMG4-808-300L1	H6802
1/4	1/4	0.112	0.233	0.983	2-1/2	Ball 300°	4	VBMG4-808-300L5	H7733
1/4	1/4	0.112	0.233	1.233	2-1/2	Ball 300°	4	VBMG4-808-300L6	H7734
5/16	5/16	0.143	0.291	0.541	2-1/2	Ball 300°	4	VBMG4-1010-300	H7087
5/16	5/16	0.143	0.291	0.728	2-1/2	Ball 300°	4	VBMG4-1010-300L1	H7088
5/16	5/16	0.143	0.291	1.041	2-1/2	Ball 300°	4	VBMG4-1010-300L2	H7735
3/8	3/8	0.172	0.349	0.599	2-1/2	Ball 300°	4	VBMG4-1212-300	H7089
3/8	3/8	0.172	0.349	0.849	2-1/2	Ball 300°	4	VBMG4-1212-300L2	H7736
3/8	3/8	0.172	0.349	1.349	3	Ball 300°	4	VBMG4-1212-300L1	H7090
3/8	3/8	0.172	0.349	1.849	4	Ball 300°	4	VBMG4-1212-300L3	H7737
1/2	1/2	0.23	0.466	0.778	3	Ball 300°	4	VBMG4-1616-300	H7091
1/2	1/2	0.23	0.466	1.216	3	Ball 300°	4	VBMG4-1616-300L2	H7738
1/2	1/2	0.23	0.466	1.716	4	Ball 300°	4	VBMG4-1616-300L1	H7092

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**Multi Flute • 60° DOUBLE ANGLE CUTTER**

- Geometry designed for deburring, chamfering, back chamfering, and for milling a “V-groove”
- Designed for long reach applications
- 60° double angle cutter can be used in thread milling application



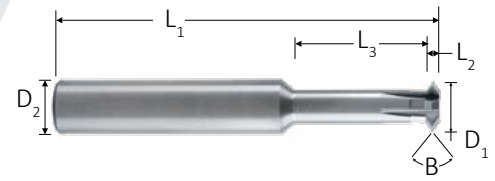
DIA D <sub>1</sub>	SHK D <sub>2</sub>	NECK DIA	NECK LENGTH L <sub>3</sub>	CUTTER WIDTH L <sub>2</sub>	OAL L <sub>1</sub>	FL	INC ANGLE B	PART NAME	Bright EDP	AITiN EDP
1/8	1/8	1/16	0.187	0.036	1-1/2	4	60	DA-1/8-60-L2	H8013	H8014
1/8	1/8	1/16	0.312	0.036	1-1/2	4	60	DA-1/8-60-L3	H8015	H8016
1/8	1/8	1/16	0.5	0.036	2	4	60	DA-1/8-60-L4	H8017	H8018
1/8	1/8	1/16	0.875	0.036	2	4	60	DA-1/8-60-L5	H8019	H8020
5/32	3/16	5/64	0.25	0.045	2	4	60	DA-5/32-60-L1	H8021	H8022
5/32	3/16	5/64	0.625	0.045	2-1/2	4	60	DA-5/32-60-L2	H8023	H8024
3/16	3/16	3/32	0.187	0.055	2	4	60	DA-3/16-60-L1	H8025	H8026
3/16	3/16	3/32	0.312	0.055	2	4	60	DA-3/16-60-L2	H8027	H8028
3/16	3/16	3/32	0.5	0.055	2	4	60	DA-3/16-60-L3	H8029	H8030
3/16	3/16	3/32	0.75	0.055	2-1/2	4	60	DA-3/16-60-L4	H8031	H8032
1/4	1/4	1/8	0.187	0.072	2	4	60	DA-1/4-60-L1	H8033	H8034
1/4	1/4	1/8	0.312	0.072	2	4	60	DA-1/4-60-L2	H8035	H8036
1/4	1/4	1/8	0.625	0.072	2-1/2	4	60	DA-1/4-60-L3	H8037	H8038
1/4	1/4	1/8	1	0.072	3	4	60	DA-1/4-60-L4	H8039	H8040
1/4	1/4	1/8	1.75	0.072	3	4	60	DA-1/4-60-L5	H8041	H8042
5/16	5/16	3/16	0.375	0.072	2-1/2	6	60	DA-5/16-60-L1	H8043	H8044
5/16	5/16	3/16	0.875	0.072	2-1/2	6	60	DA-5/16-60-L2	H8045	H8046
3/8	3/8	1/4	0.312	0.072	2-1/2	6	60	DA-3/8-60-L1	H8047	H8048
3/8	3/8	1/4	0.5	0.072	2-1/2	6	60	DA-3/8-60-L2	H8049	H8050
3/8	3/8	1/4	1	0.072	2-1/2	6	60	DA-3/8-60-L3	H8051	H8052
3/8	3/8	1/4	1.5	0.072	3-1/2	6	60	DA-3/8-60-L4	H8053	H8054
1/2	1/2	5/16	0.5	0.109	3	6	60	DA-1/2-60-L1	H8055	H8056
1/2	1/2	5/16	1	0.109	3	6	60	DA-1/2-60-L2	H8057	H8058
1/2	1/2	5/16	1.5	0.109	4	6	60	DA-1/2-60-L3	H8059	H8060
1/2	1/2	5/16	2	0.109	4	6	60	DA-1/2-60-L4	H8061	H8062
1/2	1/2	5/16	2.625	0.109	4	6	60	DA-1/2-60-L5	H8063	H8064

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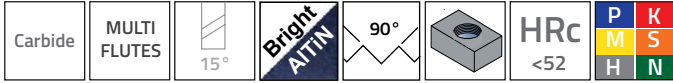
<p><b>Back Chamfering, Figure (1):</b></p> <ul style="list-style-type: none"> <li>For chamfering the backsides or underside of parts</li> </ul> <p>Figure (1):</p>	<p><b>V-Grooves, Figure (2):</b></p> <ul style="list-style-type: none"> <li>For cutting specific angles into the side or along the edge of parts horizontal or vertical</li> </ul> <p>Figure (2):</p>	<p><b>Deburring, Figure (3):</b></p> <ul style="list-style-type: none"> <li>For removing the burrs or sharp edges left on a parts</li> <li>External or Internal</li> </ul> <p>Figure (3):</p>	<p><b>Countersinking, Figure (4):</b></p> <ul style="list-style-type: none"> <li>To recess/remove the top edge of a part with specific angle.</li> </ul> <p>Figure (4):</p>	<p><b>Chamfering, Figure (5):</b></p> <ul style="list-style-type: none"> <li>To machine the outer edge of a part to add a specific angle to the edge</li> </ul> <p>Figure (5):</p>	<p><b>Thread Milling, Figure (6):</b></p> <ul style="list-style-type: none"> <li>To produce either an internal or external thread pitch of 60° form to specific depths one pitch at a time</li> </ul> <p>Figure (6):</p>
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## Multi Flute • 90° DOUBLE ANGLE CUTTER



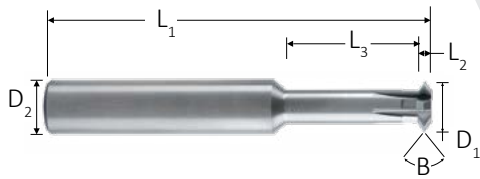
- > Geometry designed for deburring, chamfering, back chamfering, and for milling a “V-groove”
- > Designed for long reach applications
- > 90° double angle cutter



DIA D <sub>1</sub>	SHK D <sub>2</sub>	NECK DIA	NECK LENGTH L <sub>3</sub>	CUTTER WIDTH L <sub>2</sub>	OAL L <sub>1</sub>	FL	INC ANGLE B	PART NAME	Bright EDP	AITiN EDP
1/16	1/8	1/32	0.062	0.031	1-1/2	2	90	DA-1/16-90-L1	H8065	H8066
1/16	1/8	1/32	0.093	0.031	1-1/2	2	90	DA-1/16-90-L2	H8067	H8068
1/16	1/8	1/32	0.156	0.031	1-1/2	2	90	DA-1/16-90-L3	H8069	H8070
1/16	1/8	1/32	0.25	0.031	1-1/2	2	90	DA-1/16-90-L4	H8071	H8072
1/16	1/8	1/32	0.375	0.031	1-1/2	2	90	DA-1/16-90-L5	H8073	H8074
5/64	1/8	0.039	0.078	0.039	1-1/2	2	90	DA-5/64-90-L1	H8075	H8076
5/64	1/8	0.039	0.118	0.039	1-1/2	2	90	DA-5/64-90-L2	H8077	H8078
5/64	1/8	0.039	0.187	0.039	1-1/2	2	90	DA-5/64-90-L3	H8079	H8080
5/64	1/8	0.039	0.312	0.039	1-1/2	2	90	DA-5/64-90-L4	H8081	H8082
5/64	1/8	0.039	0.5	0.039	1-1/2	2	90	DA-5/64-90-L5	H8083	H8084
3/32	1/8	3/64	0.093	0.047	1-1/2	2	90	DA-3/32-90-L1	H8085	H8086
3/32	1/8	3/64	0.141	0.047	1-1/2	2	90	DA-3/32-90-L2	H8087	H8088
3/32	1/8	3/64	0.25	0.047	1-1/2	2	90	DA-3/32-90-L3	H8089	H8090
3/32	1/8	3/64	0.375	0.047	1-1/2	2	90	DA-3/32-90-L4	H8091	H8092
3/32	1/8	3/64	0.625	0.047	2	2	90	DA-3/32-90-L5	H8093	H8094
3/32	1/8	3/64	0.75	0.047	2	2	90	DA-3/32-90-L6	H8095	H8096
3 mm	1/8	0.059	0.187	0.059	1-1/2	2	90	DA-3 mm-90-L1	H8097	H8098
3 mm	1/8	0.059	0.312	0.059	1-1/2	2	90	DA-3 mm-90-L2	H8099	H8100
1/8	1/8	1/16	0.125	0.062	1-1/2	4	90	DA-1/8-90-L1	H8101	H8102
1/8	1/8	1/16	0.187	0.062	1-1/2	4	90	DA-1/8-90-L2	H8103	H8104
1/8	1/8	1/16	0.312	0.062	1-1/2	4	90	DA-1/8-90-L3	H8105	H8106
1/8	1/8	1/16	0.5	0.062	2	4	90	DA-1/8-90-L4	H8107	H8108
1/8	1/8	1/16	0.625	0.062	2	4	90	DA-1/8-90-L5	H8109	H8110
1/8	1/8	1/16	0.875	0.062	2	4	90	DA-1/8-90-L6	H8111	H8112
1/8	1/8	1/16	1.125	0.062	2-1/2	4	90	DA-1/8-90-L7	H8113	H8114
5/32	3/16	5/64	0.156	0.078	2	4	90	DA-5/32-90-L1	H8115	H8116
5/32	3/16	5/64	0.25	0.078	2	4	90	DA-5/32-90-L2	H8117	H8118
5/32	3/16	5/64	0.437	0.078	2	4	90	DA-5/32-90-L3	H8119	H8120
5/32	3/16	5/64	0.625	0.078	2-1/2	4	90	DA-5/32-90-L4	H8121	H8122
5/32	3/16	5/64	1.125	0.078	2-1/2	4	90	DA-5/32-90-L5	H8123	H8124
3/16	3/16	3/32	0.187	0.093	2	4	90	DA-3/16-90-L1	H8125	H8126
3/16	3/16	3/32	0.312	0.093	2	4	90	DA-3/16-90-L2	H8127	H8128
3/16	3/16	3/32	0.5	0.093	2	4	90	DA-3/16-90-L3	H8129	H8130
3/16	3/16	3/32	0.75	0.093	2-1/2	4	90	DA-3/16-90-L4	H8131	H8132
3/16	3/16	3/32	1	0.093	2-1/2	4	90	DA-3/16-90-L5	H8133	H8134
3/16	3/16	3/32	1.312	0.093	2-1/2	4	90	DA-3/16-90-L6	H8135	H8136
3/16	3/16	3/32	1.625	0.093	3	4	90	DA-3/16-90-L7	H8137	H8138
6 mm	1/4	0.118	0.312	0.118	2	4	90	DA-6mm-90-L1	H8139	H8140
6 mm	1/4	0.118	1	0.118	2-1/2	4	90	DA-6mm-90-L2	H8141	H8142

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sizes continued on next page

**Multi Flute • 90° DOUBLE ANGLE CUTTER**

sizes continued from previous page

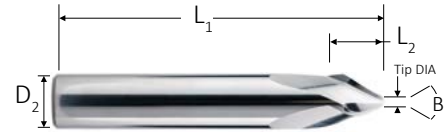
DIA D <sub>1</sub>	SHK D <sub>2</sub>	NECK DIA	NECK LENGTH L <sub>3</sub>	CUTTER WIDTH L <sub>2</sub>	OAL L <sub>1</sub>	FL	INC ANGLE B	PART NAME	Bright EDP	AlTiN EDP
1/4	1/4	1/8	0.187	0.125	2	4	90	DA-1/4-90-L1	H8143	H8144
1/4	1/4	1/8	0.312	0.125	2	4	90	DA-1/4-90-L2	H8145	H8146
1/4	1/4	1/8	0.625	0.125	2-1/2	4	90	DA-1/4-90-L3	H8147	H8148
1/4	1/4	1/8	1	0.125	3	4	90	DA-1/4-90-L4	H8149	H8150
1/4	1/4	1/8	1.312	0.125	3	4	90	DA-1/4-90-L5	H8151	H8152
1/4	1/4	1/8	1.75	0.125	3	4	90	DA-1/4-90-L6	H8153	H8154
1/4	1/4	1/8	2.125	0.125	4	4	90	DA-1/4-90-L7	H8155	H8156
5/16	5/16	3/16	0.25	0.125	2-1/2	6	90	DA-5/16-90-L1	H8157	H8158
5/16	5/16	3/16	0.375	0.125	2-1/2	6	90	DA-5/16-90-L2	H8159	H8160
5/16	5/16	3/16	0.875	0.125	2-1/2	6	90	DA-5/16-90-L3	H8161	H8162
5/16	5/16	3/16	1.25	0.125	3	6	90	DA-5/16-90-L4	H8163	H8164
5/16	5/16	3/16	2.125	0.125	3	6	90	DA-5/16-90-L5	H8165	H8166
3/8	3/8	1/4	0.312	0.125	2-1/2	6	90	DA-3/8-90-L1	H8167	H8168
3/8	3/8	1/4	0.5	0.125	2-1/2	6	90	DA-3/8-90-L2	H8169	H8170
3/8	3/8	1/4	1	0.125	2-1/2	6	90	DA-3/8-90-L3	H8171	H8172
3/8	3/8	1/4	1.5	0.125	3-1/2	6	90	DA-3/8-90-L4	H8173	H8174
3/8	3/8	1/4	2	0.125	3-1/2	6	90	DA-3/8-90-L5	H8175	H8176
3/8	3/8	1/4	2.312	0.125	3-1/2	6	90	DA-3/8-90-L6	H8177	H8178
3/8	3/8	1/4	2.625	0.125	4	6	90	DA-3/8-90-L7	H8179	H8180
7/16	7/16	9/32	0.5	0.157	2-3/4	6	90	DA-7/16-90-L1	H8181	H8182
7/16	7/16	9/32	1.5	0.157	3-1/2	6	90	DA-7/16-90-L2	H8183	H8184
1/2	1/2	5/16	0.312	0.187	3	6	90	DA-1/2-90-L1	H8185	H8186
1/2	1/2	5/16	0.5	0.187	3	6	90	DA-1/2-90-L2	H8187	H8188
1/2	1/2	5/16	1	0.187	3	6	90	DA-1/2-90-L3	H8189	H8190
1/2	1/2	5/16	1.5	0.187	4	6	90	DA-1/2-90-L4	H8191	H8192
1/2	1/2	5/16	2	0.187	4	6	90	DA-1/2-90-L5	H8193	H8194
1/2	1/2	5/16	2.625	0.187	4	6	90	DA-1/2-90-L6	H8195	H8196
1/2	1/2	5/16	3.125	0.187	6	6	90	DA-1/2-90-L7	H8197	H8198
5/8	5/8	3/8	0.75	0.25	3-1/2	6	90	DA-5/8-90-L1	H8199	H8207
5/8	5/8	3/8	1.25	0.25	3-1/2	6	90	DA-5/8-90-L2	H8208	H8209

**Speed & Feed:** page 219

# VARIOUS MATERIAL

Series: **CMG3H**

## 3 FLUTE • 60°, 90°, 120° CHAMFER MILL

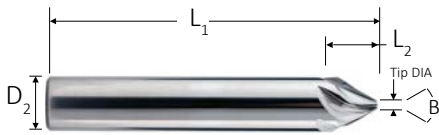


- > Helical flutes for superior finishes
- > Geometry designed for added strength and programming accuracy
- > H6 Tolerance shank for use in shrink fit holders
- > ZrN coating designed for aluminum and non-ferrous alloys
- > Geometry design enables aggressive machining while providing excellent finish



SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	INC ANGLE B	Tip Diameter	PART NAME	Bright EDP	AITiN EDP	ZrN EDP
1/4	0.164	2-1/2	60°	0.06	CMG3H-808-60	H7745	H7746	H7747
3/8	0.264	2-1/2	60°	0.07	CMG3H-1212-60	H7748	H7749	H7750
1/2	0.364	3	60°	0.08	CMG3H-1616-60	H7751	H7752	H7753
5/8	0.463	3	60°	0.09	CMG3H-2020-60	H7754	H7755	H7756
3/4	0.562	3	60°	0.10	CMG3H-2424-60	H7757	H7758	H7759
1/4	0.095	2-1/2	90°	0.06	CMG3H-808-90	H7760	H7763	H7764
3/8	0.153	2-1/2	90°	0.07	CMG3H-1212-90	H7741	H7766	H7767
1/2	0.210	3	90°	0.08	CMG3H-1616-90	H7743	H7768	H7769
5/8	0.268	3	90°	0.09	CMG3H-2020-90	H7770	H7773	H7774
3/4	0.325	3	90°	0.10	CMG3H-2424-90	H7775	H7776	H7782
1/4	0.057	2-1/2	120°	0.06	CMG3H-808-120	H7785	H7786	H7789
3/8	0.091	2-1/2	120°	0.07	CMG3H-1212-120	H7795	H7796	H7797
1/2	0.126	3	120°	0.08	CMG3H-1616-120	H7798	H7805	H7817
5/8	0.157	3	120°	0.09	CMG3H-2020-120	H7818	H7819	H7820
3/4	0.195	3	120°	0.10	CMG3H-2424-120	H7821	H7822	H7823

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**5 FLUTE • 60°, 90°, 120° CHAMFER MILL**

- › Helical flutes for superior finishes
- › Geometry designed to allow aggressive machining while providing outstanding finishes in all material.
- › H6 Tolerance shank for use in shrink fit holders
- › AlTiN coating designed to add lubricity, allows for high speed and feeds



SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	INC ANGLE B	Tip Diameter	PART NAME	Bright EDP	AlTiN EDP
1/4	0.164	2-1/2	60°	0.06	CMG5H-808-60	H7829	H7830
3/8	0.264	2-1/2	60°	0.07	CMG5H-1212-60	H7831	H7832
1/2	0.364	3	60°	0.08	CMG5H-1616-60	H7833	H7834
5/8	0.463	3	60°	0.09	CMG5H-2020-60	H7835	H7836
3/4	0.562	3	60°	0.10	CMG5H-2424-60	H7837	H7838
1/4	0.095	2-1/2	90°	0.06	CMG5H-808-90	H7839	H7840
3/8	0.153	2-1/2	90°	0.07	CMG5H-1212-90	H7841	H7842
3/8	0.153	4	90°	0.07	CMG5H-1212-L-90	H7827	H7828
1/2	0.210	3	90°	0.08	CMG5H-1616-90	H7843	H7844
1/2	0.210	6	90°	0.08	CMG5H-1616-L-90	H7845	H7846
5/8	0.268	3	90°	0.09	CMG5H-2020-90	H7847	H7848
3/4	0.325	3	90°	0.10	CMG5H-2424-90	H7849	H7850
1/4	0.057	2-1/2	120°	0.06	CMG5H-808-120	H7851	H7852
3/8	0.091	2-1/2	120°	0.07	CMG5H-1212-120	H7853	H7854
1/2	0.126	3	120°	0.08	CMG5H-1616-120	H7855	H7856
5/8	0.157	3	120°	0.09	CMG5H-2020-120	H7857	H7858
3/4	0.195	3	120°	0.10	CMG5H-2424-120	H7859	H7860

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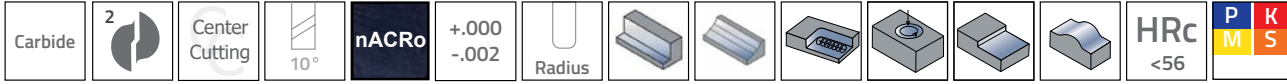
# VARIOUS MATERIAL

Series: **HXMG2**

## 2 FLUTE • HIGH FEED CARBIDE END MILL

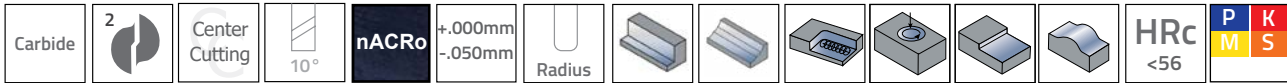


- › Designed for use in High Feed milling processes that reduce total machining time by 3-4 times over conventional methods.
- › Enables high feed per tooth with shallow depth of cut for highest metal removal rates
- › Cutting forces are directed at the machine spindle in the axial direction which means less vibration and greater tool life.
- › Especially suited for small molds and medical work



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	nACRo EDP
3/32	1/4	0.09	0.500	3	0.023	2	HXMG2-803	14553
1/8	1/4	0.095	0.650	3	0.031	2	HXMG2-804	14555
3/16	1/4	0.125	0.750	3	0.047	2	HXMG2-806	14557
1/4	1/4	0.150	1.000	3	0.062	2	HXMG2-808	H7226
5/16	5/16	0.155	1.187	3	0.078	2	HXMG2-1010	H7227
3/8	3/8	0.175	1.250	4	0.094	2	HXMG2-1212	H7228
1/2	1/2	0.200	1.500	4	0.125	2	HXMG2-1616	H7229

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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	nACRo EDP
2mm	6mm	2.2mm	12mm	75mm	0.5mm	2	HXMG2-M6M2	14558
3mm	6mm	2.8mm	16mm	75mm	0.75mm	2	HXMG2-M6M3	14559
4mm	6mm	3.5mm	20mm	75mm	1mm	2	HXMG2-M6M4	14560
5mm	6mm	3.5mm	20mm	75mm	1.25mm	2	HXMG2-M6M5	H7230
6mm	6mm	3.8mm	25mm	75mm	1.5mm	2	HXMG2-M6M6	H7231
8mm	8mm	4mm	30mm	75mm	2mm	2	HXMG2-M8M8	H7232
10mm	10mm	4.3mm	33mm	100mm	2.5mm	2	HXMG2-M10M10	H7233

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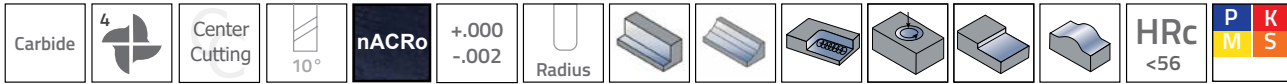
Series: **HXMG4**

**VARIOUS MATERIAL**

**4 FLUTE • HIGH FEED CARBIDE END MILL**

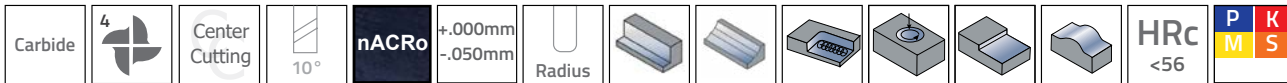


- ▶ Designed for use in High Feed milling processes that reduce total machining time by 3-4 times over conventional methods.
- ▶ Enables high feed per tooth with shallow depth of cut for highest metal removal rates
- ▶ Cutting forces are directed at the machine spindle in the axial direction which means less vibration and greater tool life.
- ▶ Especially suited for small molds and medical work



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	nACRo EDP
3/32	1/4	0.090	0.500	3	0.023	4	HXMG4-803	14550
1/8	1/4	0.095	0.650	3	0.031	4	HXMG4-804	14551
3/16	1/4	0.125	0.750	3	0.047	4	HXMG4-806	14552
1/4	1/4	0.150	1.000	3	0.062	4	HXMG4-808	14546
5/16	5/16	0.155	1.187	3	0.078	4	HXMG4-1010	14554
3/8	3/8	0.175	1.250	4	0.094	4	HXMG4-1212	14548
1/2	1/2	0.200	1.500	4	0.125	4	HXMG4-1616	14549
5/8	5/8	0.250	1.500	4	0.156	4	HXMG4-2020	14852
3/4	3/4	0.300	1.500	4	0.1875	4	HXMG4-2424	H7381

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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	nACRo EDP
2mm	6mm	2mm	12mm	75mm	0.50mm	4	HXMG4-M6M2	14843
3mm	6mm	2.8mm	16mm	75mm	0.75mm	4	HXMG4-M6M3	14844
4mm	6mm	3.5mm	20mm	75mm	1.0mm	4	HXMG4-M6M4	14845
5mm	6mm	3.5mm	20mm	75mm	1.25mm	4	HXMG4-M6M5	14846
6mm	6mm	3.8mm	25mm	75mm	1.5mm	4	HXMG4-M6M6	14847
8mm	8mm	4mm	30mm	75mm	2.0mm	4	HXMG4-M8M8	14848
10mm	10mm	4.3mm	33mm	100mm	2.5mm	4	HXMG4-M10M10	14849
12mm	12mm	4.6mm	38mm	100mm	3.0mm	4	HXMG4-M12M12	14850

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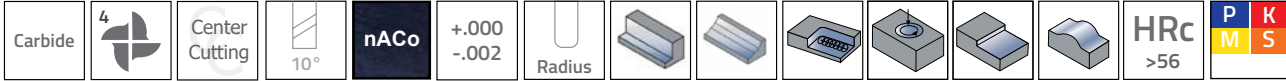
# VARIOUS MATERIAL

Series: **HXMG4**

## 4 FLUTE • HIGH FEED CARBIDE END MILL (HARD MILLING)

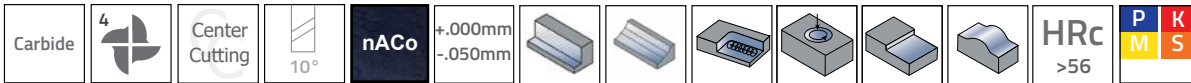


- › Designed for use in High Feed milling processes that reduce total machining time by 3-4 times over conventional methods.
- › Enables high feed per tooth with shallow depth of cut for highest metal removal rates
- › Cutting forces are directed at the machine spindle in the axial direction which means less vibration and greater tool life.
- › Especially suited for small molds and medical work



DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	nACRo EDP
1/8	1/4	0.095	0.625	2-1/2	0.031	4	HXMG4-804-HM	H6732
3/16	1/4	0.125	0.650	2-1/2	0.047	4	HXMG4-806-HM	H6733
1/4	1/4	0.150	0.750	2-1/2	0.062	4	HXMG4-808-HM	H6734
5/16	5/16	0.155	0.800	2-1/2	0.078	4	HXMG4-1010-HM	H6735
3/8	3/8	0.175	1.000	2-1/2	0.094	4	HXMG4-1212-HM	H6736
1/2	1/2	0.200	1.250	3	0.125	4	HXMG4-1616-HM	H6737
5/8	5/8	0.250	1.250	3-1/2	0.156	4	HXMG4-2020-HM	H6738

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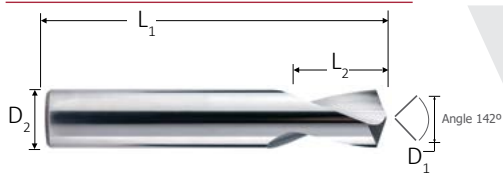


DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	LBS L <sub>3</sub>	OAL L <sub>1</sub>	CORNER	FLUTE	PART NAME	nACRo EDP
3mm	6mm	2.8mm	14mm	63mm	0.75mm	4	HXMG4-M6M3-HM	H6739
4mm	6mm	3.5mm	16mm	63mm	1.0mm	4	HXMG4-M6M4-HM	H6740
5mm	6mm	3.5mm	18mm	63mm	1.25mm	4	HXMG4-M6M5-HM	H6741
6mm	6mm	3.8mm	20mm	63mm	1.5mm	4	HXMG4-M6M6-HM	H6742
8mm	8mm	4mm	20mm	63mm	2.0mm	4	HXMG4-M8M8-HM	H6743
10mm	10mm	4.3mm	25mm	70mm	2.5mm	4	HXMG4-M10M10-HM	H6744
12mm	12mm	4.6mm	25mm	76mm	3.0mm	4	HXMG4-M12M12-HM	H6745

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Series: **HDRNC**

**VARIOUS MATERIAL**



**2 FLUTE • 142° NC CARBIDE SPOTTING DRILL**

- > Spot drill for HP drills with 140° point
- > Diameter range for all drill sizes to 3/4

Carbide			BRIGHT	+0.0000 -0.0005			HRC <54	
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DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>3</sub>	ANGLE°	PART NAME	ALL4 EDP
1/8	1/8	5/8	2	142°	HDRNC-1/8-142	H8200
3/16	3/16	3/4	2	142°	HDRNC-3/16-142	H8201
1/4	1/4	3/4	2-1/2	142°	HDRNC-1/4-142	H8202
3/8	3/8	1	3	142°	HDRNC-3/8-142	H8203
1/2	1/2	1	3	142°	HDRNC-1/2-142	H8204
5/8	5/8	1-1/4	3	142°	HDRNC-5/8-142	H8205
3/4	3/4	1-3/4	4	142°	HDRNC-3/4-142	H8206

**Speed & Feed:** page 202

HDRNC series is offered with 60° and 90° angles. See Melin General Purpose catalog for details.



# VARIOUS MATERIAL

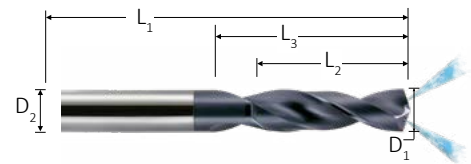
Series: **CDR**

## 2 FLUTE • 140° POINT COOLANT HOLE DRILL



COOLANT HOLE

- › Designed for use in Steel & Stainless Alloys and Cast Iron
- › Available with 3x, 5x & 7x diameter drill depths
- › Coolant hole is centered in the helix through each flute
- › Has a Self-Centering drill point
- › Unique geometry & honed edge prep minimizes need for pecking
- › Proprietary nACo coating extended tool life over conventional coatings



Carbide



2



Center Cutting



30°



nACo



DRILL POINT



HRC < 48

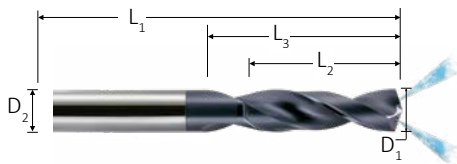


P  
M  
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S

DIA D <sub>1</sub>	SHK D <sub>2</sub>	DRILL LENGTH L <sub>2</sub>	FLUTE LENGTH L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	nACo EDP	
1/16	0.0625	3mm	0.188	0.234	2.362	CDR-1/16-3X	13166
1/16	0.0625	3mm	0.313	0.391	2.677	CDR-1/16-5X	13212
1/16	0.0625	3mm	0.438	0.547	2.992	CDR-1/16-7X	13258
50	0.0700	3mm	0.394	0.492	2.677	CDR-50-5X	19420
2mm	0.0787	3mm	6.0mm	7.5mm	60mm	CDR-2mm-3X	13167
2mm	0.0787	3mm	10.0mm	12.5mm	68mm	CDR-2mm-5X	13213
2mm	0.0787	3mm	14.0mm	17.5mm	76mm	CDR-2mm-7X	13259
2.1mm	0.0827	3mm	10.5mm	13.1mm	68mm	CDR-2.1mm-5X	14500
2.2mm	0.0866	3mm	11.0mm	13.8mm	68mm	CDR-2.2mm-5X	14501
# 43	0.0890	3mm	0.445	0.556	2.670	CDR-43-5X	19510
2.3mm	0.0906	3mm	11.5mm	14.4mm	68mm	CDR-2.3mm-5X	14502
3/32	0.0938	3mm	0.281	0.352	2.362	CDR-3/32-3X	13168
3/32	0.0938	3mm	0.469	0.586	2.677	CDR-3/32-5X	13214
3/32	0.0938	3mm	0.657	0.821	2.992	CDR-3/32-7X	13260
2.4mm	0.0945	3mm	12.0mm	15.0mm	68mm	CDR-2.4mm-5X	14503
# 40	0.0980	3mm	0.294	0.368	2.362	CDR-40-3X	13169
# 40	0.0980	3mm	0.490	0.613	2.677	CDR-40-5X	13215
# 40	0.0980	3mm	0.686	0.858	2.992	CDR-40-7X	13261
2.5mm	0.0984	3mm	7.5mm	9.4mm	60mm	CDR-2.5mm-3X	13170
2.5mm	0.0984	3mm	12.5mm	15.6mm	68mm	CDR-2.5mm-5X	13216
2.5mm	0.0984	3mm	17.5mm	21.9mm	76mm	CDR-2.5mm-7X	13262
# 38	0.1015	3mm	0.508	0.634	2.677	CDR-38-5X	19511
2.6mm	0.1024	3mm	13.0mm	16.3mm	68mm	CDR-2.6mm-5X	14504
2.7mm	0.1063	3mm	13.5mm	16.9mm	68mm	CDR-2.7mm-5X	14505
# 36	0.1065	3mm	0.320	0.399	2.362	CDR-36-3X	13171
# 36	0.1065	3mm	0.533	0.666	2.677	CDR-36-5X	13217
# 36	0.1065	3mm	0.746	0.932	2.992	CDR-36-7X	13263
7/64	0.1094	3mm	0.328	0.410	2.362	CDR-7/64-3X	13172
7/64	0.1094	3mm	0.547	0.684	2.677	CDR-7/64-5X	13218
7/64	0.1094	3mm	0.766	0.957	2.992	CDR-7/64-7X	13264
2.8mm	0.1102	3mm	14.0mm	17.5mm	68mm	CDR-2.8mm-5X	14506
2.9mm	0.1142	3mm	14.5mm	18.1mm	68mm	CDR-2.9mm-5X	14507
# 32	0.1160	3mm	0.348	0.435	2.362	CDR-32-3X	13173
# 32	0.1160	3mm	0.580	0.725	2.677	CDR-32-5X	13219
# 32	0.1160	3mm	0.812	1.015	2.992	CDR-32-7X	13265
3mm	0.1181	3mm	9.0mm	11.3mm	60mm	CDR-3mm-3X	13174
3mm	0.1181	3mm	15.0mm	18.8mm	68mm	CDR-3mm-5X	13220
3mm	0.1181	3mm	21.0mm	26.3mm	76mm	CDR-3mm-7X	13266

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**2 FLUTE • 140° POINT COOLANT HOLE DRILL**

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	<b>DIA D<sub>1</sub></b>	<b>SHK D<sub>2</sub></b>	<b>DRILL LENGTH L<sub>2</sub></b>	<b>FLUTE LENGTH L<sub>3</sub></b>	<b>OAL L<sub>1</sub></b>	<b>PART NAME</b>	<b>nACo EDP</b>
# 31	0.1200	1/8	0.358	0.407	2.362	CDR-31-3X	13175
# 31	0.1200	1/8	0.600	0.750	2.677	CDR-31-5X	13221
# 31	0.1200	1/8	0.990	1.050	2.992	CDR-31-7X	13267
3.1mm	0.1220	4mm	15.5mm	19.4mm	68mm	CDR-3.1mm-5X	14508
1/8	0.1250	1/8	0.375	0.469	2.362	CDR-1/8-3X	13176
1/8	0.1250	1/8	0.625	0.781	2.677	CDR-1/8-5X	13222
1/8	0.1250	1/8	0.875	1.094	2.992	CDR-1/8-7X	13268
3.2mm	0.1260	4mm	16.0mm	20.0mm	72mm	CDR-3.2mm-5X	14509
# 30	0.1285	4mm	0.386	0.482	2.441	CDR-30-3X	13177
# 30	0.1285	4mm	0.643	0.803	2.835	CDR-30-5X	13223
# 30	0.1285	4mm	0.900	1.124	3.189	CDR-30-7X	13269
3.3mm	0.1299	4mm	16.5mm	20.6mm	72mm	CDR-3.3mm-5X	14510
3.4mm	0.1339	4mm	17.0mm	21.3mm	72mm	CDR-3.4mm-5X	14511
# 29	0.1360	4mm	0.409	0.512	2.441	CDR-29-3X	13178
# 29	0.1360	4mm	0.782	0.850	2.835	CDR-29-5X	13224
# 29	0.1360	4mm	0.952	1.190	3.189	CDR-29-7X	13270
3.5mm	0.1378	4mm	17.5mm	21.9mm	72mm	CDR-3.5mm-5X	19512
9/64	0.1406	4mm	0.422	0.527	2.441	CDR-9/64-3X	13179
9/64	0.1406	4mm	0.703	0.879	2.835	CDR-9/64-5X	13225
9/64	0.1406	4mm	0.984	1.230	3.189	CDR-9/64-7X	13271
3.6mm	0.1417	4mm	18.0mm	22.5mm	72mm	CDR-3.6mm-5X	14512
3.7mm	0.1457	4mm	18.5mm	23.1mm	72mm	CDR-3.7mm-5X	14513
# 25	0.1495	4mm	0.748	0.934	2.835	CDR-25-5X	19513
3.8mm	0.1496	4mm	19.0mm	23.8mm	72mm	CDR-3.8mm-5X	14514
3.9mm	0.1535	4mm	19.5mm	24.4mm	72mm	CDR-3.9mm-5X	14515
5/32	0.1563	4mm	0.469	0.586	2.441	CDR-5/32-3X	13180
5/32	0.1563	4mm	0.781	0.977	2.835	CDR-5/32-5X	13226
5/32	0.1563	4mm	1.094	1.367	3.189	CDR-5/32-7X	13272
4mm	0.1575	4mm	12.0mm	15.0mm	62mm	CDR-4mm-3X	13181
4mm	0.1575	4mm	20.0mm	25.0mm	72mm	CDR-4mm-5X	13227
4mm	0.1575	4mm	28.0mm	35.0mm	81mm	CDR-4mm-7X	13273
# 21	0.1590	5mm	0.795	0.994	3.189	CDR-21-5X	19514
4.1mm	0.1614	5mm	20.5mm	25.6mm	81mm	CDR-4.1mm-5X	14516
4.2mm	0.1654	5mm	21.0mm	26.3mm	81mm	CDR-4.2mm-5X	14517
4.3mm	0.1693	5mm	21.5mm	26.9mm	81mm	CDR-4.3mm-5X	14518
11/64	0.1719	5mm	0.516	0.630	2.520	CDR-11/64-3X	19790
11/64	0.1719	5mm	0.860	1.074	3.189	CDR-11/64-5X	19791
11/64	0.1719	5mm	1.203	1.530	3.780	CDR-11/64-7X	19792
4.4mm	0.1732	5mm	22.0mm	27.5mm	81mm	CDR-4.4mm-5X	14520
# 16	0.1770	5mm	0.885	1.106	3.189	CDR-16-5X	19515
4.5mm	0.1772	5mm	13.5mm	16.9mm	64mm	CDR-4.5mm-3X	13182
4.5mm	0.1772	5mm	22.5mm	25.0mm	81mm	CDR-4.5mm-5X	13228
4.5mm	0.1772	5mm	31.5mm	35.0mm	96mm	CDR-4.5mm-7X	13274

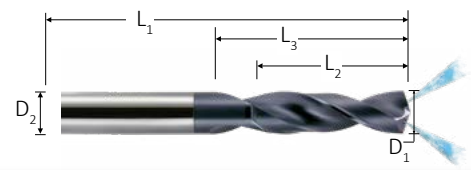
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# VARIOUS MATERIAL

## 2 FLUTE • 140° POINT COOLANT HOLE DRILL

Series: **CDR**

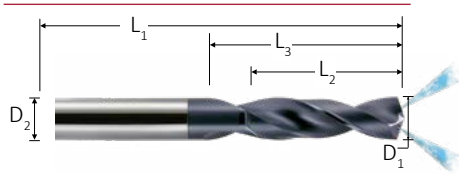


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DIA D <sub>1</sub>		SHK D <sub>2</sub>	DRILL LENGTH L <sub>2</sub>	FLUTE LENGTH L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	nAco EDP
4.6mm	0.1811	5mm	23.0mm	28.8mm	81mm	CDR-4.6mm-5X	14521
4.7mm	0.1850	5mm	23.5mm	29.4mm	81mm	CDR-4.7mm-5X	14522
3/16	0.1875	5mm	0.563	0.703	2.520	CDR-3/16-3X	13183
3/16	0.1875	5mm	0.938	1.172	3.189	CDR-3/16-5X	13229
3/16	0.1875	5mm	1.313	1.641	3.780	CDR-3/16-7X	13275
4.8mm	0.1890	5mm	24.0mm	30.0mm	81mm	CDR-4.8mm-5X	14523
4.9mm	0.1929	5mm	24.5mm	30.6mm	81mm	CDR-4.9mm-5X	14524
5mm	0.1969	5mm	15.0mm	18.8mm	64mm	CDR-5mm-3X	13184
5mm	0.1969	5mm	25.0mm	31.3mm	81mm	CDR-5mm-5X	13230
5mm	0.1969	5mm	35.0mm	43.8mm	96mm	CDR-5mm-7X	13276
5.1mm	0.2008	6mm	25.5mm	31.9mm	81mm	CDR-5.1mm-5X	14525
# 7	0.2010	6mm	1.004	1.256	3.189	CDR-7-5X	19516
13/64	0.2031	6mm	0.609	0.762	2.559	CDR-13/64-3X	13185
13/64	0.2031	6mm	1.016	1.270	3.189	CDR-13/64-5X	13231
13/64	0.2031	6mm	1.422	1.777	3.780	CDR-13/64-7X	13277
5.2mm	0.2047	6mm	26.0mm	32.5mm	81mm	CDR-5.2mm-5X	14526
5.3mm	0.2087	6mm	26.5mm	33.1mm	81mm	CDR-5.3mm-5X	14527
5.4mm	0.2126	6mm	27.0mm	33.8mm	81mm	CDR-5.4mm-5X	14528
# 3	0.2130	6mm	1.065	1.331	3.189	CDR-3-5X	19517
5.5mm	0.2165	6mm	27.5mm	34.4mm	81mm	CDR-5.5mm-5X	14529
7/32	0.2188	6mm	0.656	0.820	2.559	CDR-7/32-3X	13186
7/32	0.2188	6mm	1.094	1.367	3.189	CDR-7/32-5X	13232
7/32	0.2188	6mm	1.531	1.914	3.780	CDR-7/32-7X	13278
5.6mm	0.2205	6mm	28.0mm	35.0mm	81mm	CDR-5.6mm-5X	14530
5.7mm	0.2244	6mm	28.5mm	35.6mm	81mm	CDR-5.7mm-5X	14531
5.8mm	0.2283	6mm	33.4mm	36.3mm	81mm	CDR-5.8mm-5X	14532
5.9mm	0.2323	6mm	34mm	36.9mm	81mm	CDR-5.9mm-5X	14533
6mm	0.2362	6mm	18.0mm	22.5mm	65mm	CDR-6mm-3X	13187
6mm	0.2362	6mm	30.0mm	37.5mm	81mm	CDR-6mm-5X	13233
6mm	0.2362	6mm	42.0mm	52.5mm	96mm	CDR-6mm-7X	13279
6.1mm	0.2402	8mm	30.5mm	38.1mm	96mm	CDR-6.1mm-5X	14534
6.2mm	0.2441	8mm	31.0mm	38.8mm	96mm	CDR-6.2mm-5X	14535
6.3mm	0.2480	8mm	31.5mm	39.4mm	96mm	CDR-6.3mm-5X	14536
1/4	0.2500	8mm	0.750	0.938	2.992	CDR-1/4-3X	13188
1/4	0.2500	8mm	1.250	1.563	3.780	CDR-1/4-5X	13234
1/4	0.2500	8mm	1.750	2.188	4.567	CDR-1/4-7X	13280
6.4mm	0.2520	8mm	32.0mm	40.0mm	96mm	CDR-6.4mm-5X	14537
6.5mm	0.2559	8mm	32.5mm	40.6mm	96mm	CDR-6.5mm-5X	14538
F	0.2570	8mm	1.285	1.606	3.780	CDR-F-5X	19518
6.6mm	0.2598	8mm	33.0mm	41.3mm	96mm	CDR-6.6mm-5X	14539
6.7mm	0.2638	8mm	33.5mm	41.9mm	96mm	CDR-6.7mm-5X	14540
6.8mm	0.2677	8mm	34.0mm	42.5mm	96mm	CDR-6.8mm-5X	14541
6.9mm	0.2717	8mm	34.5mm	43.1mm	96mm	CDR-6.9mm-5X	14542

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**2 FLUTE • 140° POINT COOLANT HOLE DRILL**

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	DIA D <sub>1</sub>	SHK D <sub>2</sub>	DRILL LENGTH L <sub>2</sub>	FLUTE LENGTH L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	nAco EDP
I	0.2720	8mm	1.360	1.700	3.780	CDR-I-5X	19519
7mm	0.2756	8mm	21.0mm	26.3mm	76mm	CDR-7mm-3X	13189
7mm	0.2756	8mm	35.0mm	43.8mm	96mm	CDR-7mm-5X	13235
7mm	0.2756	8mm	49.0mm	61.3mm	116mm	CDR-7mm-7X	13281
9/32	0.2813	8mm	0.844	1.055	2.992	CDR-9/32-3X	13190
9/32	0.2813	8mm	1.406	1.758	3.780	CDR-9/32-5X	13236
9/32	0.2813	8mm	1.969	2.461	4.567	CDR-9/32-7X	13282
7.5mm	0.2953	8mm	37.5mm	46.9mm	96mm	CDR-7.5mm-5X	14547
5/16	0.3125	8mm	0.938	1.172	2.992	CDR-5/16-3X	13191
5/16	0.3125	8mm	1.563	1.953	3.780	CDR-5/16-5X	13237
5/16	0.3125	8mm	2.188	2.734	4.567	CDR-5/16-7X	13283
8mm	0.3150	8mm	24.0mm	30.0mm	76mm	CDR-8mm-3X	13192
8mm	0.3150	8mm	40.0mm	50.0mm	96mm	CDR-8mm-5X	13238
8mm	0.3150	8mm	56.0mm	70.0mm	116mm	CDR-8mm-7X	13284
Q	0.3320	10mm	1.660	2.075	4.252	CDR-Q-5X	19520
8.5mm	0.3346	10mm	42.5mm	53.1mm	108mm	CDR-8.5mm-5X	14556
11/32	0.3438	10mm	1.031	1.289	3.504	CDR-11/32-3X	13193
11/32	0.3438	10mm	1.719	2.148	4.252	CDR-11/32-5X	13239
11/32	0.3438	10mm	2.406	3.008	5.512	CDR-11/32-7X	13285
9mm	0.3543	10mm	27.0mm	33.8mm	89mm	CDR-9mm-3X	13194
9mm	0.3543	10mm	45.0mm	56.3mm	108mm	CDR-9mm-5X	13240
9mm	0.3543	10mm	63.0mm	78.8mm	140mm	CDR-9mm-7X	13286
U	0.3680	10mm	1.84	2.300	4.252	CDR-U-5X	19521
9.5mm	0.3740	10mm	47.5mm	59.4mm	108mm	CDR-9.5mm-5X	14561
3/8	0.375	10mm	1.125	1.406	3.504	CDR-3/8-3X	13195
3/8	0.375	10mm	1.875	2.344	4.252	CDR-3/8-5X	13241
3/8	0.375	10mm	2.625	3.281	5.512	CDR-3/8-7X	13287
25/64	0.3906	10mm	1.953	2.441	4.252	CDR-25/64-5X	19522
10mm	0.3937	10mm	30.0mm	37.5mm	89mm	CDR-10mm-3X	13196
10mm	0.3937	10mm	50.0mm	62.5mm	108mm	CDR-10mm-5X	13242
10mm	0.3937	10mm	70.0mm	87.5mm	140mm	CDR-10mm-7X	13288
10.5mm	0.4134	12mm	52.5mm	65.6mm	132mm	CDR-10.5mm-5X	14562
27/64	0.4219	12mm	2.110	2.707	5.197	CDR-27/64-5X	14563
11mm	0.4331	12mm	33.0mm	41.3mm	102mm	CDR-11mm-3X	13197
11mm	0.4331	12mm	55.0mm	68.8mm	132mm	CDR-11mm-5X	13243
11mm	0.4331	12mm	77.0mm	96.3mm	162mm	CDR-11mm-7X	13289
7/16	0.4375	12mm	1.313	1.641	4.016	CDR-7/16-3X	13198
7/16	0.4375	12mm	2.188	2.734	5.197	CDR-7/16-5X	13244
7/16	0.4375	12mm	3.063	3.828	6.378	CDR-7/16-7X	13290
11.5mm	0.4528	12mm	57.5mm	71.9mm	132mm	CDR-11.5mm-5X	14564
29/64	0.4531	12mm	2.266	2.832	5.197	CDR-29/64-5X	19524
12mm	0.4724	12mm	36.0mm	45mm	102mm	CDR-12mm-3X	13199

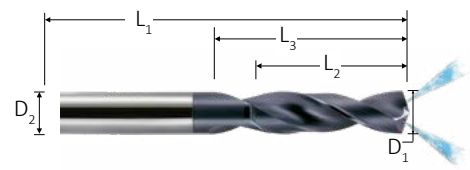
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# VARIOUS MATERIAL

## 2 FLUTE • 140° POINT COOLANT HOLE DRILL

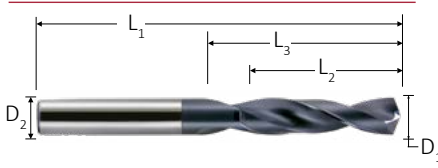
Series: **CDR**



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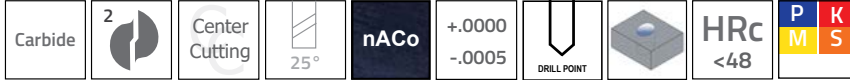
DIA D <sub>1</sub>		SHK D <sub>2</sub>	DRILL LENGTH L <sub>2</sub>	FLUTE LENGTH L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	nACo EDP
12mm	0.4724	12mm	60.0mm	75mm	132mm	CDR-12mm-5X	13245
12mm	0.4724	12mm	84.0mm	105mm	162mm	CDR-12mm-7X	13291
12.5mm	0.4921	14mm	31.25mm	37.5mm	102mm	CDR-12.5mm-3X	11773
12.5mm	0.4921	14mm	62.5mm	78.1mm	138mm	CDR-12.5mm-5X	14565
1/2	0.5000	14mm	1.500	1.875	4.016	CDR-1/2-3X	13200
1/2	0.5000	14mm	2.500	3.125	5.433	CDR-1/2-5X	13246
1/2	0.5000	14mm	3.500	4.375	6.457	CDR-1/2-7X	13292
13mm	0.5118	14mm	39.0mm	48.8mm	102mm	CDR-13mm-3X	13201
13mm	0.5118	14mm	65.0mm	81.3mm	138mm	CDR-13mm-5X	13247
13mm	0.5118	14mm	91.0mm	113.8mm	164mm	CDR-13mm-7X	13293
14mm	0.5512	14mm	39.0mm	52.5mm	102mm	CDR-14mm-3X	13202
14mm	0.5512	14mm	70.0mm	87.5mm	138mm	CDR-14mm-5X	13248
14mm	0.5512	14mm	98.0mm	122.5mm	175mm	CDR-14mm-7X	13294
9/16	0.5625	16mm	1.688	2.109	4.252	CDR-9/16-3X	13203
9/16	0.5625	16mm	2.813	3.516	5.906	CDR-9/16-5X	13249
9/16	0.5625	16mm	3.938	4.922	7.480	CDR-9/16-7X	13295
15mm	0.5906	16mm	45.0mm	56.3mm	108mm	CDR-15mm-3X	13204
15mm	0.5906	16mm	75.0mm	93.8mm	150mm	CDR-15mm-5X	13250
15mm	0.5906	16mm	105.0mm	131.3mm	190mm	CDR-15mm-7X	13296
5/8	0.6250	16mm	1.875	2.344	4.252	CDR-5/8-3X	13205
5/8	0.6250	16mm	3.125	3.906	5.906	CDR-5/8-5X	13251
5/8	0.6250	16mm	4.375	5.469	7.480	CDR-5/8-7X	13297
16mm	0.6299	16mm	48.0mm	60mm	108mm	CDR-16mm-3X	13206
16mm	0.6299	16mm	80.0mm	100mm	150mm	CDR-16mm-5X	13252
16mm	0.6299	16mm	112.0mm	140mm	190mm	CDR-16mm-7X	13298
3/4	0.7500	20mm	2.250	2.813	5.039	CDR-3/4-3X	13210
3/4	0.7500	20mm	3.750	4.688	7.008	CDR-3/4-5X	13256
3/4	0.7500	20mm	5.250	6.563	8.976	CDR-3/4-7X	13302

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**2 FLUTE • 140° POINT WITHOUT COOLANT HOLE DRILL**

- ▶ Designed for use in most Ferrous Materials
- ▶ Has a Self-Centering drill point
- ▶ Unique geometry & honed edge prep minimizes need for pecking
- ▶ Proprietary nACo coating provides extended tool life over conventional coatings



DIA D <sub>1</sub>	SHK D <sub>2</sub>	DRILL LENGTH L <sub>2</sub>	FLUTE LENGTH L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	nACo EDP	
3/64	0.0469	1/8	0.2810	0.3520	1-1/2	MDR-3/64	14257
# 55	0.0520	1/8	0.3090	0.3870	1-1/2	MDR-55	14258
# 54	0.0550	1/8	0.3250	0.4060	1-1/2	MDR-54	14259
1.5mm	0.0591	3mm	8.8mm	11mm	38mm	MDR-1.5MM	14309
# 53	0.0595	1/8	0.3480	0.4350	1-1/2	MDR-53	14260
1/16	0.0625	1/8	0.3630	0.4530	1-1/2	MDR-1/16	10292
# 52	0.0635	1/8	0.3650	0.4560	1-1/2	MDR-52	14261
# 50	0.0700	1/8	0.3990	0.4990	2	MDR-50	14262
# 49	0.0730	1/8	0.4120	0.5160	2	MDR-49	14263
# 48	0.0760	1/8	0.4260	0.5320	2	MDR-48	14264
5/64	0.0781	1/8	0.4330	0.5420	2	MDR-5/64	14265
2mm	0.0787	3mm	10.9mm	13.5mm	38mm	MDR-2MM	14310
# 46	0.0810	1/8	0.4460	0.5570	2	MDR-46	14266
# 45	0.0820	1/8	0.4470	0.5590	2	MDR-45	14267
# 44	0.0860	1/8	0.4640	0.5810	2	MDR-44	14268
# 43	0.0890	1/8	0.4760	0.5950	2	MDR-43	14269
# 42	0.0935	1/8	0.4960	0.6190	2	MDR-42	14270
3/32	0.0938	1/8	0.4920	0.6160	2	MDR-3/32	10294
# 41	0.0960	1/8	0.4990	0.6240	2	MDR-41	14271
# 40	0.0980	1/8	0.5050	0.6310	2	MDR-40	14272
2.5mm	0.0984	3mm	12.5mm	15.5mm	38mm	MDR-2.5MM	14311
# 39	0.0995	1/8	0.5070	0.6340	2	MDR-39	14273
# 38	0.1015	1/8	0.5130	0.6410	2	MDR-38	14274
# 37	0.1040	1/8	0.5200	0.6500	2	MDR-37	14275
# 36	0.1065	1/8	0.5270	0.6590	2	MDR-36	14276
7/64	0.1094	1/8	0.5360	0.6700	2	MDR-7/64	14277
#32	0.1160	1/8	0.5630	0.7040	2	MDR-32	14566
3mm	0.1181	3mm	14.1mm	17.5mm	38mm	MDR-3MM	10290
# 31	0.1200	1/8	0.5820	0.7280	2	MDR-31	14278
1/8	0.1250	1/8	0.6000	0.7500	2	MDR-1/8	14279
# 30	0.1285	3/16	0.6100	0.7630	2	MDR-30	14280
# 29	0.1360	3/16	0.6390	0.7990	2	MDR-29	14281
3.5mm	0.1378	4mm	15.6mm	19.5mm	50mm	MDR-3.5MM	14312
# 28	0.1405	3/16	0.6530	0.8170	2	MDR-28	14282
9/64	0.1406	3/16	0.6470	0.8080	2	MDR-9/64	14283
# 25	0.1495	3/16	0.6800	0.8500	2.5	MDR-25	14284
5/32	0.1562	3/16	0.7030	0.8790	2.5	MDR-5/32	14285
4mm	0.1575	4mm	16.8mm	21mm	50mm	MDR-4MM	14313

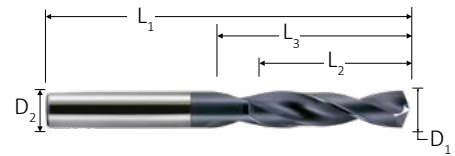
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# VARIOUS MATERIAL

Series: **MDR**

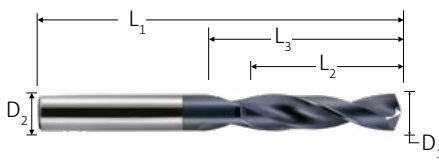
2 FLUTE • 140° POINT WITHOUT COOLANT HOLE DRILL



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	DIA D <sub>1</sub>	SHK D <sub>2</sub>	DRILL LENGTH L <sub>2</sub>	FLUTE LENGTH L <sub>3</sub>	OAL L <sub>1</sub>	PART NAME	nACo EDP
# 21	0.1590	3/16	0.7080	0.8840	2.5	MDR-21	14286
# 20	0.1610	3/16	0.6440	0.8050	2.5	MDR-20	14287
11/64	0.1719	3/16	0.6880	0.8600	2.5	MDR-11/64	14288
16	0.1770	3/16	0.7080	0.8850	2.5	MDR-16	14289
4.5mm	0.1772	5mm	18mm	22.5mm	50mm	MDR-4.5MM	14314
3/16	0.1875	3/16	0.7500	0.9380	2.5	MDR-3/16	14290
11	0.1910	1/4	0.7640	0.9550	2.5	MDR-11	14291
10	0.1935	1/4	0.7740	0.9680	2.5	MDR-10	14292
5mm	0.1969	5mm	20mm	25mm	50mm	MDR-5MM	14315
7	0.2010	1/4	0.8040	1.0050	2.5	MDR-7	14293
13/64	0.2031	1/4	0.8120	1.0160	2.5	MDR-13/64	14294
5	0.2055	1/4	0.8220	1.0280	2.5	MDR-5	14295
3	0.2130	1/4	0.8520	1.0650	2.5	MDR-3	14296
7/32	0.2188	1/4	0.8750	1.0940	2.5	MDR-7/32	14297
15/64	0.2344	1/4	0.9380	1.1720	2.5	MDR-15/64	14298
6mm	0.2362	6mm	24mm	30mm	63mm	MDR-6MM	14316
1/4	0.2500	1/4	1	1.25	2.5	MDR-1/4	10296
6.5mm	0.2559	8mm	26mm	33mm	75mm	MDR-6.5MM	19810
F	0.2570	5/16	1.0280	1.2850	3	MDR-F	14299
17/64	0.2656	5/16	1.0620	1.3280	3	MDR-17/64	14300
I	0.2720	5/16	1.0880	1.3600	3	MDR-I	14301
7mm	0.2756	8mm	28mm	35mm	75mm	MDR-7MM	14317
9/32	0.2812	5/16	1.1250	1.4060	3	MDR-9/32	14302
7.5mm	0.2953	8mm	30mm	38mm	75mm	MDR-7.5MM	19811
19/64	0.2969	5/16	1.1880	1.4840	3	MDR-19/64	19793
5/16	0.3125	5/16	1.2500	1.5630	3	MDR-5/16	10298
8mm	0.3150	8mm	32mm	40mm	75mm	MDR-8MM	14318
21/64	0.3281	3/8	1.3130	1.5750	3	MDR-21/64	19794
Q	0.3320	3/8	1.3280	1.5940	3	MDR-Q	19795
8.5mm	0.3346	10mm	34mm	41mm	100mm	MDR-8.5MM	19812
11/32	0.3438	3/8	1.3750	1.6500	3	MDR-11/32	14303
9mm	0.3543	10mm	36mm	43mm	100mm	MDR-9MM	14319
23/64	0.3594	3/8	1.4380	1.7250	3	MDR-23/64	19796
U	0.3680	3/8	1.4720	1.7660	3	MDR-U	19797
9.5mm	0.3740	10mm	38mm	45mm	100mm	MDR-9.5MM	19813
3/8	0.3750	3/8	1.5000	1.8	3	MDR-3/8	10302
25/64	0.3906	7/16	1.5630	1.9	4	MDR-25/64	19798
10mm	0.3937	10mm	40mm	47mm	100mm	MDR-10MM	14320
13/32	0.4063	7/16	1.6250	1.8690	4	MDR-13/32	19799
10.5mm	0.4134	12mm	42mm	48mm	100mm	MDR-10.5MM	19814
27/64	0.4219	7/16	1.6880	1.9410	4	MDR-27/64	19800
11mm	0.4331	12mm	44mm	49mm	100mm	MDR-11MM	19815
7/16	0.4375	7/16	1.7500	2.0130	4	MDR-7/16	14304

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**2 FLUTE • 140° POINT WITHOUT COOLANT HOLE DRILL**

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DIA $D_1$	SHK $D_2$	DRILL LENGTH $L_2$	FLUTE LENGTH $L_3$	OAL $L_1$	PART NAME	nACo EDP	
11.5mm	0.4528	12mm	46mm	51mm	100mm	MDR-11.5MM	19816
29/64	0.4531	1/2	1.8130	1.9940	4	MDR-29/64	19801
12mm	0.4724	12mm	48mm	53mm	100mm	MDR-12MM	14321
31/64	0.4844	1/2	1.9380	2.1310	4	MDR-31/64	19802
12.5mm	0.4921	14mm	50mm	56mm	100mm	MDR-12.5MM	19817
1/2	0.5000	1/2	2.0000	2.2	4	MDR-1/2	14305
13mm	0.5118	14mm	52mm	58mm	100mm	MDR-13MM	19818
33/64	0.5156	9/16	2.0630	2.2690	4	MDR-33/64	19803
17/32	0.5313	9/16	2.1250	2.3380	4	MDR-17/32	19804
13.5mm	0.5315	14mm	54mm	60mm	100mm	MDR-13.5MM	19819
35/64	0.5469	9/16	2.1880	2.4060	4	MDR-35/64	19805
14mm	0.5512	14mm	56mm	62mm	100mm	MDR-14MM	19151
9/16	0.5625	9/16	2.2500	2.4750	4	MDR-9/16	14306
37/64	0.5781	5/8	2.3130	2.5440	5	MDR-37/64	19806
15mm	0.5906	16mm	60mm	66mm	127mm	MDR-15MM	19152
19/32	0.5938	5/8	2.3750	2.6130	5	MDR-19/32	19807
5/8	0.6250	5/8	2.5000	2.7500	5	MDR-5/8	14307
16mm	0.6299	16mm	64mm	70mm	127mm	MDR-16MM	19153
21/32	0.6563	3/4	2.4280	2.6710	5	MDR-21/32	19808
11/16	0.6875	3/4	2.5440	2.7980	5	MDR-11/16	19809
3/4	0.7500	3/4	2.7750	3.0530	5	MDR-3/4	14308

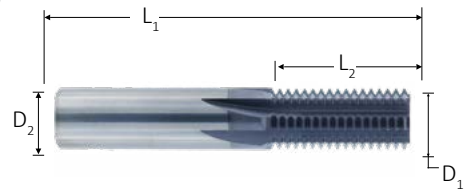
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# VARIOUS MATERIAL

## MULTI FLUTE • 60° STRAIGHT FLUTE, UN THREAD MILLS

Series: **TM**

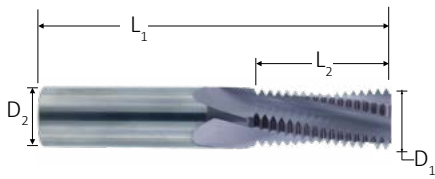


- › Threads large diameter holes faster and more accurately than conventional or high performance taps
- › Reduces chatter



MIN THREAD DIA./PITCH	CUTTER DIA $D_1$	SHK $D_2$	LOC $L_2$	OAL $L_1$	FLUTE	PART NAME	AITiN EDP
6-32	0.085	1/8	7/32	2	2	TM-6-32-S	17500
8-32	0.120	1/8	1/4	2	3	TM-8-32-S	17501
10-24	0.140	3/16	5/16	2-1/2	3	TM-10-24-S	17502
10-28	0.140	3/16	5/16	2-1/2	3	TM-10-28-S	17503
10-32	0.140	3/16	5/16	2-1/2	3	TM-10-32-S	17504
1/4-20	0.180	3/16	1/2	2-1/2	3	TM-1/4-20-S	17505
1/4-28	0.180	3/16	1/2	2-1/2	3	TM-1/4-28-S	17506
1/4-32	0.180	3/16	1/2	2-1/2	3	TM-1/4-32-S	17507
5/16-18	0.235	1/4	5/8	2-1/2	3	TM-5/16-18-S	17508
5/16-24	0.235	1/4	5/8	2-1/2	3	TM-5/16-24-S	17509
5/16-32	0.235	1/4	5/8	2-1/2	3	TM-5/16-32-S	17510
3/8-16	0.300	5/16	3/4	3	4	TM-3/8-16-S	17511
3/8-24	0.300	5/16	3/4	3	4	TM-3/8-24-S	17512
7/16-14	0.345	3/8	3/4	3-1/2	4	TM-7/16-14-S	17513
7/16-20	0.345	3/8	3/4	3-1/2	4	TM-7/16-20-S	17514
1/2-13	0.370	3/8	7/8	3-1/2	4	TM-1/2-13-S	17515
1/2-20	0.370	3/8	7/8	3-1/2	4	TM-1/2-20-S	17516
1/2-28	0.370	3/8	7/8	3-1/2	4	TM-1/2-28-S	17517
9/16-12	0.450	1/2	7/8	3-1/2	4	TM-9/16-12-S	17518
9/16-18	0.450	1/2	7/8	3-1/2	4	TM-9/16-18-S	17519
5/8-10	0.490	1/2	1-1/4	3-1/2	6	TM-5/8-10-S	17520
5/8-11	0.490	1/2	1-1/4	3-1/2	6	TM-5/8-11-S	17521
5/8-12	0.490	1/2	1-1/4	3-1/2	6	TM-5/8-12-S	17522
5/8-18	0.490	1/2	1-1/4	3-1/2	6	TM-5/8-18-S	17523
3/4-12	0.600	5/8	1-1/4	3-1/2	6	TM-3/4-12-S	17524
3/4-16	0.600	5/8	1-1/4	3-1/2	6	TM-3/4-16-S	17525
3/4-20	0.600	5/8	1-1/4	3-1/2	6	TM-3/4-20-S	17526
7/8-9	0.620	5/8	1-1/4	3-1/2	6	TM-7/8-9-S	17527
7/8-12	0.620	5/8	1-1/4	3-1/2	6	TM-7/8-12-S	17528
7/8-14	0.620	5/8	1-1/4	3-1/2	6	TM-7/8-14-S	17529
7/8-16	0.620	5/8	1-1/4	3-1/2	6	TM-7/8-16-S	17530
7/8-20	0.620	5/8	1-1/4	3-1/2	6	TM-7/8-20-S	17531
1-8	0.735	3/4	1-3/8	5	4	TM-1-8-S	17532
1-12	0.735	3/4	1-3/8	5	4	TM-1-12-S	17533
1-16	0.735	3/4	1-3/8	5	4	TM-1-16-S	17534
1-20	0.735	3/4	1-3/8	5	4	TM-1-20-S	17535

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**MULTI FLUTE • 60° HELICAL FLUTE, UN THREAD MILLS**

- Threads large diameter holes faster and more accurately than conventional or high performance taps
- Reduces chatter

Carbide	MULTI FLUTES	15°	AITiN	60°		HRC <52	<table border="1"> <tr> <td>P</td> <td>K</td> </tr> <tr> <td>M</td> <td>S</td> </tr> <tr> <td>H</td> <td>N</td> </tr> </table>	P	K	M	S	H	N
P	K												
M	S												
H	N												

MIN THREAD DIA./PITCH	CUTTER DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTE	PART NAME	AITiN EDP
2-56	0.065	1/8	0.125	2	3	TM-2-56-H	14647
3-48	0.075	1/8	0.167	2	3	TM-3-48-H	14649
4-40	0.085	1/8	0.175	2	3	TM-4-40-H	14650
6-32	0.085	1/8	7/32	2	3	TM-6-32-H	17536
8-32	0.120	1/8	1/4	2	3	TM-8-32-H	17537
10-24	0.140	3/16	5/16	2-1/2	3	TM-10-24-H	17538
10-28	0.140	3/16	5/16	2-1/2	3	TM-10-28-H	17539
10-32	0.140	3/16	5/16	2-1/2	3	TM-10-32-H	17540
1/4-20	0.180	3/16	1/2	2-1/2	3	TM-1/4-20-H	17541
1/4-28	0.180	3/16	1/2	2-1/2	3	TM-1/4-28-H	17542
1/4-32	0.180	3/16	1/2	2-1/2	3	TM-1/4-32-H	17543
5/16-18	0.235	1/4	5/8	2-1/2	3	TM-5/16-18-H	17544
5/16-24	0.235	1/4	5/8	2-1/2	3	TM-5/16-24-H	17545
5/16-32	0.235	1/4	5/8	2-1/2	3	TM-5/16-32-H	17546
3/8-16	0.300	5/16	3/4	3	4	TM-3/8-16-H	17547
3/8-24	0.300	5/16	3/4	3	4	TM-3/8-24-H	17548
7/16-14	0.345	3/8	3/4	3-1/2	4	TM-7/16-14-H	17549
7/16-20	0.345	3/8	3/4	3-1/2	4	TM-7/16-20-H	17550
1/2-13	0.370	3/8	7/8	3-1/2	4	TM-1/2-13-H	17551
1/2-20	0.370	3/8	7/8	3-1/2	4	TM-1/2-20-H	17552
1/2-28	0.370	3/8	7/8	3-1/2	4	TM-1/2-28-H	17553
9/16-12	0.450	1/2	7/8	3-1/2	4	TM-9/16-12-H	17554
9/16-18	0.450	1/2	7/8	3-1/2	4	TM-9/16-18-H	17555
5/8-10	0.490	1/2	1-1/4	3-1/2	4	TM-5/8-10-H	17556
5/8-11	0.490	1/2	1-1/4	3-1/2	4	TM-5/8-11-H	17557
5/8-12	0.490	1/2	1-1/4	3-1/2	4	TM-5/8-12-H	17558
5/8-18	0.490	1/2	1-1/4	3-1/2	4	TM-5/8-18-H	17559
3/4-12	0.600	5/8	1-1/4	3-1/2	4	TM-3/4-12-H	17560
3/4-16	0.600	5/8	1-1/4	3-1/2	4	TM-3/4-16-H	17561
3/4-20	0.600	5/8	1-1/4	3-1/2	4	TM-3/4-20-H	17562
7/8-9	0.620	5/8	1-1/4	3-1/2	4	TM-7/8-9-H	17563
7/8-12	0.620	5/8	1-1/4	3-1/2	4	TM-7/8-12-H	17564
7/8-14	0.620	5/8	1-1/4	3-1/2	4	TM-7/8-14-H	17565
7/8-16	0.620	5/8	1-1/4	3-1/2	4	TM-7/8-16-H	17566
7/8-20	0.620	5/8	1-1/4	3-1/2	4	TM-7/8-20-H	17567
1-8	0.735	3/4	1-3/8	5	4	TM-1-8-H	17568
1-12	0.735	3/4	1-3/8	5	4	TM-1-12-H	17569
1-16	0.735	3/4	1-3/8	5	4	TM-1-16-H	17570
1-20	0.735	3/4	1-3/8	5	4	TM-1-20-H	17571

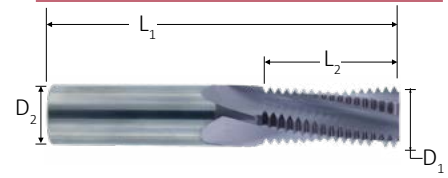
**Speed & Feed:** page 220

# VARIOUS MATERIAL

## MULTI FLUTE • 60° HELICAL FLUTE, UN THREAD MILLS

- > Threads large diameter holes faster and more accurately than conventional or high performance taps
- > Reduces chatter

Series: **TM**



MIN THREAD DIA./PITCH	CUTTER DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTE	PART NAME	AITiN EDP
m3-.5	2.2mm	3mm	6mm	57mm	2	TM-M3-.5-H	17585
m3.5-.6	2.4mm	3mm	6mm	57mm	2	TM-M3.5-.6-H	17586
m4-.7	2.9mm	3mm	6.5mm	57mm	2	TM-M4-.7-H	17587
m4.5-.75	3.1mm	4mm	6.5mm	63mm	2	TM-M4.5-.75-H	17588
m5-.8	3.7mm	6mm	8mm	63mm	3	TM-M5-.8-H	17589
m6-1	4.3mm	6mm	12mm	63mm	3	TM-M6-1-H	17590
m8-1	5.9mm	6mm	16mm	63mm	3	TM-M8-1-H	17591
m8-1.25	5.9mm	6mm	16mm	63mm	3	TM-M8-1.25-H	17592
m10-1.25	7.6mm	8mm	19mm	63mm	4	TM-M10-1.25-H	17593
m10-1.5	7.6mm	8mm	19mm	63mm	4	TM-M10-1.5-H	17594
m12-1.25	9.4mm	10mm	22mm	70mm	4	TM-M12-1.25-H	17595
m12-1.75	9.4mm	10mm	22mm	70mm	4	TM-M12-1.75-H	17596
m14-1.25	11.4mm	12mm	24mm	76mm	4	TM-M14-1.25-H	17597
m14-1.5	11.4mm	12mm	24mm	76mm	4	TM-M14-1.5-H	17598
m14-2	11.4mm	12mm	24mm	76mm	4	TM-M14-2-H	17599
m18-2.5	12.7mm	16mm	30mm	89mm	4	TM-M18-2.5-H	17600
m20-1.5	15.7mm	16mm	30mm	89mm	4	TM-M20-1.5-H	17601
m20-2	15.7mm	16mm	30mm	89mm	4	TM-M20-2-H	17602
m24-1.5	19.1mm	20mm	40mm	100mm	4	TM-M24-1.5-H	17603
m24-2	19.1mm	20mm	40mm	100mm	4	TM-M24-2-H	17604
m24-2.5	19.1mm	20mm	40mm	100mm	4	TM-M24-2.5-H	17605
m24-3	19.1mm	20mm	40mm	100mm	4	TM-M24-3-H	17606

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\*See FIGURE 1

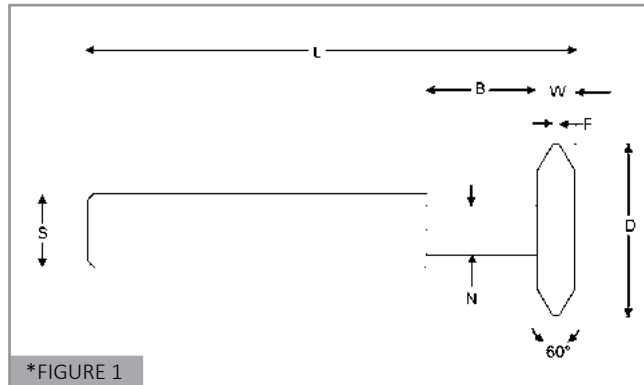
**MULTI FLUTE • STRAIGHT FLUTE, NPTF THREAD MILLS**

- Designed for milling precision I.D. & O.D threads in all types of steels, non-ferrous metals, & exotic metals
- Single form thread can be used for a wide range of thread pitches

Carbide	MULTI FLUTES	0°	Bright AITiN	60°		HRC <52	P M H	K S N
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CUTTER DIA (D)	SHK DIA (S)	OAL (L)	WIDTH (W)	FLAT (F)	NECK DIA (N)	NECK WIDTH (B)	FLUTE	MIN TPI	MAX PITCH	PART NAME	BRIGHT EDP	AITiN EDP
0.080	0.1875	2	0.026	0.001	0.040	0.250	3	40	64	TM-4-L1	15820	55820
0.080	0.1875	2	0.026	0.001	0.040	0.375	3	40	64	TM-4-L2	15824	55824
0.098	0.1875	2	0.032	0.001	0.050	0.375	3	32	64	TM-6-L1	15826	55826
0.098	0.1875	2	0.032	0.001	0.050	0.500	3	32	64	TM-6-L2	15828	55828
0.250	0.2500	2.500	0.062	.0020	0.150	1.000	4	16	48	TM-1/4	12311	52311
0.375	0.2500	2.593	0.093	.0020	0.220	0.600	4	12	32	TM-3/8	12313	52313
0.500	0.3125	2.625	0.125	.0035	0.295	0.600	5	11	32	TM-1/2	12309	52309
0.750	0.3750	2.656	0.156	.0045	----	----	6	8	16	TM-3/4	12312	52312
1.000	0.5000	3.187	0.187	.0090	----	----	7	6	12	TM-1	12308	52308

Speed & Feed: page 220



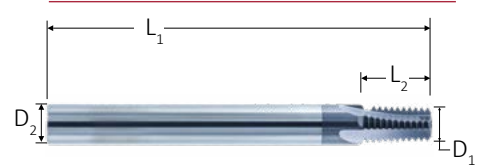
## Thread Mill Software Program

Melin offers a stand alone software program designed to assist you in programming when using our THREAD MILLS SERIES. Visit [www.melintool.com](http://www.melintool.com) to download our software.

# VARIOUS MATERIAL

## MULTI FLUTE • STRAIGHT FLUTE, NPT THREAD MILLS

Series: **TM**



MIN THREAD DIA./PITCH	CUTTER DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTE	PART NAME	AITiN EDP
1/16-27NPT	0.218	1/4	1/2	2-1/2	3	TM-1/16-27NPT-S	17572
1/8-27NPT	0.300	5/16	19/32	3	4	TM-1/8-27NPT-S	17573
1/4-18NPT	0.360	3/8	5/8	3-1/2	4	TM-1/4-18NPT-S	17574
3/8-18NPT	0.425	7/16	3/4	4	4	TM-3/8-18NPT-S	17575
1/2-14NPT	0.490	1/2	1	4	6	TM-1/2-14NPT-S	17576
1-11.5NPT	0.620	5/8	1-1/8	4	6	TM-1-11.5NPT-S	17577
2.5-8NPT	0.990	1	1-1/2	5	6	TM-2.5-8NPT-S	17578

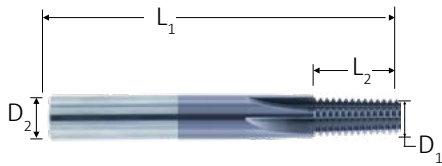
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## MULTI FLUTE • HELICAL FLUTE, NPT THREAD MILLS



MIN THREAD DIA./PITCH	CUTTER DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTE	PART NAME	AITiN EDP
1/16-27NPT	0.218	1/4	1/2	2-1/2	3	TM-1/16-27NPT-H	17579
1/8-27NPT	0.300	5/16	19/32	3	3	TM-1/8-27NPT-H	17580
1/4-18NPT	0.360	3/8	5/8	3-1/2	4	TM-1/4-18NPT-H	17581
3/8-18NPT	0.425	7/16	3/4	4	4	TM-3/8-18NPT-H	17582
1/2-14NPT	0.490	1/2	1	4	4	TM-1/2-14NPT-H	17583
1-11.5NPT	0.620	5/8	1-1/8	4	4	TM-1-11.5NPT-H	17584

Speed & Feed: page 220

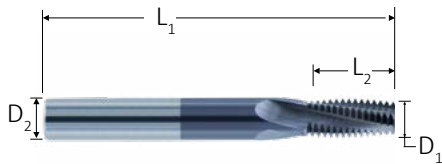


**MULTI FLUTE • STRAIGHT FLUTE, NPTF THREAD MILLS**

Carbide	MULTI FLUTES	0°	AlTiN	60°		HRC <52	<table border="1"> <tr><td>P</td><td>K</td></tr> <tr><td>M</td><td>S</td></tr> <tr><td>H</td><td>N</td></tr> </table>	P	K	M	S	H	N
P	K												
M	S												
H	N												

MIN THREAD DIA./PITCH	CUTTER DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTE	PART NAME	AlTiN EDP
1/8-27NPTF	0.300	5/16	19/32	3	3	TM-1/8-27NPTF-S	11607
1/4-18NPTF	0.360	3/8	5/8	3-1/2	4	TM-1/4-18NPTF-S	11609
1/2-14NPTF	0.490	1/2	1	4	6	TM-1/2-14NPTF-S	11611
1-11.5NPTF	0.620	5/8	1-1/8	4	6	TM-1-11.5NPTF-S	11613

**Speed & Feed:** page 220

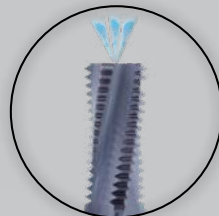


**MULTI FLUTE • HELICAL FLUTE, NPTF THREAD MILLS**

Carbide	MULTI FLUTES	15°	AlTiN	60°		HRC <52	<table border="1"> <tr><td>P</td><td>K</td></tr> <tr><td>M</td><td>S</td></tr> <tr><td>H</td><td>N</td></tr> </table>	P	K	M	S	H	N
P	K												
M	S												
H	N												

MIN THREAD DIA./PITCH	CUTTER DIA D <sub>1</sub>	SHK D <sub>2</sub>	LOC L <sub>2</sub>	OAL L <sub>1</sub>	FLUTE	PART NAME	AlTiN EDP
1/8-27NPTF	0.300	5/16	19/32	3	3	TM-1/8-27NPTF-H	11615
1/4-18NPTF	0.360	3/8	5/8	3-1/2	4	TM-1/4-18NPTF-H	11616
1/2-14NPTF	0.490	1/2	1	4	4	TM-1/2-14NPTF-H	11617
1-11.5NPTF	0.620	5/8	1-1/8	4	4	TM-1-11.5NPTF-H	11619

**Speed & Feed:** page 220



**COOLANT HOLE**  
Option available upon request.

Call Customer Service Today

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MAL3

### DESCRIPTION: 3 FLUTE - 39° SQ AND RADIUS, FOR ROUGHING & FINISHING

Material Guide		Condition	SFM	CHIP PER TOOTH									
				1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	
ISO-N	<b>Wrought Aluminum Alloys</b>	6061-T6/T651, 7075-T6, 2024-T4/T6, 2014	Slotting	1800	0.0012	0.0018	0.0020	0.0024	0.0032	0.0041	0.0040	0.0048	0.0082
			≤ 65% Dia. Profiling	2400	0.0015	0.0024	0.0032	0.0048	0.0047	0.0056	0.0080	0.0096	0.0112
	<b>Cast Aluminum Alloys</b>	319, 328, 360, 383	Slotting	900	0.0012	0.0018	0.0022	0.0024	0.0034	0.0045	0.0040	0.0048	0.0090
				≤ 65% Dia. Profiling	1200	0.0015	0.0024	0.0028	0.0048	0.0043	0.0055	0.0080	0.0096
	<b>Copper</b>	Red Brass, High Lead Brass, Yellow Brass, C-17200, Naval Brass, A-17, High Silicon Bronze	Slotting	475	0.0008	0.0008	0.0016	0.0020	0.0024	0.0030	0.0032	0.0032	0.0060
				≤ 65% Dia. Profiling	625	0.0011	0.0011	0.0022	0.0028	0.0033	0.0040	0.0045	0.0045
	<b>Copper Alloys</b>	Low Silicon Bronze, Alum/Bronze, Beryllium Copper, Nickel Silver, Oxygen-Free Copper	Slotting	425	0.0008	0.0008	0.0016	0.0020	0.0024	0.0030	0.0032	0.0032	0.0060
				≤ 65% Dia. Profiling	600	0.0011	0.0011	0.0022	0.0028	0.0033	0.0040	0.0045	0.0045
	<b>Magnesium</b>		Slotting	1400	0.0012	0.0018	0.0020	0.0024	0.0032	0.0042	0.0048	0.0064	0.0084
				≤ 65% Dia. Profiling	1600	0.0015	0.0024	0.0032	0.0048	0.0047	0.0056	0.0080	0.0096
	<b>Plastics</b>	Acrylics, Polycarbonate, Phenolics	Slotting	600	0.0020	0.0024	0.0032	0.0048	0.0052	0.0056	0.0080	0.0096	0.0112
				≤ 15% Dia. Profiling	800	0.0008	0.0016	0.0024	0.0032	0.0032	0.0060	0.0064	0.0080

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MAL3R

DESCRIPTION: 3 FLUTE - 39° ROUGHER FOR HIGH VELOCITY MACHINING

	Material Guide		Condition	SFM	CHIP PER TOOTH								
					1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
ISO-N	Wrought Aluminum Alloys	6061-T6/T651, 7075-T6, 2024-T4/T6, 2014	Slotting	1800	0.0012	0.0018	0.0020	0.0024	0.0032	0.0041	0.0040	0.0048	0.0082
			≤ 75% Dia. Profiling	2400	0.0015	0.0024	0.0032	0.0048	0.0047	0.0056	0.0080	0.0096	0.0112
	Cast Aluminum Alloys	319, 328, 360, 383	Slotting	900	0.0012	0.0018	0.0022	0.0024	0.0034	0.0045	0.0040	0.0048	0.0090
			≤ 75% Dia. Profiling	1200	0.0015	0.0024	0.0028	0.0048	0.0043	0.0055	0.0080	0.0096	0.0110
	Copper	Red Brass, High Lead Brass, Yellow Brass, C-17200, Naval Brass, A-17, High Silicon Bronze	Slotting	475	0.0008	0.0008	0.0016	0.0020	0.0024	0.0030	0.0032	0.0032	0.0060
			≤ 75% Dia. Profiling	625	0.0011	0.0011	0.0022	0.0028	0.0033	0.0040	0.0045	0.0045	0.0080
	Copper Alloys	Low Silicon Bronze, Alum/Bronze, Beryllium Copper, Nickel Silver, Oxygen-Free Copper	Slotting	425	0.0008	0.0008	0.0016	0.0020	0.0024	0.0030	0.0032	0.0032	0.0060
			≤ 70% Dia. Profiling	600	0.0011	0.0011	0.0022	0.0028	0.0033	0.0040	0.0045	0.0045	0.0080
	Magnesium		Slotting	1400	0.0012	0.0018	0.0020	0.0024	0.0032	0.0042	0.0048	0.0064	0.0084
			≤ 75% Dia. Profiling	1600	0.0015	0.0024	0.0032	0.0048	0.0047	0.0056	0.0080	0.0096	0.0112
	Plastics	Acrylics, Polycarbonate, Phenolics	Slotting	600	0.0020	0.0024	0.0032	0.0048	0.0052	0.0056	0.0080	0.0096	0.0112
			≤ 15% Dia. Profiling	800	0.0008	0.0016	0.0024	0.0032	0.0032	0.0060	0.0064	0.0080	0.0120



# SPEED & FEED INFORMATION

## SPEED & FEEDS FOR SERIES: HVMG2

DESCRIPTION: 2 FLUTE - 30° FOR HIGH VELOCITY MACHINING

**Notes**  
**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

HIGH PERFORMANCE / HIGH HORSEPOWER / SPECIALIZED MACHINES										
Material Guide			Condition	SFM	CHIP PER TOOTH					
ISO-N	Aluminum+ Aluminum Alloys	2024-T4/T6, 2014, 6061-T6/T651, 7075-T6			1/4"	3/8"	1/2"	5/8"	3/4"	1"
						Slotting up to 40% of Dia. Deep	4000-8000	0.0036	0.0053	0.0072
			Profiling up to 75% of Dia	4000-8000	0.0054	0.0079	0.0108	0.0137	0.0162	0.0216

Material Guide			Condition	M/MIN	CHIP PER TOOTH - METRIC				
ISO-N	Aluminum+ Aluminum Alloys	2024-T4/T6, 2014, 6061-T6/T651, 7075-T6			10mm	12mm	16mm	20mm	25mm
						Slotting up to 40% of Dia. Deep	1219-2438	0.1341	0.1829
			Profiling up to 75% of Dia	1219-2438	0.2012	0.2743	0.3475	0.4115	0.5486

STANDARD MACHINES										
Material Guide			Condition	SFM	CHIP PER TOOTH					
ISO-N	Aluminum+ Aluminum Alloys	2024-T4/T6, 2014, 6061-T6/T651, 7075-T6			1/4"	3/8"	1/2"	5/8"	3/4"	1"
						Slotting up to 1x Dia. Deep	1800	0.0020	0.0030	0.0040
			Profiling up to 60% of Dia	2400	0.0025	0.0040	0.0050	0.0070	0.0080	0.0100

Material Guide			Condition	M/MIN	CHIP PER TOOTH - METRIC				
ISO-N	Aluminum+ Aluminum Alloys	2024-T4/T6, 2014, 6061-T6/T651, 7075-T6			10mm	12mm	16mm	20mm	25mm
						Slotting up to 1x Dia. Deep	548-731	0.0762	0.1016
			Profiling up to 60% of Dia	548-731	0.1016	0.1270	0.1778	0.2032	0.2540



# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: AXMG45

### DESCRIPTION: 2 FLUTE - 45° HELIX END MILLS FOR ALUMINUM APPLICATIONS

Material Guide		Condition	SFM	CHIP PER TOOTH																			
				1/16"	3/32"	1/8"	5/32"	3/16"	7/32"	1/4"	9/32"	5/16"	11/32"	3/8"	13/32"	7/16"	15/32"	1/2"	5/8"	3/4"	1"	1-1/4"	
ISO-N	Aluminum+ Aluminum Alloys	6061-T6/T651, 7075-T6, 2024-T4/T6, 2014	Slotting	1000	0.0004	0.0006	0.0008	0.0012	0.0016	0.0016	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0040	0.0048	0.0056	0.0060
		≤ 75% Dia. Profiling	1200	0.0010	0.0015	0.0020	0.0022	0.0024	0.0026	0.0032	0.0036	0.0040	0.0044	0.0048	0.0052	0.0054	0.0060	0.0064	0.0080	0.0096	0.0112	0.0126	
	Copper	Red Brass, High Lead Brass, Yellow Brass, C-17200, Naval Brass, A-17, High Silicon Bronze	Slotting	800	0.0004	0.0006	0.0008	0.0008	0.0009	0.0012	0.0016	0.0017	0.0018	0.0019	0.0020	0.0021	0.0022	0.0023	0.0024	0.0032	0.0032	0.0040	0.0050
			≤ 75% Dia. Profiling	875	0.0006	0.0007	0.0011	0.0011	0.0011	0.0016	0.0022	0.0024	0.0025	0.0027	0.0028	0.0029	0.0030	0.0032	0.0034	0.0045	0.0045	0.0056	0.0065
	Copper Alloys	Low Silicon Bronze, Alum/Bronze, Beryllium Copper, Nickel Silver, Oxygen-Free Copper	Slotting	500	0.0004	0.0006	0.0008	0.0080	0.0009	0.0012	0.0016	0.0017	0.0018	0.0019	0.0020	0.0021	0.0022	0.0023	0.0024	0.0032	0.0032	0.0040	0.0048
			≤ 75% Dia. Profiling	600	0.0006	0.0007	0.0011	0.0011	0.0012	0.0017	0.0022	0.0024	0.0025	0.0027	0.0028	0.0030	0.0031	0.0032	0.0034	0.0045	0.0045	0.0056	0.0065
	Magnesium		Slotting	1000	0.0004	0.0006	0.0008	0.0012	0.0016	0.0017	0.0018	0.0020	0.0021	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0048	0.0064	0.0072	0.0080
			≤ 75% Dia. Profiling	1200	0.0010	0.0015	0.0020	0.0022	0.0024	0.0028	0.0032	0.0036	0.0040	0.0044	0.0048	0.0052	0.0054	0.0060	0.0064	0.0080	0.0096	0.0112	0.0126
	Plastics	Acrylics, Polycarbonate, Phenolics	Slotting	350	0.0010	0.0015	0.0020	0.0022	0.0024	0.0028	0.0032	0.0036	0.0040	0.0044	0.0048	0.0052	0.0054	0.0060	0.0064	0.0080	0.0096	0.0100	0.0104
			≤ 75% Dia. Profiling	400	0.0004	0.0006	0.0008	0.0012	0.0016	0.0020	0.0024	0.0026	0.0028	0.0030	0.0032	0.0036	0.0040	0.0044	0.0048	0.0064	0.0080	0.0090	0.0100

Material Guide		Condition	M/ MIN	CHIP PER TOOTH - METRIC												
				3mm	4mm	5mm	6mm	8mm	10mm	12mm	14mm	16mm	18mm	20mm	25mm	
ISO-N	Aluminum+ Aluminum Alloys	6061-T6/T651, 7075-T6, 2024-T4/T6, 2014	Slotting	400	0.0203	0.0406	0.0456	0.0508	0.0610	0.0813	0.1016	0.1056	0.1118	0.1153	0.1219	0.1422
		≤ 75% Dia. Profiling	550	0.0508	0.0813	0.0914	0.1016	0.1219	0.1626	0.2032	0.2112	0.2184	0.2302	0.2438	0.2845	
	Copper	Red Brass, High Lead Brass, Yellow Brass, C-17200, Naval Brass, A-17, High Silicon Bronze	Slotting	243	0.0203	0.0406	0.0435	0.0457	0.0508	0.0610	0.0813	0.0832	0.0836	0.0840	0.0850	0.1016
			≤ 75% Dia. Profiling	325	0.0284	0.0569	0.0601	0.0635	0.0711	0.0853	0.1138	0.1141	0.1143	0.1145	0.1147	0.1422
	Copper Alloys	Low Silicon Bronze, Alum/Bronze, Beryllium Copper, Nickel Silver, Oxygen-Free Copper	Slotting	152	0.0203	0.0406	0.0432	0.0457	0.0508	0.0610	0.0813	0.0834	0.0836	0.0840	0.0854	0.1016
			≤ 75% Dia. Profiling	182	0.0284	0.0569	0.0602	0.0635	0.0711	0.0853	0.1138	0.1141	0.1143	0.1145	0.1147	0.1422
	Magnesium		Slotting	300	0.0203	0.0406	0.0452	0.0508	0.0610	0.0813	0.1219	0.1318	0.1422	0.1521	0.1626	0.1829
			≤ 75% Dia. Profiling	350	0.0508	0.0813	0.0925	0.1016	0.1219	0.1626	0.2032	0.2112	0.2235	0.2336	0.2438	0.2845
	Plastics	Acrylics, Polycarbonate, Phenolics	Slotting	150	0.0203	0.0610	0.0753	0.0914	0.0813	0.1219	0.1626	0.1727	0.1829	0.1926	0.2032	0.2845
			≤ 75% Dia. Profiling	180	0.0508	0.0813	0.0927	0.1016	0.1219	0.1626	0.2032	0.2138	0.2235	0.2334	0.2438	0.3048

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: GXMG5

### DESCRIPTION: 5 FLUTE - 45° HELIX END MILLS FOR TROCHOIDAL TOOLPATHING

Material Guide		Condition	SFM	CHIP PER TOOTH										
				1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"	
ISO-N	<b>Aluminum+ Aluminum Alloys</b>	6061-T6/T651, 7075-T6, 2024-T4/T6, 2014	≤ 35% Dia. Profiling	1200	0.0016	0.0019	0.0026	0.0032	0.0038	0.0044	0.0051	0.0064	0.0077	0.0090
	<b>Copper</b>	Red Brass, High Lead Brass, Yellow Brass, C-17200, Naval Brass, A-17, High Silicon Bronze	≤ 35% Dia. Profiling	875	0.0009	0.0009	0.0018	0.0021	0.0022	0.0025	0.0027	0.0036	0.0036	0.0045
	<b>Copper Alloys</b>	Low Silicon Bronze, Alum/Bronze, Beryllium Copper, Nickel Silver, Oxygen-Free Copper	≤ 35% Dia. Profiling	600	0.0009	0.0009	0.0018	0.0020	0.0022	0.0025	0.0027	0.0036	0.0036	0.0045
	<b>Magnesium</b>		≤ 35% Dia. Profiling	1200	0.0016	0.0019	0.0026	0.0032	0.0038	0.0045	0.0051	0.0064	0.0077	0.0090

Material Guide		Condition	M/ MIN	CHIP PER TOOTH - METRIC									
				3mm	4mm	5mm	6mm	8mm	10mm	12mm	16mm	20mm	
ISO-N	<b>Aluminum+ Aluminum Alloys</b>	6061-T6/T651, 7075-T6, 2024-T4/T6, 2014	≤ 35% Dia. Profiling	550	0.0508	0.0813	0.0915	0.1016	0.1219	0.1626	0.2032	0.2184	0.2438
	<b>Copper</b>	Red Brass, High Lead Brass, Yellow Brass, C-17200, Naval Brass, A-17, High Silicon Bronze	≤ 35% Dia. Profiling	325	0.0284	0.0569	0.0602	0.0635	0.0711	0.0853	0.1138	0.1143	0.1138
	<b>Copper Alloys</b>	Low Silicon Bronze, Alum/Bronze, Beryllium Copper, Nickel Silver, Oxygen-Free Copper	≤ 35% Dia. Profiling	182	0.0284	0.0569	0.0601	0.0635	0.0711	0.0853	0.1138	0.1143	0.1138
	<b>Magnesium</b>		≤ 35% Dia. Profiling	350	0.0508	0.0813	0.0915	0.1016	0.1219	0.1626	0.2032	0.2235	0.2438

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: ALMG

DESCRIPTION: 2 FLUTE - 35° HELIX - FOR LIGHT DUTY CNC MACHINES

Material Guide		Condition	SFM	CHIP PER TOOTH										
				1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"	
ISO-N	Aluminum+ Aluminum Alloys	6061-T6/T651, 7075-T6, 2024-T4/T6, 2014	Slotting	600	0.0007	0.0014	0.0014	0.0018	0.0022	0.0025	0.0029	0.0036	0.0043	0.0050
			25-50% Dia. Profiling	800	0.0018	0.0022	0.0029	0.0036	0.0043	0.0050	0.0058	0.0072	0.0086	0.0101
	Copper	Red Brass, High Lead Brass, Yellow Brass, C-17200, Naval Brass, A-17, High Silicon Bronze	Slotting	575	0.0007	0.0007	0.0014	0.0018	0.0018	0.0020	0.0022	0.0029	0.0029	0.0036
			25-50% Dia. Profiling	625	0.0010	0.0010	0.0020	0.0023	0.0025	0.0028	0.0031	0.0041	0.0041	0.0050
	Magnesium		Slotting	600	0.0007	0.0014	0.0014	0.0018	0.0022	0.0023	0.0029	0.0043	0.0058	0.0065
			25-50% Dia. Profiling	800	0.0018	0.0022	0.0029	0.0036	0.0043	0.0050	0.0058	0.0072	0.0086	0.0101
	Plastics	Acrylics, Polycarbonate, Phenolics	Slotting	350	0.0018	0.0022	0.0029	0.0036	0.0043	0.0050	0.0058	0.0072	0.0086	0.0090
			25-50% Dia. Profiling	400	0.0007	0.0014	0.0022	0.0025	0.0029	0.0036	0.0043	0.0058	0.0072	0.0081

Material Guide		Condition	M/MIN	CHIP PER TOOTH - METRIC										
				3mm	4mm	5mm	6mm	8mm	10mm	12mm	16mm	20mm	25mm	
ISO-N	Aluminum+ Aluminum Alloys	6061-T6/T651, 7075-T6, 2024-T4/T6, 2014	Slotting	400	0.0183	0.0365	0.0410	0.0457	0.0549	0.0732	0.0914	0.1006	0.1097	0.1280
			25-50% Dia. Profiling	550	0.0457	0.0732	0.0824	0.0914	0.1097	0.1463	0.1829	0.1966	0.2194	0.2561
	Copper	Red Brass, High Lead Brass, Yellow Brass, C-17200, Naval Brass, A-17, High Silicon Bronze	Slotting	243	0.0183	0.0365	0.0391	0.0411	0.0457	0.0549	0.0732	0.0732	0.0732	0.0914
			25-50% Dia. Profiling	325	0.0256	0.0512	0.0542	0.0572	0.0640	0.0768	0.1024	0.1029	0.1024	0.1280
	Magnesium		Slotting	275	0.0183	0.0365	0.0410	0.0457	0.0549	0.0732	0.1097	0.1280	0.1463	0.1646
			25-50% Dia. Profiling	350	0.0457	0.0732	0.0824	0.0914	0.1097	0.1463	0.1829	0.2012	0.2194	0.2561
	Plastics	Acrylics, Polycarbonate, Phenolics	Slotting	150	0.0183	0.0549	0.0677	0.0823	0.0732	0.1097	0.1463	0.1646	0.1829	0.2561
			25-50% Dia. Profiling	180	0.0457	0.0732	0.0824	0.0914	0.1097	0.1463	0.1829	0.2012	0.2194	0.2743

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: ELMG

DESCRIPTION: 3 FLUTE - 35° HELIX - FOR LIGHT DUTY CNC MACHINES

Material Guide			Condition	SFM	CHIP PER TOOTH									
					1/8"	3/16"	1/4"	5/16	3/8"	7/16	1/2"	5/8"	3/4"	1"
ISO-N	Aluminum+Aluminum Alloys	2024-T4/T6, 2014, 6061-T6/T651, 7075-T6	Slotting	600	0.0007	0.0014	0.0014	0.0018	0.0022	0.0025	0.0029	0.0036	0.0043	0.0050
			25-50% Dia. Profiling	800	0.0018	0.0022	0.0029	0.0036	0.0043	0.0050	0.0058	0.0072	0.0086	0.0101
	Copper	Red Brass, High Lead Brass, Yellow Brass, C-17200, Navel Brass, A-17, High Silicon Bronze	Slotting	575	0.0007	0.0007	0.0014	0.0018	0.0018	0.0020	0.0022	0.0029	0.0029	0.0036
			26-50% Dia. Profiling	625	0.0010	0.0010	0.0020	0.0023	0.0025	0.0028	0.0031	0.0041	0.0041	0.0050
Magnesium			Slotting	600	0.0007	0.0014	0.0014	0.0018	0.0022	0.0023	0.0029	0.0043	0.0058	0.0065
			27-50% Dia. Profiling	800	0.0018	0.0022	0.0029	0.0036	0.0043	0.0050	0.0058	0.0072	0.0086	0.0101

Material Guide			Condition	M/MIN	CHIP PER TOOTH - METRIC									
					3mm	4mm	5mm	6mm	8mm	10mm	12mm	16mm	20mm	25mm
ISO-N	Aluminum+Aluminum Alloys	2024-T4/T6, 2014, 6061-T6/T651, 7075-T6	Slotting	275	0.0183	0.0365	0.0410	0.0457	0.0549	0.0732	0.0914	0.1006	0.1097	0.1280
			25-50% Dia. Profiling	350	0.0457	0.0732	0.0824	0.0914	0.1097	0.1463	0.1829	0.1966	0.2194	0.2561
	Copper	Red Brass, High Lead Brass, Yellow Brass, C-17200, Navel Brass, A-17, High Silicon Bronze	Slotting	243	0.0183	0.0365	0.0391	0.0411	0.0457	0.0549	0.0732	0.0732	0.0732	0.0914
			26-50% Dia. Profiling	325	0.0256	0.0512	0.0542	0.0572	0.0640	0.0768	0.1024	0.1029	0.1024	0.1280
Magnesium			Slotting	275	0.0183	0.0365	0.0410	0.0457	0.0549	0.0732	0.1097	0.1280	0.1463	0.1646
			27-50% Dia. Profiling	350	0.0457	0.0732	0.0824	0.0914	0.1097	0.1463	0.1829	0.2012	0.2194	0.2561

# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MTi4 - PROFILING

### DESCRIPTION: 4 FLUTE - PROFILING - VARIABLE HELIX FOR ROUGHING & FINISHING

FOR SLOTTING - SEE CHART FOR MTi4 FOR SLOTTING

Material Guide		Condition	SFM	FL	CHIP PER TOOTH									
					1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation 13-8, 15-5, 17-4PH	High Speed Profiling @ Full Length Axial	450	4	0.0013	0.0018	0.0024	0.0031	0.0037	0.0049	0.0062	0.0074	0.0099	
		Profiling @ Full Length Axial	325	4	0.0013	0.0017	0.0024	0.0031	0.0036	0.0047	0.0060	0.0071	0.0096	
	Austenitic 302, 303, 304L, 316L	High Speed Profiling @ Full Length Axial	475	4	0.0015	0.0020	0.0029	0.0038	0.0044	0.0060	0.0074	0.0089	0.0119	
		Profiling @ Full Length Axial	325	4	0.0015	0.0021	0.0028	0.0037	0.0043	0.0057	0.0071	0.0085	0.0114	
	Martensitic 403, 410, 416	High Speed Profiling @ Full Length Axial	500	4	0.0014	0.0020	0.0026	0.0034	0.0040	0.0053	0.0066	0.0080	0.0106	
		Profiling @ Full Length Axial	375	4	0.0015	0.0023	0.0030	0.0040	0.0045	0.0061	0.0076	0.0090	0.0122	
ISO-P	High Strength Steels 4140, 4340, 52100	High Speed Profiling @ Full Length Axial	500	4	0.0014	0.0020	0.0026	0.0034	0.0040	0.0053	0.0066	0.0080	0.0106	
		Profiling @ Full Length Axial	375	4	0.0015	0.0024	0.0030	0.0040	0.0045	0.0061	0.0076	0.0090	0.0122	
	High Alloy Steels Mold & Die A-2, P20, 01, 02, D2, H-13	High Speed Profiling @ Full Length Axial	475	4	0.0012	0.0017	0.0023	0.0030	0.0034	0.0044	0.0056	0.0067	0.0090	
		Profiling @ Full Length Axial	350	4	0.0014	0.0019	0.0025	0.0033	0.0039	0.0051	0.0064	0.0077	0.0103	
	Medium Alloy Steels 200,250, 300	High Speed Profiling @ Full Length Axial	425	4	0.0014	0.0020	0.0026	0.0034	0.0040	0.0053	0.0066	0.0080	0.0106	
		Profiling @ Full Length Axial	375	4	0.0015	0.0024	0.0030	0.0040	0.0045	0.0061	0.0076	0.0090	0.0122	
	Low Alloy Steels-Maraging 10XX, 11XX, 13XX	High Speed Profiling @ Full Length Axial	525	4	0.0015	0.0024	0.0029	0.0038	0.0043	0.0058	0.0072	0.0087	0.0117	
		Profiling @ Full Length Axial	400	4	0.0017	0.0025	0.0034	0.0044	0.0060	0.0066	0.0083	0.0100	0.0133	
	ISO-K	Ductile Iron ASTM A536, ASTM 897	High Speed Profiling @ Full Length Axial	475	4	0.0011	0.0015	0.0021	0.0027	0.0032	0.0042	0.0053	0.0062	0.0083
			Profiling @ Full Length Axial	350	4	0.0013	0.0016	0.0024	0.0031	0.0036	0.0047	0.0060	0.0071	0.0096
Cast Iron Grey Cast Iron		High Speed Profiling @ Full Length Axial	500	4	0.0013	0.0019	0.0024	0.0031	0.0037	0.0050	0.0062	0.0075	0.0100	
		Profiling @ Full Length Axial	375	4	0.0015	0.0023	0.0028	0.0037	0.0043	0.0057	0.0071	0.0085	0.0114	
ISO-S	Titanium Alloys 6AL-4V, ASTM 1, 2, 3, 6AL-2S	High Speed Profiling @ Full Length Axial	425	4	0.0012	0.0017	0.0023	0.0030	0.0034	0.0045	0.0057	0.0068	0.0090	
		Profiling @ Full Length Axial	300	4	0.0012	0.0017	0.0022	0.0029	0.0034	0.0043	0.0055	0.0065	0.0087	

For 5553, decrease SFM and IPM by 25%

MTi4 Stepmover for Dynamic Milling shouldn't surpass 25% of Dia inside

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MT14 FOR SLOTTING

### DESCRIPTION: 4 FLUTE - SLOTting - VARIABLE HELIX FOR ROUGHING & FINISHING

FOR PROFILING - SEE CHART FOR MT14 FOR PROFILING

Material Guide			Condition	SFM	FL	CHIP PER TOOTH								
						1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ $\leq 1 \times D$	250	4	0.0008	0.0013	0.0017	0.0022	0.0024	0.0033	0.0041	0.0050	0.0067
	Austenitic	302, 303, 304L, 316L	Slotting @ $\leq 1 \times D$	275	4	0.0010	0.0015	0.0019	0.0025	0.0030	0.0040	0.0050	0.0059	0.0079
	Martensitic	403, 410, 416	Slotting @ $\leq 1 \times D$	300	4	0.0011	0.0017	0.0021	0.0027	0.0031	0.0042	0.0053	0.0063	0.0085
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ $\leq 1 \times D$	300	4	0.0011	0.0016	0.0021	0.0027	0.0031	0.0042	0.0053	0.0063	0.0085
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ $\leq 1 \times D$	275	4	0.0008	0.0013	0.0018	0.0024	0.0027	0.0035	0.0045	0.0053	0.0071
	Medium Alloy Steels	200,250, 300	Slotting @ $\leq 1 \times D$	325	4	0.0006	0.0006	0.0018	0.0024	0.0029	0.0036	0.0048	0.0061	0.0073
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ $\leq 1 \times D$	325	4	0.0012	0.0018	0.0023	0.0030	0.0035	0.0046	0.0058	0.0069	0.0092
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ $\leq 1 \times D$	400	4	0.0006	0.0010	0.0012	0.0016	0.0018	0.0024	0.0030	0.0036	0.0048
	Ductile Cast Iron													
	Cast Iron Grey Cast Iron	SAE J431, ASTM A48	Slotting @ $\leq 1 \times D$	450	4	0.0007	0.0012	0.0015	0.0019	0.0022	0.0029	0.0036	0.0044	0.0058
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ $\leq 1 \times D$	275	4	0.0007	0.0012	0.0016	0.0020	0.0023	0.0030	0.0038	0.0046	0.0061

For 5553, decrease SFM and IPM by 25%

Long and Extra Long LOC should have feed reduced by 50%

# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MTI5 - PROFILING

### DESCRIPTION: 5 FLUTE - PROFILING - VARIABLE INDEX FOR ROUGHING & FINISHING

FOR SLOTTING - SEE CHART FOR MTI5 FOR SLOTTING

Material Guide			Condition	SFM	FL	CHIP PER TOOTH										
						1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	1-1/4"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	High Speed Profiling @ Full Length Axial	450	5	0.0013	0.0018	0.0024	0.0031	0.0037	0.0049	0.0062	0.0074	0.0099	0.0123	
			Profiling @ Full Length Axial	325	5	0.0013	0.0017	0.0024	0.0031	0.0036	0.0047	0.0060	0.0071	0.0096	0.0120	
	Austenitic	302, 303, 304L, 316L	High Speed Profiling @ Full Length Axial	475	5	0.0015	0.0020	0.0029	0.0038	0.0044	0.0060	0.0074	0.0089	0.0119	0.0148	
			Profiling @ Full Length Axial	325	5	0.0015	0.0021	0.0028	0.0037	0.0043	0.0057	0.0071	0.0085	0.0114	0.0143	
	Martensitic	403, 410, 416	High Speed Profiling @ Full Length Axial	500	5	0.0014	0.0020	0.0026	0.0034	0.0040	0.0053	0.0066	0.0080	0.0106	0.0132	
			Profiling @ Full Length Axial	375	5	0.0015	0.0023	0.0030	0.0040	0.0045	0.0061	0.0076	0.0090	0.0122	0.0152	
ISO-P	High Strength Steels	4140, 4340, 52100	High Speed Profiling @ Full Length Axial	500	5	0.0014	0.0020	0.0026	0.0034	0.0040	0.0053	0.0066	0.0080	0.0106	0.0132	
			Profiling @ Full Length Axial	375	5	0.0015	0.0024	0.0030	0.0040	0.0045	0.0061	0.0076	0.0090	0.0122	0.0152	
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	High Speed Profiling @ Full Length Axial	475	5	0.0012	0.0017	0.0023	0.0030	0.0034	0.0044	0.0056	0.0067	0.0090	0.0113	
			Profiling @ Full Length Axial	350	5	0.0014	0.0019	0.0025	0.0033	0.0039	0.0051	0.0064	0.0077	0.0103	0.0128	
	Medium Alloy Steels	200,250, 300	High Speed Profiling @ Full Length Axial	425	5	0.0014	0.0020	0.0026	0.0034	0.0040	0.0053	0.0066	0.0080	0.0106	0.0132	
			Profiling @ Full Length Axial	375	5	0.0015	0.0024	0.0030	0.0040	0.0045	0.0061	0.0076	0.0090	0.0122	0.0152	
	Low Alloy Steels- Maraging	10XX, 11XX, 13XX	High Speed Profiling @ Full Length Axial	525	5	0.0015	0.0024	0.0029	0.0038	0.0043	0.0058	0.0072	0.0087	0.0117	0.0146	
			Profiling @ Full Length Axial	400	5	0.0017	0.0025	0.0034	0.0044	0.0060	0.0066	0.0083	0.0100	0.0133	0.0167	
	ISO-K	Ductile Iron Ductile Cast Iron	ASTM A536, ASTM 897	High Speed Profiling @ Full Length Axial	475	5	0.0011	0.0015	0.0021	0.0027	0.0032	0.0042	0.0053	0.0062	0.0083	0.0104
				Profiling @ Full Length Axial	350	5	0.0013	0.0016	0.0024	0.0031	0.0036	0.0047	0.0060	0.0071	0.0096	0.0120
Cast Iron Grey Cast Iron		SAE J431, ASTM A48	High Speed Profiling @ Full Length Axial	500	5	0.0013	0.0019	0.0024	0.0031	0.0037	0.0050	0.0062	0.0075	0.0100	0.0124	
			Profiling @ Full Length Axial	375	5	0.0015	0.0023	0.0028	0.0037	0.0043	0.0057	0.0071	0.0085	0.0114	0.0143	
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	High Speed Profiling @ Full Length Axial	425	5	0.0012	0.0017	0.0023	0.0030	0.0034	0.0045	0.0057	0.0068	0.0090	0.0113	
			Profiling @ Full Length Axial	300	5	0.0012	0.0017	0.0022	0.0029	0.0034	0.0043	0.0055	0.0065	0.0087	0.0109	

For 5553, decrease SFM and IPM by 25%

MTI5 Stepover for Dynamic Milling shouldn't surpass 25% of Dia. inside



# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MT15 FOR SLOTTING

### DESCRIPTION: 5 FLUTE - SLOTTING - VARIABLE INDEX FOR ROUGHING & FINISHING

FOR PROFILING - SEE CHART FOR MT15 FOR PROFILING

Material Guide			Condition	SFM	FL	CHIP PER TOOTH									
						1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	1-1/4"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ 1 x D	250	5	0.0008	0.0013	0.0017	0.0022	0.0024	0.0033	0.0041	0.0050	0.0067	0.0083
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ 1 x D	275	5	0.0010	0.0015	0.0019	0.0025	0.0030	0.0040	0.0050	0.0059	0.0079	0.0098
	Martensitic	403, 410, 416	Slotting @ ≤ 1 x D	300	5	0.0011	0.0017	0.0021	0.0027	0.0031	0.0042	0.0053	0.0063	0.0085	0.0105
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ 1 x D	300	5	0.0011	0.0016	0.0021	0.0027	0.0031	0.0042	0.0053	0.0063	0.0085	0.0105
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ 1 x D	275	5	0.0008	0.0013	0.0018	0.0024	0.0027	0.0035	0.0045	0.0053	0.0071	0.0090
	Medium Alloy Steels	200,250, 300	Slotting @ ≤ 1 x D	325	5	0.0006	0.0006	0.0018	0.0024	0.0029	0.0036	0.0048	0.0061	0.0073	0.0091
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ 1 x D	325	5	0.0012	0.0018	0.0023	0.0030	0.0035	0.0046	0.0058	0.0069	0.0092	0.0115
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ 1 x D	400	5	0.0006	0.0010	0.0012	0.0016	0.0018	0.0024	0.0030	0.0036	0.0048	0.0061
	Ductile Cast Iron														
	Cast Iron Grey Cast Iron	SAE J431, ASTM A48	Slotting @ ≤ 1 x D	450	5	0.0007	0.0012	0.0015	0.0019	0.0022	0.0029	0.0036	0.0044	0.0058	0.0073
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ 1 x D	275	5	0.0007	0.0012	0.0016	0.0020	0.0023	0.0030	0.0038	0.0046	0.0061	0.0076

For 5553, decrease SFM and IPM by 25%

Long and Extra Long LOC should have feed reduced by 50%

# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MTI7 - PROFILING

### DESCRIPTION: 7 FLUTE - PROFILING - VARIABLE HELIX FOR ROUGHING & FINISHING

Material Guide			Condition	SFM	FL	CHIP PER TOOTH								
						1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	High Speed Profiling @ Full Length Axial	450	7	0.0013	0.0018	0.0024	0.0037	0.0049	0.0062	0.0074	0.0099	
			Profiling @ Full Length Axial	325	7	0.0013	0.0017	0.0024	0.0036	0.0047	0.0060	0.0071	0.0096	
	Austenitic	302, 303, 304L, 316L	High Speed Profiling @ Full Length Axial	475	7	0.0015	0.0020	0.0029	0.0044	0.0060	0.0074	0.0089	0.0119	
			Profiling @ Full Length Axial	325	7	0.0015	0.0021	0.0028	0.0043	0.0057	0.0071	0.0085	0.0114	
	Martensitic	403, 410, 416	High Speed Profiling @ Full Length Axial	500	7	0.0014	0.0020	0.0026	0.0040	0.0053	0.0066	0.0080	0.0106	
			Profiling @ Full Length Axial	375	7	0.0015	0.0023	0.0030	0.0045	0.0061	0.0076	0.0090	0.0122	
ISO-P	High Strength Steels	4140, 4340, 52100	High Speed Profiling @ Full Length Axial	500	7	0.0014	0.0020	0.0026	0.0040	0.0053	0.0066	0.0080	0.0106	
			Profiling @ Full Length Axial	375	7	0.0015	0.0024	0.0030	0.0045	0.0061	0.0076	0.0090	0.0122	
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	High Speed Profiling @ Full Length Axial	475	7	0.0012	0.0017	0.0023	0.0034	0.0044	0.0056	0.0067	0.0090	
			Profiling @ Full Length Axial	350	7	0.0014	0.0019	0.0025	0.0039	0.0051	0.0064	0.0077	0.0103	
	Medium Alloy Steels	200,250, 300	High Speed Profiling @ Full Length Axial	425	7	0.0014	0.0020	0.0026	0.0040	0.0053	0.0066	0.0080	0.0106	
			Profiling @ Full Length Axial	375	7	0.0015	0.0024	0.0030	0.0045	0.0061	0.0076	0.0090	0.0122	
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	High Speed Profiling @ Full Length Axial	525	7	0.0015	0.0024	0.0029	0.0043	0.0058	0.0072	0.0087	0.0117	
			Profiling @ Full Length Axial	400	7	0.0017	0.0025	0.0034	0.0060	0.0066	0.0083	0.0100	0.0133	
	ISO-K	Ductile Iron	ASTM A536, ASTM 897	High Speed Profiling @ Full Length Axial	475	7	0.0011	0.0015	0.0021	0.0032	0.0042	0.0053	0.0062	0.0083
		Profiling @ Full Length Axial		350	7	0.0013	0.0016	0.0024	0.0036	0.0047	0.0060	0.0071	0.0096	
Cast Iron		SAE J431, ASTM A48	High Speed Profiling @ Full Length Axial	500	7	0.0013	0.0019	0.0024	0.0037	0.0050	0.0062	0.0075	0.0100	
Grey Cast Iron			Profiling @ Full Length Axial	375	7	0.0015	0.0023	0.0028	0.0043	0.0057	0.0071	0.0085	0.0114	
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	High Speed Profiling @ Full Length Axial	425	7	0.0012	0.0017	0.0023	0.0034	0.0045	0.0057	0.0068	0.0090	
			Profiling @ Full Length Axial	300	7	0.0012	0.0017	0.0022	0.0034	0.0043	0.0055	0.0065	0.0087	

For 5553, decrease SFM and IPM by 25%

MTI7 Stepmover for Dynamic Milling shouldn't surpass 10% of Dia and Should be 7% or less

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MNI4

### DESCRIPTION: 4 FLUTE - VARIABLE HELIX FOR ROUGHING & FINISHING

Material Guide		Condition	SFM	CHIP PER TOOTH										
				FL	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ $\leq 1 \times D$	225	4	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	225	4	0.0008	0.0012	0.0016	0.0019	0.0024	0.0032	0.0040	0.0048	0.0064
	Austenitic	302, 303, 304L, 316L	Slotting @ $\leq 1 \times D$	225	4	0.0007	0.0010	0.0013	0.0016	0.0020	0.0026	0.0033	0.0040	0.0053
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	250	4	0.0009	0.0013	0.0018	0.0021	0.0026	0.0035	0.0044	0.0053	0.0070
	Martensitic	403, 410, 416	Slotting @ $\leq 1 \times D$	300	4	0.0007	0.0011	0.0014	0.0017	0.0021	0.0028	0.0035	0.0042	0.0056
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	325	4	0.0009	0.0014	0.0018	0.0022	0.0027	0.0036	0.0045	0.0054	0.0072
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ $.5 \times D$	95	4	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	150	4	0.0008	0.0012	0.0016	0.0019	0.0024	0.0032	0.0040	0.0048	0.0064
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ $.5 \times D$	95	4	0.0007	0.0010	0.0013	0.0016	0.0020	0.0026	0.0033	0.0040	0.0053
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	150	4	0.0009	0.0013	0.0018	0.0021	0.0026	0.0035	0.0044	0.0053	0.0070
	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting @ $.5 \times D$	95	4	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	130	4	0.0008	0.0012	0.0016	0.0019	0.0024	0.0032	0.0040	0.0048	0.0064
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ $\leq 1 \times D$	325	4	0.0004	0.0006	0.0008	0.0010	0.0012	0.0016	0.0020	0.0024	0.0032
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	400	4	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ $\leq 1 \times D$	275	4	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	350	4	0.0008	0.0012	0.0016	0.0019	0.0024	0.0032	0.0040	0.0048	0.0064

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MNI5

### DESCRIPTION: 5 FLUTE - VARIABLE HELIX FOR ROUGHING & FINISHING

Material Guide		Condition	SFM	FL	CHIP PER TOOTH									
					1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ $\leq 1 \times D$	225	5	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	225	5	0.0008	0.0012	0.0016	0.0019	0.0024	0.0032	0.0040	0.0048	0.0064
	Austenitic	302, 303, 304L, 316L	Slotting @ $\leq 1 \times D$	225	5	0.0007	0.0010	0.0013	0.0016	0.0020	0.0026	0.0033	0.0040	0.0053
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	250	5	0.0009	0.0013	0.0018	0.0021	0.0026	0.0035	0.0044	0.0053	0.0070
	Martensitic	403, 410, 416	Slotting @ $\leq 1 \times D$	300	5	0.0007	0.0011	0.0014	0.0017	0.0021	0.0028	0.0035	0.0042	0.0056
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	325	5	0.0009	0.0014	0.0018	0.0022	0.0027	0.0036	0.0045	0.0054	0.0072
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ $.5 \times D$	95	5	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	150	5	0.0008	0.0012	0.0016	0.0019	0.0024	0.0032	0.0040	0.0048	0.0064
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ $.5 \times D$	95	5	0.0007	0.0010	0.0013	0.0016	0.0020	0.0026	0.0033	0.0040	0.0053
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	150	5	0.0009	0.0013	0.0018	0.0021	0.0026	0.0035	0.0044	0.0053	0.0070
	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting @ $.5 \times D$	95	5	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	130	5	0.0008	0.0012	0.0016	0.0019	0.0024	0.0032	0.0040	0.0048	0.0064
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ $\leq 1 \times D$	325	5	0.0004	0.0006	0.0008	0.0010	0.0012	0.0016	0.0020	0.0024	0.0032
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	400	5	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ $\leq 1 \times D$	275	5	0.0006	0.0009	0.0012	0.0014	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .15 D$ Radial	350	5	0.0008	0.0012	0.0016	0.0019	0.0024	0.0032	0.0040	0.0048	0.0064

# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: VXMG3T

### DESCRIPTION: 3 FLUTE - VARIABLE FLUTE - HP ROUGHING & FINISHING APPLICATIONS

Material Guide			Condition	SFM	FL	CHIP PER TOOTH					
						1/32"	3/64"	0.055"	1/16"	5/64"	3/32"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ $\leq .5 \times D$	250	3	0.00016	0.00025	0.00030	0.00033	0.00048	0.00055
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	325	3	0.00027	0.00039	0.00046	0.00052	0.00081	0.00092
ISO-M	Martensitic	403, 410, 416	Slotting @ $\leq .5 \times D$	250	3	0.00016	0.00025	0.00030	0.00033	0.00048	0.00055
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	325	3	0.00027	0.00039	0.00046	0.00052	0.00081	0.00092
ISO-S	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ $.5 \times D$	75	3	0.00010	0.00016	0.00020	0.00021	0.00031	0.00035
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	115	3	0.00017	0.00025	0.00029	0.00034	0.00052	0.00059
ISO-P	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ $.5 \times D$	375	3	0.00013	0.00020	0.00023	0.00026	0.00039	0.00044
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	325	3	0.00022	0.00031	0.00036	0.00042	0.00065	0.00073
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ $.5 \times D$	175	3	0.00016	0.00025	0.00030	0.00033	0.00048	0.00055
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	325	3	0.00022	0.00031	0.00036	0.00042	0.00065	0.00073

For 5553, decrease SFM and IPM by 25%

Material Guide			Condition	M/ MIN	FL	CHIP PER TOOTH - METRIC					
						1mm	1.5mm	1.6mm	2mm	2.5mm	3mm
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ $.5 \times D$	76	3	0.00397	0.07326	0.07326	0.07326	0.01387	0.01387
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	99	3	0.00693	0.01321	0.011721	0.011721	0.02344	0.02344
ISO-M	Martensitic	403, 410, 416	Slotting @ $.5 \times D$	76	3	0.00397	0.07326	0.07326	0.07326	0.01387	0.01387
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	99	3	0.00693	0.01321	0.011721	0.011721	0.02344	0.02344
ISO-S	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ $.5 \times D$	23	3	0.00254	0.04688	0.04688	0.04688	0.00892	0.00892
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	35	3	0.00443	0.00845	0.07501	0.07501	0.01486	0.01486
ISO-P	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ $.5 \times D$	84	3	0.00317	0.05860	0.05860	0.05860	0.01123	0.01123
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	107	3	0.00555	0.01057	0.09377	0.09377	0.01849	0.01849
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ $.5 \times D$	53	3	0.00397	0.07326	0.07326	0.07326	0.01387	0.01387
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	84	3	0.00693	0.01321	0.011721	0.011721	0.02311	0.02311

For 5553, decrease SFM and IPM by 25%

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: VXMG6T

### DESCRIPTION: 6 FLUTE - VARIABLE FLUTE - ROUGHING & FINISHING APPLICATIONS

Material Guide		Condition	SFM	FL	CHIP PER TOOTH					
					3/8"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ $\leq 1 \times D$	250	6	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	325	6	0.0024	0.0033	0.0041	0.0050	0.0067
	Austenitic	302, 303, 304L, 316L	Slotting @ $\leq 1 \times D$	275	6	0.0022	0.0029	0.0036	0.0044	0.0058
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	350	6	0.0030	0.0040	0.0050	0.0059	0.0079
	Martensitic	403, 410, 416	Slotting @ $\leq 1 \times D$	300	6	0.0023	0.0031	0.0039	0.0046	0.0062
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	375	6	0.0031	0.0042	0.0053	0.0063	0.0085
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ $.5 \times D$	110	6	0.0010	0.0013	0.0017	0.0019	0.0027
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	150	6	0.0008	0.0016	0.0019	0.0024	0.0031
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ $.5 \times D$	75	6	0.0012	0.0021	0.0019	0.0031	0.0031
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	115	6	0.0013	0.0022	0.0022	0.0027	0.0027
	Iron Base	Inconel 800-802, Multimet N-155, Timken 16-26-6	Slotting @ $.5 \times D$	95	6	0.0017	0.0023	0.0028	0.0034	0.0045
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	130	6	0.0019	0.0025	0.0031	0.0038	0.0051
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ $\leq 1 \times D$	300	6	0.0023	0.0031	0.0039	0.0046	0.0062
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	375	6	0.0031	0.0042	0.0053	0.0063	0.0085
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	Slotting @ $\leq 1 \times D$	275	6	0.0019	0.0027	0.0033	0.0039	0.0052
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	350	6	0.0027	0.0035	0.0045	0.0053	0.0071
	Medium Alloy Steels	200, 250, 300	Slotting @ $\leq 1 \times D$	325	6	0.0024	0.0030	0.0042	0.0048	0.0061
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	400	6	0.0029	0.0036	0.0048	0.0061	0.0073
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ $\leq 1 \times D$	325	6	0.0025	0.0034	0.0042	0.0051	0.0068
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	400	6	0.0035	0.0046	0.0058	0.0069	0.0092
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ $\leq 1 \times D$	400	6	0.0018	0.0024	0.0030	0.0036	0.0048
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	550	6	0.0024	0.0033	0.0041	0.0050	0.0067
	Cast Iron	SAE J431, ASTM A48	Slotting @ $\leq 1 \times D$	450	6	0.0022	0.0029	0.0036	0.0044	0.0058
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	600	6	0.0030	0.0040	0.0050	0.0059	0.0079
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ $\leq 1 \times D$	175	6	0.0017	0.0022	0.0028	0.0034	0.0045
			Profiling @ $2 \times D$ Axial / $\leq .1 D$ Radial	275	6	0.0023	0.0030	0.0038	0.0046	0.0061

For 5553, decrease SFM and IPM by 25%

# SPEED & FEED INFORMATION

**Notes**  
**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: VXMG7

### DESCRIPTION: 7 FLUTE - VARIABLE FLUTE - LIGHT TO MEDIUM FINISHING APPLICATIONS

Material Guide			Condition	SFM	FL	CHIP PER TOOTH								
						1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	High Speed Profiling @ Full Length Axial / < .1 D Radial	325	7	0.0010	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077	
			Profiling @ Full Length Axial / < .08 D Radial	250	7	0.0007	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058	
	Austenitic	302, 303, 304L, 316L	High Speed Profiling @ Full Length Axial / < .1 D Radial	350	7	0.0010	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077	
			Profiling @ Full Length Axial / < .08 D Radial	275	7	0.0007	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058	
	Martensitic	403, 410, 416	High Speed Profiling @ Full Length Axial / < .1 D Radial	375	7	0.0011	0.0016	0.0022	0.0032	0.0043	0.0054	0.0065	0.0086	
			Profiling @ Full Length Axial / < .08 D Radial	250	7	0.0008	0.0013	0.0017	0.0025	0.0034	0.0042	0.0050	0.0067	
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40	High Speed Profiling @ Full Length Axial / < .1 D Radial	135	7	0.0003	0.0004	0.0005	0.0008	0.0011	0.0014	0.0016	0.0022	
			Profiling @ Full Length Axial / < .08 D Radial	110	7	0.0003	0.0005	0.0007	0.0007	0.0013	0.0016	0.0020	0.0026	
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, Perma-Nickel 300, Inconel 600	High Speed Profiling @ Full Length Axial / < .1 D Radial	120	7	0.0004	0.0005	0.0007	0.0010	0.0017	0.0016	0.0026	0.0026	
			Profiling @ Full Length Axial / < .08 D Radial	105	7	0.0004	0.0005	0.0007	0.0011	0.0018	0.0018	0.0022	0.0022	
	Iron Base	Incoloy 800-802, Multimet N-155	High Speed Profiling @ Full Length Axial / < .1 D Radial	105	7	0.0004	0.0005	0.0008	0.0013	0.0017	0.0021	0.0025	0.0033	
			Profiling @ Full Length Axial / < .08 D Radial	95	7	0.0004	0.0006	0.0009	0.0014	0.0019	0.0023	0.0028	0.0038	
ISO-P	High Strength Steels	4140, 4340, 52100	High Speed Profiling @ Full Length Axial / < .1 D Radial	425	7	0.00072	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058	
			Profiling @ Full Length Axial / < .08 D Radial	350	7	0.0005	0.0007	0.0010	0.0014	0.0019	0.0024	0.0029	0.0038	
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	High Speed Profiling @ Full Length Axial / < .1 D Radial	400	7	0.0010	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077	
			Profiling @ Full Length Axial / < .08 D Radial	300	7	0.0007	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058	
	Medium Alloy Steels	200, 250, 300	High Speed Profiling @ Full Length Axial / < .1 D Radial	375	7	0.0010	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077	
			Profiling @ Full Length Axial / < .08 D Radial	320	7	0.0007	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058	
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	High Speed Profiling @ Full Length Axial / < .1 D Radial	420	7	0.0011	0.0016	0.0022	0.0032	0.0043	0.0054	0.0065	0.0086	
			Profiling @ Full Length Axial / < .08 D Radial	350	7	0.0007	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058	
	ISO-K	Ductile Iron	ASTM A536, ASTM 897	High Speed Profiling @ Full Length Axial / < .1 D Radial	375	7	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096
		Profiling @ Full Length Axial / < .08 D Radial		300	7	0.0010	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077	
Cast Iron		SAE J431, ASTM A48	High Speed Profiling @ Full Length Axial / < .1 D Radial	425	7	0.0018	0.0027	0.0036	0.0054	0.0072	0.0090	0.0108	0.0144	
Profiling @ Full Length Axial / < .08 D Radial			325	7	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096		
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	High Speed Profiling @ Full Length Axial / < .1 D Radial	300	7	0.0010	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077	
			Profiling @ Full Length Axial / < .08 D Radial	225	7	0.0007	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058	

For S553, decrease SFM and IPM by 25%

Material Guide			Condition	M/ MIN	FL	CHIP PER TOOTH - METRIC											
						3mm	4mm	6mm	8mm	10mm	12mm	14mm	16mm	18mm	20mm	25mm	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	High Speed Profiling @ Full Length Axial / < .1 D Radial	99	7	0.0244	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951	
			Profiling @ Full Length Axial / < .08 D Radial	76	7	0.0183	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463	
	Austenitic	302, 303, 304L, 316L	High Speed Profiling @ Full Length Axial / < .1 D Radial	107	7	0.0244	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951	
			Profiling @ Full Length Axial / < .08 D Radial	84	7	0.0183	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463	
	Martensitic	403, 410, 416	High Speed Profiling @ Full Length Axial / < .1 D Radial	114	7	0.0274	0.0411	0.0549	0.0686	0.0823	0.1097	0.1234	0.1372	0.1509	0.1646	0.2195	
			Profiling @ Full Length Axial / < .08 D Radial	76	7	0.0213	0.0320	0.0427	0.0533	0.0640	0.0853	0.0960	0.1067	0.1173	0.1280	0.1707	
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40	High Speed Profiling @ Full Length Axial / < .1 D Radial	41	7	0.0076	0.0102	0.0127	0.0178	0.0203	0.0279	0.0305	0.0356	0.0381	0.0406	0.0559	
			Profiling @ Full Length Axial / < .08 D Radial	34	7	0.0076	0.0127	0.0178	0.0203	0.0178	0.0330	0.0305	0.0406	0.0381	0.0508	0.0660	
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, Perma-Nickel 300, Inconel 600	High Speed Profiling @ Full Length Axial / < .1 D Radial	37	7	0.0102	0.0127	0.0178	0.0229	0.0254	0.0432	0.0381	0.0406	0.0483	0.0660	0.0660	
			Profiling @ Full Length Axial / < .08 D Radial	32	7	0.0102	0.0127	0.0178	0.0229	0.0279	0.0457	0.0406	0.0457	0.0508	0.0559	0.0559	
	Iron Base	Incoloy 800-802, Multimet N-155	High Speed Profiling @ Full Length Axial / < .1 D Radial	32	7	0.0102	0.0127	0.0203	0.0229	0.0330	0.0432	0.0457	0.0533	0.0559	0.0635	0.0838	
			Profiling @ Full Length Axial / < .08 D Radial	29	7	0.0102	0.0152	0.0229	0.0254	0.0356	0.0483	0.0508	0.0584	0.0610	0.0711	0.0965	
ISO-P	High Strength Steels	4140, 4340, 52100	High Speed Profiling @ Full Length Axial / < .1 D Radial	130	7	0.0183	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463	
			Profiling @ Full Length Axial / < .08 D Radial	107	7	0.0122	0.0183	0.0244	0.0305	0.0366	0.0488	0.0549	0.0610	0.0671	0.0732	0.0975	
	High Alloy Steels - Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	High Speed Profiling @ Full Length Axial / < .1 D Radial	122	7	0.0244	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951	
			Profiling @ Full Length Axial / < .08 D Radial	91	7	0.0183	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463	
	Medium Alloy Steels	200, 250, 300	High Speed Profiling @ Full Length Axial / < .1 D Radial	114	7	0.0244	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951	
			Profiling @ Full Length Axial / < .08 D Radial	98	7	0.0183	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463	
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	High Speed Profiling @ Full Length Axial / < .1 D Radial	128	7	0.0274	0.0411	0.0549	0.0686	0.0823	0.1097	0.1234	0.1372	0.1509	0.1646	0.2195	
			Profiling @ Full Length Axial / < .08 D Radial	107	7	0.0183	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463	
	ISO-K	Ductile Iron	ASTM A536, ASTM 897	High Speed Profiling @ Full Length Axial / < .1 D Radial	114	7	0.0305	0.0457	0.0610	0.0762	0.0914	0.1219	0.1372	0.1524	0.1676	0.1829	0.2438
		Profiling @ Full Length Axial / < .08 D Radial		91	7	0.0244	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951	
Cast Iron		SAE J431, ASTM A48	High Speed Profiling @ Full Length Axial / < .1 D Radial	130	7	0.0457	0.0686	0.0914	0.1143	0.1372	0.1829	0.2057	0.2286	0.2515	0.2743	0.3658	
Profiling @ Full Length Axial / < .08 D Radial			99	7	0.0305	0.0457	0.0610	0.0762	0.0914	0.1219	0.1372	0.1524	0.1676	0.1829	0.2438		
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	High Speed Profiling @ Full Length Axial / < .1 D Radial	91	7	0.0244	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951	
			Profiling @ Full Length Axial / < .08 D Radial	69	7	0.0183	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463	

For S553, decrease SFM and IPM by 25%





# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: VXM9

### DESCRIPTION: 9 FLUTE - VARIABLE FLUTE - FINE FINISHING APPLICATIONS

Material Guide			Condition	SFM	FL	CHIP PER TOOTH						
						3/16"	1/4"	3/8"	1/2"	5/8"	3/4"	1"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	High Speed Profiling @ Full Length Axial / < .1 D Radial	325	9	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077
			Profiling @ Full Length Axial / < .08 D Radial	250	9	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058
	Austenitic	302, 303, 304L, 316L	High Speed Profiling @ Full Length Axial / < .1 D Radial	350	9	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077
			Profiling @ Full Length Axial / < .08 D Radial	275	9	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058
ISO-S	Martensitic	403, 410, 416	High Speed Profiling @ Full Length Axial / < .1 D Radial	375	9	0.0016	0.0022	0.0032	0.0043	0.0054	0.0065	0.0086
			Profiling @ Full Length Axial / < .08 D Radial	250	9	0.0013	0.0017	0.0025	0.0034	0.0042	0.0050	0.0067
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	High Speed Profiling @ Full Length Axial / < .1 D Radial	135	9	0.0004	0.0005	0.0008	0.0011	0.0014	0.0016	0.0022
			Profiling @ Full Length Axial / < .08 D Radial	110	9	0.0005	0.0007	0.0007	0.0013	0.0016	0.0020	0.0026
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	High Speed Profiling @ Full Length Axial / < .1 D Radial	120	9	0.0005	0.0007	0.0010	0.0017	0.0016	0.0026	0.0026
			Profiling @ Full Length Axial / < .08 D Radial	105	9	0.0005	0.0007	0.0011	0.0018	0.0018	0.0022	0.0022
	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	High Speed Profiling @ Full Length Axial / < .1 D Radial	105	9	0.0005	0.0008	0.0013	0.0017	0.0021	0.0025	0.0033
			Profiling @ Full Length Axial / < .08 D Radial	95	9	0.0006	0.0009	0.0014	0.0019	0.0023	0.0028	0.0038
ISO-P	High Strength Steels	4140, 4340, 52100	High Speed Profiling @ Full Length Axial / < .1 D Radial	425	9	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058
			Profiling @ Full Length Axial / < .08 D Radial	350	9	0.0007	0.0010	0.0014	0.0019	0.0024	0.0029	0.0038
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	High Speed Profiling @ Full Length Axial / < .1 D Radial	400	9	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077
			Profiling @ Full Length Axial / < .08 D Radial	300	9	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058
	Medium Alloy Steels	200, 250, 300	High Speed Profiling @ Full Length Axial / < .1 D Radial	375	9	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077
			Profiling @ Full Length Axial / < .08 D Radial	320	9	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	High Speed Profiling @ Full Length Axial / < .1 D Radial	420	9	0.0016	0.0022	0.0032	0.0043	0.0054	0.0065	0.0086
			Profiling @ Full Length Axial / < .08 D Radial	350	9	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058
ISO-K	Ductile Iron	ASTM A536, ASTM 897	High Speed Profiling @ Full Length Axial / < .1 D Radial	375	9	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096
			Profiling @ Full Length Axial / < .08 D Radial	300	9	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077
	Ductile Cast Iron	SAE J431, ASTM A48	High Speed Profiling @ Full Length Axial / < .1 D Radial	425	9	0.0027	0.0036	0.0054	0.0072	0.0090	0.0108	0.0144
ISO-S	Cast Iron	SAE J431, ASTM A48	High Speed Profiling @ Full Length Axial / < .1 D Radial	425	9	0.0027	0.0036	0.0054	0.0072	0.0090	0.0108	0.0144
			Profiling @ Full Length Axial / < .08 D Radial	325	9	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	High Speed Profiling @ Full Length Axial / < .1 D Radial	300	9	0.0014	0.0019	0.0029	0.0038	0.0048	0.0058	0.0077
			Profiling @ Full Length Axial / < .08 D Radial	225	9	0.0011	0.0014	0.0022	0.0029	0.0036	0.0043	0.0058

For 5553, decrease SFM and IPM by 25%

Material Guide			Condition	M/ MIN	FL	CHIP PER TOOTH - METRIC									
						4mm	6mm	8mm	10mm	12mm	14mm	16mm	18mm	20mm	25mm
ISO-M	Precipitation	13-8, 15-5, 17-4PH	High Speed Profiling @ Full Length Axial / < .1 D Radial	99	9	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951
			Profiling @ Full Length Axial / < .08 D Radial	76	9	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463
	Austenitic	302, 303, 304L, 316L	High Speed Profiling @ Full Length Axial / < .1 D Radial	107	9	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951
			Profiling @ Full Length Axial / < .08 D Radial	84	9	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463
ISO-S	Martensitic	403, 410, 416	High Speed Profiling @ Full Length Axial / < .1 D Radial	114	9	0.0411	0.0549	0.0686	0.0823	0.1097	0.1234	0.1372	0.1509	0.1646	0.2195
			Profiling @ Full Length Axial / < .08 D Radial	76	9	0.0320	0.0427	0.0533	0.0640	0.0853	0.0960	0.1067	0.1173	0.1280	0.1707
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	High Speed Profiling @ Full Length Axial / < .1 D Radial	41	9	0.0102	0.0127	0.0178	0.0203	0.0279	0.0305	0.0356	0.0381	0.0508	0.0559
			Profiling @ Full Length Axial / < .08 D Radial	34	9	0.0127	0.0178	0.0203	0.0178	0.0330	0.0305	0.0406	0.0381	0.0508	0.0660
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	High Speed Profiling @ Full Length Axial / < .1 D Radial	37	9	0.0127	0.0178	0.0229	0.0254	0.0432	0.0381	0.0406	0.0483	0.0660	0.0660
			Profiling @ Full Length Axial / < .08 D Radial	32	9	0.0127	0.0178	0.0229	0.0279	0.0457	0.0406	0.0457	0.0508	0.0559	0.0559
	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	High Speed Profiling @ Full Length Axial / < .1 D Radial	32	9	0.0127	0.0203	0.0229	0.0330	0.0432	0.0457	0.0533	0.0559	0.0635	0.0838
			Profiling @ Full Length Axial / < .08 D Radial	29	9	0.0152	0.0229	0.0254	0.0356	0.0483	0.0508	0.0584	0.0610	0.0711	0.0965
ISO-P	High Strength Steels	4140, 4340, 52100	High Speed Profiling @ Full Length Axial / < .1 D Radial	130	9	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463
			Profiling @ Full Length Axial / < .08 D Radial	107	9	0.0183	0.0244	0.0305	0.0366	0.0488	0.0549	0.0610	0.0671	0.0732	0.0975
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	High Speed Profiling @ Full Length Axial / < .1 D Radial	122	9	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951
			Profiling @ Full Length Axial / < .08 D Radial	91	9	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463
	Medium Alloy Steels	200, 250, 300	High Speed Profiling @ Full Length Axial / < .1 D Radial	114	9	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951
			Profiling @ Full Length Axial / < .08 D Radial	98	9	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	High Speed Profiling @ Full Length Axial / < .1 D Radial	128	9	0.0411	0.0549	0.0686	0.0823	0.1097	0.1234	0.1372	0.1509	0.1646	0.2195
			Profiling @ Full Length Axial / < .08 D Radial	107	9	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463
ISO-K	Ductile Iron	ASTM A536, ASTM 897	High Speed Profiling @ Full Length Axial / < .1 D Radial	114	9	0.0457	0.0610	0.0762	0.0914	0.1219	0.1372	0.1524	0.1676	0.1829	0.2438
			Profiling @ Full Length Axial / < .08 D Radial	91	9	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951
	Ductile Cast Iron	SAE J431, ASTM A48	High Speed Profiling @ Full Length Axial / < .1 D Radial	130	9	0.0686	0.0914	0.1143	0.1372	0.1829	0.2057	0.2286	0.2515	0.2743	0.3658
ISO-S	Cast Iron	SAE J431, ASTM A48	High Speed Profiling @ Full Length Axial / < .1 D Radial	130	9	0.0686	0.0914	0.1143	0.1372	0.1829	0.2057	0.2286	0.2515	0.2743	0.3658
			Profiling @ Full Length Axial / < .08 D Radial	99	9	0.0457	0.0610	0.0762	0.0914	0.1219	0.1372	0.1524	0.1676	0.1829	0.2438
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	High Speed Profiling @ Full Length Axial / < .1 D Radial	91	9	0.0366	0.0488	0.0610	0.0732	0.0975	0.1097	0.1219	0.1341	0.1463	0.1951
			Profiling @ Full Length Axial / < .08 D Radial	69	9	0.0274	0.0366	0.0457	0.0549	0.0732	0.0823	0.0914	0.1006	0.1097	0.1463

For 5553, decrease SFM and IPM by 25%



# SPEED & FEED INFORMATION

**Notes**

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: EMG35

### DESCRIPTION: 3 FLUTE - 35° FOR STAINLESS STEEL

Material Guide			Condition	SFM	FL	CHIP PER TOOTH										
						1/8"	5/32"	3/16"	7/32"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	250	3	0.0006	0.0006	0.0008	0.0009	0.0010	0.0015	0.0016	0.0020	0.0022	0.0028	0.0033
			Profiling @ 2 x D Axial / ≤ .15 D Radial	325	3	0.0008	0.0009	0.0012	0.0014	0.0015	0.0020	0.0022	0.0027	0.0030	0.0038	0.0046
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	275	3	0.0007	0.0007	0.0009	0.0011	0.0013	0.0018	0.0020	0.0024	0.0027	0.0033	0.0040
			Profiling @ 2 x D Axial / ≤ .15 D Radial	350	3	0.0009	0.0010	0.0013	0.0016	0.0017	0.0025	0.0028	0.0033	0.0037	0.0046	0.0055
Martensitic	403, 410, 416	Slotting @ ≤ .5 x D	300	3	0.0007	0.0008	0.0010	0.0012	0.0014	0.0019	0.0021	0.0026	0.0029	0.0036	0.0043	
		Profiling @ 2 x D Axial / ≤ .15 D Radial	375	3	0.0010	0.0011	0.0015	0.0017	0.0018	0.0026	0.0029	0.0035	0.0039	0.0050	0.0059	
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	110	3	0.0003	0.0003	0.0003	0.0004	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017
			Profiling @ 2 x D Axial / ≤ .15 D Radial	150	3	0.0003	0.0003	0.0003	0.0006	0.0007	0.0006	0.0007	0.0012	0.0014	0.0017	0.0022
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ ≤ .5 x D	75	3	0.0005	0.0002	0.0002	0.0006	0.0007	0.0009	0.0010	0.0017	0.0018	0.0017	0.0029
			Profiling @ 2 x D Axial / ≤ .15 D Radial	115	3	0.0005	0.0003	0.0003	0.0006	0.0007	0.0010	0.0012	0.0018	0.0020	0.0020	0.0024
Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting @ ≤ .5 x D	95	3	0.0005	0.0003	0.0005	0.0008	0.0009	0.0014	0.0015	0.0019	0.0021	0.0025	0.0031	
		Profiling @ 2 x D Axial / ≤ .15 D Radial	130	3	0.0005	0.0003	0.0005	0.0009	0.0010	0.0016	0.0017	0.0021	0.0023	0.0029	0.0035	
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	300	3	0.0007	0.0007	0.0009	0.0012	0.0014	0.0019	0.0021	0.0026	0.0029	0.0036	0.0043
			Profiling @ 2 x D Axial / ≤ .15 D Radial	375	3	0.0010	0.0010	0.0014	0.0017	0.0018	0.0026	0.0029	0.0035	0.0039	0.0050	0.0059
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	275	3	0.0006	0.0006	0.0008	0.0010	0.0012	0.0016	0.0017	0.0022	0.0024	0.0030	0.0036
			Profiling @ 2 x D Axial / ≤ .15 D Radial	350	3	0.0008	0.0009	0.0012	0.0015	0.0016	0.0022	0.0024	0.0029	0.0032	0.0042	0.0050
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ .5 x D	325	3	0.0006	0.0003	0.0005	0.0011	0.0013	0.0020	0.0022	0.0025	0.0028	0.0039	0.0045
			Profiling @ 2 x D Axial / ≤ .15 D Radial	400	3	0.0006	0.0003	0.0005	0.0015	0.0016	0.0024	0.0027	0.0030	0.0033	0.0045	0.0057
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ .5 x D	325	3	0.0008	0.0008	0.0010	0.0014	0.0015	0.0021	0.0023	0.0028	0.0031	0.0039	0.0047
			Profiling @ 2 x D Axial / ≤ .15 D Radial	400	3	0.0012	0.0012	0.0016	0.0019	0.0021	0.0029	0.0032	0.0038	0.0043	0.0054	0.0065
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ .5 x D	400	3	0.0006	0.0006	0.0008	0.0009	0.0010	0.0015	0.0016	0.0020	0.0022	0.0028	0.0033
			Profiling @ 2 x D Axial / ≤ .15 D Radial	550	3	0.0008	0.0008	0.0010	0.0014	0.0015	0.0020	0.0022	0.0027	0.0030	0.0038	0.0046
	Cast Iron	SAE J431, ASTM A48	Slotting @ ≤ .5 x D	450	3	0.0007	0.0008	0.0010	0.0011	0.0013	0.0018	0.0020	0.0024	0.0027	0.0033	0.0040
			Profiling @ 2 x D Axial / ≤ .15 D Radial	600	3	0.0009	0.0010	0.0013	0.0016	0.0017	0.0025	0.0028	0.0033	0.0037	0.0046	0.0055
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ .5 x D	175	3	0.0006	0.0005	0.0007	0.0008	0.0009	0.0014	0.0015	0.0018	0.0020	0.0025	0.0031
			Profiling @ 2 x D Axial / ≤ .15 D Radial	275	3	0.0007	0.0008	0.0010	0.0012	0.0014	0.0019	0.0021	0.0025	0.0028	0.0035	0.0043

For S553, decrease SFM and IPM by 25%

Material Guide			Condition	M/ MIN	FL	CHIP PER TOOTH - METRIC									
						3mm	4mm	5mm	6mm	8mm	10mm	12mm	14mm	16mm	20mm
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	75	3	0.0132	0.0147	0.0238	0.0264	0.0322	0.0411	0.0558	0.0646	0.0705	0.0851
			Profiling @ 2 x D Axial / ≤ .15 D Radial	99	3	0.0185	0.0206	0.0343	0.0381	0.0469	0.0558	0.0762	0.0880	0.0968	0.1173
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	84	3	0.0158	0.0176	0.0290	0.0322	0.0411	0.0499	0.0675	0.0762	0.0851	0.1027
			Profiling @ 2 x D Axial / ≤ .15 D Radial	107	3	0.0211	0.0234	0.0396	0.0440	0.0558	0.0705	0.0939	0.1056	0.1173	0.1408
Martensitic	403, 410, 416	Slotting @ ≤ .5 x D	91	3	0.0158	0.0176	0.0317	0.0352	0.0440	0.0528	0.0733	0.0821	0.0909	0.1086	
		Profiling @ 2 x D Axial / ≤ .15 D Radial	114	3	0.0238	0.0264	0.0422	0.0469	0.0587	0.0733	0.0998	0.1115	0.1261	0.1496	
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	34	3	0.0079	0.0088	0.0106	0.0118	0.0147	0.0206	0.0293	0.0352	0.0381	0.0440
			Profiling @ 2 x D Axial / ≤ .15 D Radial	46	3	0.0079	0.0088	0.0158	0.0176	0.0176	0.0176	0.0352	0.0411	0.0440	0.0558
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ ≤ .5 x D	23	3	0.0106	0.0118	0.0158	0.0176	0.0206	0.0264	0.0469	0.0469	0.0469	0.0733
			Profiling @ 2 x D Axial / ≤ .15 D Radial	35	3	0.0106	0.0118	0.0158	0.0176	0.0234	0.0293	0.0499	0.0050	0.0499	0.0616
Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting @ ≤ .5 x D	29	3	0.0106	0.0118	0.0211	0.0234	0.0293	0.0381	0.0528	0.0587	0.0646	0.0792	
		Profiling @ 2 x D Axial / ≤ .15 D Radial	40	3	0.0106	0.0118	0.0238	0.0264	0.0352	0.0440	0.0587	0.0646	0.0733	0.0880	
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	91	3	0.0158	0.0176	0.0317	0.0352	0.0440	0.0528	0.0733	0.0821	0.0909	0.1086
			Profiling @ 2 x D Axial / ≤ .15 D Radial	114	3	0.0238	0.0264	0.0422	0.0469	0.0587	0.0733	0.0998	0.1115	0.1261	0.1496
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	84	3	0.0132	0.0147	0.0264	0.0293	0.0411	0.0499	0.0616	0.0675	0.0762	0.0909
			Profiling @ 2 x D Axial / ≤ .15 D Radial	107	3	0.0185	0.0206	0.0370	0.0411	0.0499	0.0616	0.0821	0.0939	0.1056	0.1261
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ .5 x D	99	3	0.0132	0.0147	0.0290	0.0322	0.0411	0.0558	0.0705	0.0762	0.0998	0.1145
			Profiling @ 2 x D Axial / ≤ .15 D Radial	122	3	0.0132	0.0147	0.0370	0.0411	0.0528	0.0675	0.0851	0.0998	0.1145	0.1438
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ .5 x D	99	3	0.0185	0.0206	0.0343	0.0381	0.0469	0.0587	0.0792	0.0880	0.0998	0.1202
			Profiling @ 2 x D Axial / ≤ .15 D Radial	122	3	0.0264	0.0293	0.0475	0.0528	0.0675	0.0821	0.1086	0.1232	0.1379	0.1642
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ .5 x D	122	3	0.0132	0.0147	0.0238	0.0264	0.0352	0.0411	0.0558	0.0616	0.0705	0.0851
			Profiling @ 2 x D Axial / ≤ .15 D Radial	168	3	0.0185	0.0206	0.0343	0.0381	0.0440	0.0558	0.0762	0.0851	0.0968	0.1173
	Cast Iron	SAE J431, ASTM A48	Slotting @ ≤ .5 x D	140	3	0.0158	0.0176	0.0290	0.0322	0.0411	0.0499	0.0675	0.0762	0.0851	0.1027
			Profiling @ 2 x D Axial / ≤ .15 D Radial	183	3	0.0211	0.0234	0.0396	0.0440	0.0558	0.0705	0.0939	0.1056	0.1173	0.1408
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ .5 x D	53	3	0.0132	0.0147	0.0211	0.0234	0.0293	0.0381	0.0499	0.0587	0.0646	0.0792
			Profiling @ 2 x D Axial / ≤ .15 D Radial	84	3	0.0158	0.0176	0.0317	0.0352	0.0440	0.0528	0.0705	0.0792	0.0880	0.1086

For S553, decrease SFM and IPM by 25%



# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: GMG

### DESCRIPTION: 5 FLUTE - 45° FOR STAINLESS STEEL/NICKLE BASED ALLOYS

Material Guide			Condition	SFM	FL	CHIP PER TOOTH																	
						1/16	3/32"	1/8"	5/32"	3/16"	7/32"	1/4"	5/16"	3/8"	13/32"	7/16"	1/2"	9/16"	5/8"	3/4"	1"	1-1/4"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	250	5	0.0003	0.0005	0.0006	0.0006	0.0008	0.0010	0.0011	0.0015	0.0017	0.0018	0.0021	0.0023	0.0026	0.0029	0.0035	0.0047	0.0051	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	325	5	0.0004	0.0006	0.0008	0.0009	0.0012	0.0014	0.0016	0.0021	0.0023	0.0025	0.0028	0.0031	0.0036	0.0040	0.0048	0.0065	0.0071	
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	275	5	0.0004	0.0005	0.0007	0.0007	0.0010	0.0012	0.0013	0.0018	0.0020	0.0022	0.0025	0.0028	0.0031	0.0035	0.0042	0.0056	0.0062	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	350	5	0.0005	0.0007	0.0010	0.0010	0.0013	0.0016	0.0018	0.0026	0.0029	0.0031	0.0035	0.0038	0.0043	0.0048	0.0058	0.0077	0.0084	
Martensitic	403, 410, 416		Slotting @ ≤ .5 x D	300	5	0.0004	0.0005	0.0007	0.0008	0.0011	0.0013	0.0014	0.0019	0.0022	0.0024	0.0027	0.0030	0.0033	0.0037	0.0044	0.0060	0.0066	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	375	5	0.0005	0.0008	0.0011	0.0012	0.0016	0.0017	0.0019	0.0027	0.0030	0.0033	0.0037	0.0041	0.0046	0.0052	0.0061	0.0083	0.0091	
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	110	5	0.0002	0.0003	0.0004	0.0003	0.0004	0.0004	0.0005	0.0008	0.0008	0.0010	0.0011	0.0012	0.0014	0.0016	0.0018	0.0025	0.0028	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	150	5	0.0002	0.0003	0.0004	0.0003	0.0004	0.0004	0.0006	0.0007	0.0006	0.0007	0.0008	0.0012	0.0013	0.0014	0.0016	0.0018	0.0023	0.0030
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ ≤ .5 x D	75	5	0.0002	0.0004	0.0005	0.0002	0.0002	0.0006	0.0007	0.0010	0.0011	0.0016	0.0017	0.0019	0.0016	0.0018	0.0030	0.0030	0.0033	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	115	5	0.0002	0.0004	0.0005	0.0003	0.0004	0.0006	0.0007	0.0011	0.0012	0.0017	0.0018	0.0020	0.0018	0.0020	0.0025	0.0025	0.0028	
Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6		Slotting @ ≤ .5 x D	95	5	0.0002	0.0004	0.0005	0.0004	0.0005	0.0009	0.0010	0.0014	0.0016	0.0017	0.0019	0.0022	0.0024	0.0026	0.0032	0.0043	0.0048	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	130	5	0.0002	0.0004	0.0005	0.0004	0.0005	0.0010	0.0011	0.0016	0.0018	0.0019	0.0022	0.0024	0.0027	0.0030	0.0036	0.0049	0.0054	
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	300	5	0.0004	0.0005	0.0007	0.0007	0.0010	0.0013	0.0014	0.0019	0.0022	0.0024	0.0027	0.0030	0.0033	0.0037	0.0044	0.0060	0.0066	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	375	5	0.0005	0.0008	0.0011	0.0011	0.0014	0.0017	0.0019	0.0027	0.0030	0.0033	0.0037	0.0041	0.0046	0.0052	0.0061	0.0083	0.0091	
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	275	5	0.0003	0.0005	0.0006	0.0006	0.0008	0.0011	0.0012	0.0016	0.0018	0.0020	0.0023	0.0025	0.0028	0.0031	0.0037	0.0050	0.0055	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	350	5	0.0004	0.0006	0.0008	0.0009	0.0012	0.0015	0.0017	0.0023	0.0025	0.0027	0.0030	0.0034	0.0039	0.0043	0.0052	0.0070	0.0077	
	Medium Alloy Steels	200, 250, 300		Slotting @ ≤ .5 x D	325	5	0.0003	0.0005	0.0006	0.0004	0.0005	0.0012	0.0013	0.0021	0.0023	0.0023	0.0026	0.0029	0.0037	0.0041	0.0047	0.0059	0.0065
				Profiling @ 2 x D Axial / ≤ .15 D Radial	400	5	0.0003	0.0005	0.0006	0.0004	0.0005	0.0015	0.0017	0.0025	0.0028	0.0028	0.0031	0.0035	0.0042	0.0047	0.0059	0.0071	0.0078
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX		Slotting @ ≤ .5 x D	325	5	0.0004	0.0006	0.0008	0.0008	0.0011	0.0014	0.0016	0.0022	0.0024	0.0026	0.0029	0.0032	0.0037	0.0041	0.0049	0.0066	0.0073
				Profiling @ 2 x D Axial / ≤ .15 D Radial	400	5	0.0006	0.0009	0.0012	0.0013	0.0017	0.0019	0.0022	0.0030	0.0034	0.0036	0.0040	0.0044	0.0051	0.0056	0.0067	0.0090	0.0099
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ .5 x D	400	5	0.0003	0.0005	0.0006	0.0006	0.0008	0.0010	0.0011	0.0015	0.0017	0.0018	0.0021	0.0023	0.0026	0.0029	0.0035	0.0047	0.0051	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	550	5	0.0004	0.0006	0.0008	0.0008	0.0011	0.0014	0.0016	0.0021	0.0023	0.0025	0.0028	0.0031	0.0036	0.0040	0.0048	0.0065	0.0071	
	Cast Iron	SAE J431, ASTM A48	Grey Cast Iron	Slotting @ ≤ .5 x D	450	5	0.0004	0.0005	0.0007	0.0008	0.0011	0.0012	0.0013	0.0018	0.0020	0.0022	0.0025	0.0028	0.0031	0.0035	0.0042	0.0056	0.0062
				Profiling @ 2 x D Axial / ≤ .15 D Radial	600	5	0.0005	0.0007	0.0010	0.0010	0.0013	0.0016	0.0018	0.0026	0.0029	0.0031	0.0035	0.0038	0.0043	0.0048	0.0058	0.0077	0.0084
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ .5 x D	175	5	0.0003	0.0005	0.0006	0.0005	0.0007	0.0009	0.0010	0.0014	0.0016	0.0017	0.0018	0.0020	0.0024	0.0026	0.0032	0.0043	0.0048	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	275	5	0.0004	0.0005	0.0007	0.0008	0.0011	0.0013	0.0014	0.0019	0.0022	0.0023	0.0026	0.0029	0.0032	0.0036	0.0044	0.0059	0.0065	

For 5553, decrease SFM and IPM by 25%

Material Guide			Condition	M/ MIN	FL	CHIP PER TOOTH - METRIC									
						3mm	4mm	5mm	6mm	8mm	10mm	12mm	16mm	20mm	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	75	5	0.0137	0.0152	0.0247	0.0275	0.0335	0.0427	0.0580	0.0732	0.0884	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	99	5	0.0192	0.0214	0.0356	0.0396	0.0487	0.0580	0.0792	0.1006	0.1219	
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	84	5	0.0164	0.0182	0.0301	0.0335	0.0427	0.0518	0.0701	0.0884	0.1067	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	107	5	0.0219	0.0244	0.0411	0.0457	0.0580	0.0732	0.0976	0.1219	0.1463	
Martensitic	403, 410, 416		Slotting @ ≤ .5 x D	91	5	0.0164	0.0182	0.0329	0.0366	0.0457	0.0548	0.0762	0.0944	0.1128	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	114	5	0.0247	0.0275	0.0438	0.0487	0.0610	0.0762	0.1037	0.1310	0.1554	
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	34	5	0.0082	0.0091	0.0110	0.0122	0.0152	0.0214	0.0305	0.0396	0.0457	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	46	5	0.0082	0.0091	0.0164	0.0182	0.0182	0.0182	0.0366	0.0457	0.0580	
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ ≤ .5 x D	23	5	0.0110	0.0122	0.0164	0.0182	0.0214	0.0275	0.0487	0.0487	0.0762	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	35	5	0.0110	0.0122	0.0164	0.0182	0.0244	0.0305	0.0518	0.0518	0.0640	
Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6		Slotting @ ≤ .5 x D	29	5	0.0110	0.0122	0.0219	0.0244	0.0305	0.0396	0.0548	0.0671	0.0823	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	40	5	0.0110	0.0122	0.0247	0.0275	0.0366	0.0457	0.0610	0.0762	0.0914	
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	91	5	0.0164	0.0182	0.0329	0.0366	0.0457	0.0548	0.0762	0.0944	0.1128	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	114	5	0.0247	0.0275	0.0438	0.0487	0.0610	0.0762	0.1037	0.1310	0.1554	
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	84	5	0.0137	0.0152	0.0274	0.0305	0.0366	0.0457	0.0640	0.0792	0.0944	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	107	5	0.0192	0.0214	0.0384	0.0427	0.0518	0.0640	0.0853	0.1097	0.1310	
	Medium Alloy Steels	200, 250, 300		Slotting @ ≤ .5 x D	99	5	0.0137	0.0152	0.0301	0.0335	0.0457	0.0580	0.0732	0.1037	0.1189
				Profiling @ 2 x D Axial / ≤ .15 D Radial	122	5	0.0137	0.0152	0.0384	0.0427	0.0548	0.0701	0.0884	0.1189	0.1494
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX		Slotting @ ≤ .5 x D	99	5	0.0192	0.0214	0.0356	0.0396	0.0487	0.0610	0.0823	0.1037	0.1249
				Profiling @ 2 x D Axial / ≤ .15 D Radial	122	5	0.0274	0.0305	0.0494	0.0548	0.0701	0.0853	0.1128	0.1433	0.1706
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ .5 x D	122	5	0.0137	0.0152	0.0247	0.0275	0.0366	0.0427	0.0580	0.0732	0.0884	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	168	5	0.0192	0.0214	0.0356	0.0396	0.0457	0.0580	0.0792	0.1006	0.1219	
	Cast Iron	SAE J431, ASTM A48	Grey Cast Iron	Slotting @ ≤ .5 x D	140	5	0.0164	0.0182	0.0301	0.0335	0.0427	0.0518	0.0701	0.0884	0.1067
				Profiling @ 2 x D Axial / ≤ .15 D Radial	183	5	0.0219	0.0244	0.0411	0.0457	0.0580	0.0732	0.0976	0.1219	0.1463
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ .5 x D	53	5	0.0137	0.0152	0.0219	0.0244	0.0305	0.0396	0.0518	0.0671	0.0823	
			Profiling @ 2 x D Axial / ≤ .15 D Radial	84	5	0.0164	0.0182	0.0329	0.0366	0.0457	0.0548	0.0732	0.		

# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: CCAC

DESCRIPTION: 4 & 6 FLUTE - COBALT AEROCUT ROUGHING END MILLS

	Material Guide	Condition	SFM	CHIP PER TOOTH				
				3/4"	1"	1-1/4"	1-1/2"	2"
ISO-M	Stainless Steels < 28 HRc	Slotting	75	0.0025	0.0030	0.0035	0.0035	0.0040
		30-40% Dia. Profiling	90	0.0035	0.0040	0.0050	0.0050	0.0055
	Stainless Steels 30-40 HRc	Slotting	65	0.0020	0.0025	0.0030	0.0035	0.0035
		30-40% Dia. Profiling	80	0.0030	0.0035	0.0040	0.0040	0.0045
	Stainless Steels > 42 HRc	Slotting	45	0.0020	0.0025	0.0030	0.0035	0.0035
		30-40% Dia. Profiling	60	0.0030	0.0035	0.0040	0.0040	0.0045
ISO-S	Titanium < 28 HRc	Slotting	50	0.0025	0.0030	0.0035	0.0035	0.0040
		30-40% Dia. Profiling	65	0.0035	0.0040	0.0050	0.0050	0.0055
	Titanium 30-40 HRc	Slotting	40	0.0020	0.0025	0.0030	0.0035	0.0035
		30-40% Dia. Profiling	50	0.0030	0.0035	0.0040	0.0040	0.0045
	Titanium > 42 HRc	Slotting	35	0.0020	0.0025	0.0030	0.0035	0.0035
		30-40% Dia. Profiling	45	0.0030	0.0035	0.0040	0.0040	0.0045

# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: VXM4

### DESCRIPTION: 4 FLUTE - VARIABLE FLUTE - HP ROUGHING APPLICATIONS

Material Guide		Condition	SFM	FL	CHIP PER TOOTH												
					1/16"	3/32"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ 1 x D	250	4	0.0003	0.0003	0.0006	0.0009	0.0011	0.0014	0.0017	0.0020	0.0022	0.0028	0.0033	0.0044
			Profiling @ 2 x D Axial / ≤ .1 D Radial	325	4	0.0004	0.0005	0.0008	0.0012	0.0015	0.0020	0.0022	0.0026	0.0030	0.0037	0.0045	0.0061
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ 1 x D	275	4	0.0003	0.0004	0.0007	0.0010	0.0013	0.0017	0.0020	0.0024	0.0026	0.0033	0.0040	0.0053
			Profiling @ 2 x D Axial / ≤ .1 D Radial	350	4	0.0004	0.0005	0.0009	0.0013	0.0018	0.0023	0.0028	0.0033	0.0036	0.0045	0.0054	0.0072
Martensitic	403, 410, 416	Slotting @ ≤ 1 x D	300	4	0.0003	0.0004	0.0007	0.0011	0.0014	0.0019	0.0021	0.0025	0.0029	0.0035	0.0042	0.0056	
		Profiling @ 2 x D Axial / ≤ .1 D Radial	375	4	0.0005	0.0006	0.0010	0.0015	0.0019	0.0024	0.0029	0.0034	0.0039	0.0048	0.0057	0.0077	
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ .5 x D	110	4	0.0002	0.0002	0.0003	0.0004	0.0006	0.0007	0.0009	0.0011	0.0012	0.0015	0.0018	0.0024
			Profiling @ 2 x D Axial / ≤ .1 D Radial	150	4	0.0002	0.0002	0.0003	0.0004	0.0008	0.0010	0.0008	0.0009	0.0014	0.0018	0.0022	0.0029
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ .5 x D	75	4	0.0002	0.0003	0.0004	0.0003	0.0008	0.0010	0.0011	0.0013	0.0019	0.0018	0.0029	0.0029
			Profiling @ 2 x D Axial / ≤ .1 D Radial	115	4	0.0002	0.0003	0.0004	0.0004	0.0008	0.0010	0.0012	0.0015	0.0020	0.0020	0.0024	0.0024
Iron Base	Inconel 800-802, Multimet N-155, Timken 16-26-6	Slotting @ .5 x D	95	4	0.0002	0.0003	0.0004	0.0006	0.0010	0.0013	0.0015	0.0018	0.0021	0.0025	0.0031	0.0041	
		Profiling @ 2 x D Axial / ≤ .1 D Radial	130	4	0.0002	0.0003	0.0004	0.0006	0.0011	0.0014	0.0018	0.0021	0.0023	0.0029	0.0034	0.0046	
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ 1 x D	300	4	0.0003	0.0004	0.0007	0.0010	0.0014	0.0019	0.0021	0.0025	0.0029	0.0035	0.0042	0.0056
			Profiling @ 2 x D Axial / ≤ .1 D Radial	375	4	0.0005	0.0006	0.0010	0.0014	0.0019	0.0024	0.0029	0.0034	0.0039	0.0048	0.0057	0.0077
	High Alloy Steels - Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	Slotting @ ≤ 1 x D	275	4	0.0003	0.0003	0.0006	0.0009	0.0012	0.0016	0.0018	0.0021	0.0024	0.0030	0.0035	0.0047
			Profiling @ 2 x D Axial / ≤ .1 D Radial	350	4	0.0004	0.0005	0.0008	0.0012	0.0017	0.0021	0.0024	0.0029	0.0032	0.0041	0.0048	0.0065
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ 1 x D	325	4	0.0003	0.0003	0.0006	0.0006	0.0013	0.0017	0.0022	0.0026	0.0028	0.0039	0.0044	0.0055
			Profiling @ 2 x D Axial / ≤ .1 D Radial	400	4	0.0003	0.0003	0.0006	0.0006	0.0017	0.0021	0.0026	0.0032	0.0033	0.0044	0.0055	0.0066
Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ 1 x D	325	4	0.0004	0.0005	0.0008	0.0011	0.0015	0.0020	0.0023	0.0028	0.0031	0.0039	0.0046	0.0062	
		Profiling @ 2 x D Axial / ≤ .1 D Radial	400	4	0.0006	0.0007	0.0011	0.0017	0.0021	0.0027	0.0032	0.0038	0.0042	0.0053	0.0063	0.0084	
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ 1 x D	400	4	0.0003	0.0003	0.0006	0.0009	0.0011	0.0014	0.0017	0.0020	0.0022	0.0028	0.0033	0.0044
			Profiling @ 2 x D Axial / ≤ .1 D Radial	550	4	0.0004	0.0005	0.0008	0.0011	0.0015	0.0020	0.0022	0.0026	0.0030	0.0037	0.0045	0.0061
	Cast Iron	SAE J431, ASTM A48	Slotting @ ≤ 1 x D	450	4	0.0003	0.0004	0.0007	0.0011	0.0013	0.0017	0.0020	0.0024	0.0026	0.0033	0.0040	0.0053
			Profiling @ 2 x D Axial / ≤ .1 D Radial	600	4	0.0004	0.0005	0.0009	0.0013	0.0018	0.0023	0.0028	0.0033	0.0036	0.0045	0.0054	0.0072
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ 1 x D	175	4	0.0003	0.0003	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0025	0.0031	0.0041
			Profiling @ 2 x D Axial / ≤ .1 D Radial	275	4	0.0003	0.0004	0.0007	0.0011	0.0014	0.0019	0.0021	0.0025	0.0028	0.0034	0.0042	0.0055

For S553, decrease SFM and IPM by 25%

Material Guide		Condition	M/ MIN	FL	CHIP PER TOOTH - METRIC															
					1.5mm	2mm	2.5mm	3mm	4mm	5mm	6mm	8mm	10mm	12mm	14mm	16mm	18mm	20mm	25mm	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ 1 x D	76	4	0.0064	0.0076	0.0099	0.0127	0.0163	0.0203	0.0254	0.0325	0.0381	0.0508	0.0544	0.0635	0.0711	0.0762	0.1016
			Profiling @ 2 x D Axial / ≤ .1 D Radial	100	4	0.0089	0.0107	0.0139	0.0178	0.0228	0.0279	0.0356	0.0456	0.0508	0.0685	0.0736	0.0864	0.0971	0.1041	0.1397
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ 1 x D	83	4	0.0076	0.0091	0.0119	0.0152	0.0195	0.0229	0.0305	0.0389	0.0457	0.0610	0.0652	0.0762	0.0853	0.0914	0.1219
			Profiling @ 2 x D Axial / ≤ .1 D Radial	110	4	0.0102	0.0122	0.0158	0.0203	0.0260	0.0305	0.0406	0.0520	0.0635	0.0838	0.0895	0.1041	0.1163	0.1214	0.1651
Martensitic	403, 410, 416	Slotting @ ≤ 1 x D	90	4	0.0076	0.0091	0.0119	0.0152	0.0195	0.0254	0.0330	0.0389	0.0482	0.0660	0.0677	0.0812	0.0903	0.0965	0.1295	
		Profiling @ 2 x D Axial / ≤ .1 D Radial	115	4	0.0115	0.0137	0.0179	0.0229	0.0293	0.0355	0.0431	0.0586	0.0660	0.0889	0.0953	0.1117	0.1254	0.1320	0.1778	
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ .5 x D	34	4	0.0038	0.0046	0.0059	0.0076	0.0097	0.0102	0.0127	0.0195	0.0203	0.0279	0.0300	0.0355	0.0401	0.0406	0.0558
			Profiling @ 2 x D Axial / ≤ .1 D Radial	45	4	0.0038	0.0046	0.0059	0.0076	0.0097	0.0102	0.0178	0.0195	0.0178	0.0330	0.0275	0.0406	0.0452	0.0508	0.0660
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ .5 x D	23	4	0.0051	0.0061	0.0080	0.0102	0.0131	0.0102	0.0178	0.0261	0.0254	0.0431	0.0385	0.0406	0.0467	0.0660	0.0660
			Profiling @ 2 x D Axial / ≤ .1 D Radial	35	4	0.0053	0.0064	0.0083	0.0106	0.0136	0.0102	0.0178	0.0271	0.0279	0.0457	0.0415	0.0457	0.0521	0.0558	0.0558
Iron Base	Inconel 800-802, Multimet N-155, Timken 16-26-6	Slotting @ .5 x D	30	4	0.0051	0.0061	0.0080	0.0102	0.0131	0.0127	0.0229	0.0261	0.0355	0.0482	0.0486	0.0584	0.0645	0.0711	0.0939	
		Profiling @ 2 x D Axial / ≤ .1 D Radial	40	4	0.0051	0.0061	0.0080	0.0102	0.0131	0.0127	0.0254	0.0261	0.0406	0.0533	0.0537	0.0660	0.0721	0.0787	0.1066	
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ 1 x D	92	4	0.0076	0.0091	0.0119	0.0152	0.0195	0.0229	0.0330	0.0389	0.0482	0.0660	0.0677	0.0812	0.0903	0.0965	0.1295
			Profiling @ 2 x D Axial / ≤ .1 D Radial	115	4	0.0115	0.0137	0.0179	0.0229	0.0293	0.0330	0.0431	0.0586	0.0660	0.0889	0.0953	0.1117	0.1254	0.1320	0.1778
	High Alloy Steels - Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	Slotting @ ≤ 1 x D	84	4	0.0064	0.0076	0.0099	0.0127	0.0163	0.0203	0.0279	0.0325	0.0406	0.0558	0.0569	0.0685	0.0761	0.0812	0.1092
			Profiling @ 2 x D Axial / ≤ .1 D Radial	110	4	0.0089	0.0106	0.0138	0.0177	0.0227	0.0279	0.0381	0.0453	0.0558	0.0737	0.0785	0.0939	0.1045	0.1117	0.1498
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ 1 x D	100	4	0.0064	0.0076	0.0099	0.0127	0.0163	0.0127	0.0304	0.0325	0.0508	0.0635	0.0671	0.0889	0.0965	0.1016	0.1270
			Profiling @ 2 x D Axial / ≤ .1 D Radial	122	4	0.0064	0.0076	0.0099	0.0127	0.0163	0.0127	0.0381	0.0325	0.0609	0.0762	0.0772	0.1016	0.1092	0.1270	0.1524
Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ 1 x D	100	4	0.0089	0.0107	0.0139	0.0178	0.0228	0.0254	0.0355	0.0456	0.0533	0.0711	0.0761	0.0889	0.0996	0.1066	0.1422	
		Profiling @ 2 x D Axial / ≤ .1 D Radial	122	4	0.0127	0.0152	0.0198	0.0254	0.0325	0.0381	0.0482	0.0650	0.0736	0.0965	0.1061	0.1219	0.1371	0.1447	0.1930	
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ 1 x D	122	4	0.0064	0.0076	0.0099	0.0127	0.0163	0.0203	0.0254	0.0325	0.0381	0.0508	0.0544	0.0635	0.0711	0.0762	0.1016
			Profiling @ 2 x D Axial / ≤ .1 D Radial	168	4	0.0089	0.0107	0.0139	0.0178	0.0228	0.0254	0.0355	0.0456	0.0508	0.0685	0.0736	0.0863	0.0970	0.1041	0.1397
	Cast Iron	SAE J431, ASTM A48	Slotting @ ≤ 1 x D	137	4	0.0076	0.0091	0.0119	0.0152	0.0195	0.0254	0.0304	0.0389	0.0457	0.0609	0.0652	0.0762	0.0853	0.0914	0.1219
			Profiling @ 2 x D Axial / ≤ .1 D Radial	183	4	0.0102	0.0122	0.0158	0.0203	0.0260	0.0304	0.0406	0.0520	0.0635	0.0838	0.0895	0.1041	0.1163	0.1244	0.1651
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ 1 x D	53	4	0.0064	0.0076	0.0099	0.0127	0.0163	0.0178	0.0229	0.0325	0.0355	0.0457	0.0518	0.0584	0.0660	0.0711	0.0939

# SPEED & FEED INFORMATION

**Notes**  
**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: VXMG5

### DESCRIPTION: 5 FLUTE - VARIABLE FLUTE - HP ROUGHING APPLICATIONS

Material Guide		Condition	SFM	FL	CHIP PER TOOTH												
					1/16"	3/32"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ 1 x D	250	5	0.0003	0.0003	0.0006	0.0009	0.0011	0.0014	0.0017	0.0020	0.0022	0.0028	0.0033	0.0044
			Profiling @ 2 x D Axial / ≤ .1 D Radial	325	5	0.0004	0.0005	0.0008	0.0012	0.0015	0.0020	0.0022	0.0026	0.0030	0.0037	0.0045	0.0061
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ 1 x D	275	5	0.0003	0.0004	0.0007	0.0010	0.0013	0.0017	0.0020	0.0024	0.0026	0.0033	0.0040	0.0053
			Profiling @ 2 x D Axial / ≤ .1 D Radial	350	5	0.0004	0.0005	0.0009	0.0013	0.0018	0.0023	0.0028	0.0033	0.0036	0.0045	0.0054	0.0072
Martensitic	403, 410, 416	403, 410, 416	Slotting @ ≤ 1 x D	300	5	0.0003	0.0004	0.0007	0.0011	0.0014	0.0019	0.0021	0.0025	0.0029	0.0035	0.0042	0.0056
			Profiling @ 2 x D Axial / ≤ .1 D Radial	375	5	0.0005	0.0006	0.0010	0.0015	0.0019	0.0024	0.0029	0.0034	0.0039	0.0048	0.0057	0.0077
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ .5 x D	110	5	0.0002	0.0002	0.0003	0.0004	0.0006	0.0007	0.0009	0.0011	0.0012	0.0015	0.0018	0.0024
			Profiling @ 2 x D Axial / ≤ .1 D Radial	150	5	0.0002	0.0002	0.0003	0.0004	0.0008	0.0010	0.0008	0.0009	0.0014	0.0018	0.0022	0.0029
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ .5 x D	75	5	0.0002	0.0003	0.0004	0.0003	0.0008	0.0010	0.0011	0.0013	0.0019	0.0018	0.0029	0.0029
			Profiling @ 2 x D Axial / ≤ .1 D Radial	115	5	0.0002	0.0003	0.0004	0.0004	0.0008	0.0010	0.0012	0.0015	0.0020	0.0020	0.0024	0.0024
Iron Base	Inconel 800-802, Multimet N-155, Timken 16-26-6	Inconel 800-802, Multimet N-155, Timken 16-26-6	Slotting @ .5 x D	95	5	0.0002	0.0003	0.0004	0.0006	0.0010	0.0013	0.0015	0.0018	0.0021	0.0025	0.0031	0.0041
			Profiling @ 2 x D Axial / ≤ .1 D Radial	130	5	0.0002	0.0003	0.0004	0.0006	0.0011	0.0014	0.0018	0.0021	0.0023	0.0029	0.0034	0.0046
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ 1 x D	300	5	0.0003	0.0004	0.0007	0.0010	0.0014	0.0019	0.0021	0.0025	0.0029	0.0035	0.0042	0.0056
			Profiling @ 2 x D Axial / ≤ .1 D Radial	375	5	0.0005	0.0006	0.0010	0.0014	0.0019	0.0024	0.0029	0.0034	0.0039	0.0048	0.0057	0.0077
	High Alloy Steels - Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	Slotting @ ≤ 1 x D	275	5	0.0003	0.0003	0.0006	0.0009	0.0012	0.0016	0.0018	0.0021	0.0024	0.0030	0.0035	0.0047
			Profiling @ 2 x D Axial / ≤ .1 D Radial	350	5	0.0004	0.0005	0.0008	0.0012	0.0017	0.0021	0.0024	0.0029	0.0032	0.0041	0.0048	0.0065
Medium Alloy Steels	200, 250, 300	200, 250, 300	Slotting @ ≤ 1 x D	325	5	0.0003	0.0003	0.0006	0.0006	0.0013	0.0017	0.0022	0.0026	0.0028	0.0039	0.0044	0.0055
			Profiling @ 2 x D Axial / ≤ .1 D Radial	400	5	0.0003	0.0003	0.0006	0.0006	0.0017	0.0021	0.0026	0.0032	0.0033	0.0044	0.0055	0.0066
Low Alloy Steels-Maraging	10XX, 11XX, 13XX	10XX, 11XX, 13XX	Slotting @ ≤ 1 x D	325	5	0.0004	0.0005	0.0008	0.0011	0.0015	0.0020	0.0023	0.0028	0.0031	0.0039	0.0046	0.0062
			Profiling @ 2 x D Axial / ≤ .1 D Radial	400	5	0.0006	0.0007	0.0011	0.0017	0.0021	0.0027	0.0032	0.0038	0.0042	0.0053	0.0063	0.0084
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ 1 x D	400	5	0.0003	0.0003	0.0006	0.0009	0.0011	0.0014	0.0017	0.0020	0.0022	0.0028	0.0033	0.0044
			Profiling @ 2 x D Axial / ≤ .1 D Radial	550	5	0.0004	0.0005	0.0008	0.0011	0.0015	0.0020	0.0022	0.0026	0.0030	0.0037	0.0045	0.0061
	Cast Iron	SAE J431, ASTM A48	SAE J431, ASTM A48	Slotting @ ≤ 1 x D	450	5	0.0003	0.0004	0.0007	0.0011	0.0013	0.0017	0.0020	0.0024	0.0026	0.0033	0.0040
Profiling @ 2 x D Axial / ≤ .1 D Radial				600	5	0.0004	0.0005	0.0009	0.0013	0.0018	0.0023	0.0028	0.0033	0.0036	0.0045	0.0054	0.0072
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ 1 x D	175	5	0.0003	0.0003	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0025	0.0031	0.0041
			Profiling @ 2 x D Axial / ≤ .1 D Radial	275	5	0.0003	0.0004	0.0007	0.0011	0.0014	0.0019	0.0021	0.0025	0.0028	0.0034	0.0042	0.0055

For 5553, decrease SFM and IPM by 25%

Material Guide		Condition	M/ MIN	FL	CHIP PER TOOTH - METRIC															
					1.5mm	2mm	2.5mm	3mm	4mm	5mm	6mm	8mm	10mm	12mm	14mm	16mm	18mm	20mm	25mm	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ 1 x D	76	5	0.0064	0.0076	0.0099	0.0127	0.0163	0.0203	0.0254	0.0325	0.0381	0.0508	0.0544	0.0635	0.0711	0.0762	0.1016
			Profiling @ 2 x D Axial / ≤ .1 D Radial	100	5	0.0089	0.0107	0.0139	0.0178	0.0228	0.0279	0.0356	0.0456	0.0508	0.0685	0.0736	0.0864	0.0971	0.1041	0.1397
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ 1 x D	83	5	0.0076	0.0091	0.0119	0.0152	0.0195	0.0229	0.0305	0.0389	0.0457	0.0610	0.0652	0.0762	0.0853	0.0914	0.1219
			Profiling @ 2 x D Axial / ≤ .1 D Radial	110	5	0.0102	0.0122	0.0158	0.0203	0.0260	0.0305	0.0406	0.0520	0.0635	0.0838	0.0895	0.1041	0.1163	0.1214	0.1651
Martensitic	403, 410, 416	403, 410, 416	Slotting @ ≤ 1 x D	90	5	0.0076	0.0091	0.0119	0.0152	0.0195	0.0254	0.0330	0.0389	0.0482	0.0660	0.0677	0.0812	0.0903	0.0965	0.1295
			Profiling @ 2 x D Axial / ≤ .1 D Radial	115	5	0.0115	0.0137	0.0179	0.0229	0.0293	0.0355	0.0431	0.0586	0.0660	0.0889	0.0953	0.1117	0.1254	0.1320	0.1778
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ .5 x D	34	5	0.0038	0.0046	0.0059	0.0076	0.0097	0.0102	0.0127	0.0195	0.0203	0.0279	0.0300	0.0355	0.0401	0.0406	0.0558
			Profiling @ 2 x D Axial / ≤ .1 D Radial	45	5	0.0038	0.0046	0.0059	0.0076	0.0097	0.0102	0.0178	0.0195	0.0178	0.0330	0.0275	0.0406	0.0452	0.0508	0.0660
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ .5 x D	23	5	0.0051	0.0061	0.0080	0.0102	0.0131	0.0102	0.0178	0.0261	0.0254	0.0431	0.0385	0.0406	0.0467	0.0660	0.0660
			Profiling @ 2 x D Axial / ≤ .1 D Radial	35	5	0.0053	0.0064	0.0083	0.0106	0.0136	0.0102	0.0178	0.0271	0.0279	0.0457	0.0415	0.0457	0.0521	0.0558	0.0558
Iron Base	Inconel 800-802, Multimet N-155, Timken 16-26-6	Inconel 800-802, Multimet N-155, Timken 16-26-6	Slotting @ .5 x D	30	5	0.0051	0.0061	0.0080	0.0102	0.0131	0.0127	0.0229	0.0261	0.0355	0.0482	0.0486	0.0584	0.0645	0.0711	0.0939
			Profiling @ 2 x D Axial / ≤ .1 D Radial	40	5	0.0051	0.0061	0.0080	0.0102	0.0131	0.0127	0.0254	0.0261	0.0406	0.0533	0.0537	0.0660	0.0721	0.0787	0.1066
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ 1 x D	92	5	0.0076	0.0091	0.0119	0.0152	0.0195	0.0229	0.0330	0.0389	0.0482	0.0660	0.0677	0.0812	0.0903	0.0965	0.1295
			Profiling @ 2 x D Axial / ≤ .1 D Radial	115	5	0.0115	0.0137	0.0179	0.0229	0.0293	0.0330	0.0431	0.0586	0.0660	0.0889	0.0953	0.1117	0.1254	0.1320	0.1778
	High Alloy Steels - Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	Slotting @ ≤ 1 x D	84	5	0.0064	0.0076	0.0099	0.0127	0.0163	0.0203	0.0279	0.0325	0.0406	0.0558	0.0569	0.0685	0.0761	0.0812	0.1092
			Profiling @ 2 x D Axial / ≤ .1 D Radial	110	5	0.0089	0.0106	0.0138	0.0177	0.0227	0.0279	0.0381	0.0453	0.0558	0.0737	0.0785	0.0939	0.1045	0.1117	0.1498
Medium Alloy Steels	200, 250, 300	200, 250, 300	Slotting @ ≤ 1 x D	100	5	0.0064	0.0076	0.0099	0.0127	0.0163	0.0127	0.0304	0.0325	0.0508	0.0635	0.0671	0.0889	0.0965	0.1016	0.1270
			Profiling @ 2 x D Axial / ≤ .1 D Radial	122	5	0.0064	0.0076	0.0099	0.0127	0.0163	0.0127	0.0381	0.0325	0.0609	0.0762	0.0772	0.1016	0.1092	0.1270	0.1524
Low Alloy Steels-Maraging	10XX, 11XX, 13XX	10XX, 11XX, 13XX	Slotting @ ≤ 1 x D	100	5	0.0089	0.0107	0.0139	0.0178	0.0228	0.0254	0.0355	0.0456	0.0533	0.0711	0.0761	0.0889	0.0996	0.1066	0.1422
			Profiling @ 2 x D Axial / ≤ .1 D Radial	122	5	0.0127	0.0152	0.0198	0.0254	0.0325	0.0381	0.0482	0.0650	0.0736	0.0965	0.1061	0.1219	0.1371	0.1447	0.1930
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ 1 x D	122	5	0.0064	0.0076	0.0099	0.0127	0.0163	0.0203	0.0254	0.0325	0.0381	0.0508	0.0544	0.0635	0.0711	0.0762	0.1016
			Profiling @ 2 x D Axial / ≤ .1 D Radial	168	5	0.0089	0.0107	0.0139	0.0178	0.0228	0.0254	0.0355	0.0456	0.0508	0.0685	0.0736	0.0863	0.0970	0.1041	0.1397
	Cast Iron	SAE J431, ASTM A48	SAE J431, ASTM A48	Slotting @ ≤ 1 x D	137	5	0.0076	0.0091	0.0119	0.0152	0.0195	0.0254	0.0304	0.0389	0.0457	0.0609	0.0652	0.0762	0.0853	0.0914
Profiling @ 2 x D Axial / ≤ .1 D Radial				183	5	0.0102	0.0122	0.0158	0.0203	0.0260	0.0304	0.0406	0.0520	0.0635	0.0838	0.0895	0.1041	0.1163	0.1244	0.1651
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3																		

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: CMG3H

DESCRIPTION: 3 FLUTE - 60° - 90° - 120° CHAMFER MILL

Material Guide			SFM	CHIP PER TOOTH				
				1/4"	3/8"	1/2"	5/8"	3/4"
ISO-M	Austenitic	304, 316	225	0.0018	0.0027	0.0036	0.0043	0.0054
	Martensitic	403, 410, 416	325	0.0022	0.0033	0.0044	0.0053	0.0066
ISO-P	High Alloy Steels Mold & Die	A-2, P20, H-13	250	0.0020	0.0030	0.0040	0.0048	0.0060
	High Alloy Steels Carbon Steels	4140, 8620	350	0.0022	0.0033	0.0044	0.0053	0.0066
ISO-N	Copper Alloys	Brass, Aluminum Bronze	600	0.0030	0.0045	0.0060	0.0072	0.0090
	Aluminum	8-12% Silicon Content	1250	0.0022	0.0033	0.0044	0.0053	0.0066
	Aluminum	6061, 7075	1950	0.0035	0.0053	0.0070	0.0084	0.0105

## SPEED & FEEDS FOR SERIES: CMG5H

DESCRIPTION: 5 FLUTE - 60° - 90° - 120° CHAMFER MILL

Material Guide			SFM	CHIP PER TOOTH				
				1/4"	3/8"	1/2"	5/8"	3/4"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	225	0.0018	0.0027	0.0036	0.0043	0.0054
	Austenitic	304, 316	225	0.0018	0.0027	0.0036	0.0043	0.0054
	Martensitic	403, 410, 416	325	0.0022	0.0033	0.0044	0.0053	0.0066
ISO-S	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	150	0.0018	0.0027	0.0036	0.0043	0.0054
ISO-P	High Alloy Steels Mold & Die	A-2, P20, H-13	250	0.0020	0.0030	0.0040	0.0048	0.0060
	High Alloy Steels Carbon Steels	4140, 8620	350	0.0022	0.0033	0.0044	0.0053	0.0066
	High Alloy Steels Tool Steels	S7, D2	250	0.0020	0.0030	0.0040	0.0048	0.0060
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	225	0.0018	0.0027	0.0036	0.0043	0.0054



# SPEED & FEED INFORMATION

## SPEED & FEEDS FOR SERIES: HDRNC

DESCRIPTION: 3 FLUTE - 142° NC CARBIDE SPOTTING DRILL (60°, 90° 120° AVAILABLE)

### Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

Material Guide			SFM	CHIP PER TOOTH										
				1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	75	0.0020	0.0025	0.0030	0.0037	0.0045	0.0047	0.0050	0.0063	0.0079	0.0090	0.0098
	Martensitic	403, 410, 416	75	0.0025	0.0035	0.0039	0.0050	0.0060	0.0062	0.0065	0.0085	0.0098	0.0112	0.0124
	Austenitic	304, 316	75	0.0020	0.0025	0.0030	0.0037	0.0045	0.0047	0.0050	0.0063	0.0079	0.0090	0.0098
ISO-S	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	50	0.0016	0.0020	0.0025	0.0030	0.0035	0.0037	0.0039	0.0049	0.0063	0.0071	0.0079
	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	65	0.0020	0.0025	0.0030	0.0037	0.0045	0.0047	0.0050	0.0063	0.0079	0.0090	0.0098
ISO-P	High Strength Steels	4140, 8620	210	0.0025	0.0035	0.0039	0.0050	0.0060	0.0062	0.0065	0.0085	0.0098	0.0112	0.0124
	High Alloy Steels Mold & Die	A-2, P20, H-13	165	0.0020	0.0025	0.0030	0.0037	0.0045	0.0047	0.0050	0.0063	0.0079	0.0090	0.0098
	High Alloy Steels Tool Steels	S7, D2	130	0.0020	0.0025	0.0030	0.0037	0.0045	0.0047	0.0050	0.0063	0.0079	0.0090	0.0098
ISO-N	Copper Alloys	Brass, Aluminum Bronze	575	0.0025	0.0035	0.0039	0.0050	0.0060	0.0062	0.0065	0.0085	0.0098	0.0112	0.0124
	Aluminum	8-12% Silicon Content	400	0.0039	0.0050	0.0069	0.0081	0.0094	0.0096	0.0098	0.0124	0.0157	0.0177	0.0197
	Aluminum	6061, 7075	650	0.0049	0.0060	0.0079	0.0100	0.0120	0.0122	0.0124	0.0157	0.0197	0.0230	0.0248

Material Guide			M/MIN	CHIP PER TOOTH - METRIC						
				3mm	4mm	5mm	6mm	8mm	10mm	12mm
ISO-M	Precipitation	13-8, 15-5, 17-4PH	23	0.0508	0.0578	0.0635	0.0762	0.0980	0.1143	0.1270
	Martensitic	403, 410, 416	23	0.0635	0.0775	0.0889	0.0991	0.1253	0.1524	0.1651
	Austenitic	304, 316	23	0.0508	0.0578	0.0635	0.0762	0.0980	0.1143	0.1270
ISO-S	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	15	0.0406	0.0456	0.0508	0.0635	0.0752	0.0889	0.0991
	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	20	0.0508	0.0578	0.0635	0.0762	0.0980	0.1143	0.1270
ISO-P	High Strength Steels	4140, 8620	64	0.0635	0.0775	0.0889	0.0991	0.1253	0.1524	0.1651
	High Alloy Steels Mold & Die	A-2, P20, H-13	50	0.0508	0.0578	0.0635	0.0762	0.0980	0.1143	0.1270
	High Alloy Steels Tool Steels	S7, D2	40	0.0508	0.0578	0.0635	0.0762	0.0980	0.1143	0.1270
ISO-N	Copper Alloys	Brass, Aluminum Bronze	175	0.0635	0.0775	0.0889	0.0991	0.1253	0.1524	0.1651
	Aluminum	8-12% Silicon Content	122	0.0991	0.1121	0.1270	0.1753	0.2104	0.2388	0.2489
	Aluminum	6061, 7075	198	0.1245	0.1376	0.1524	0.2007	0.2508	0.3048	0.3150

# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: EMG60

DESCRIPTION: 3 FLUTE - 60° GENERAL MACHINING APPLICATIONS IN STAINLESS STEEL

Material Guide			Condition	SFM	FL	CHIP PER TOOTH										
						1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	1"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	250	3	0.0005	0.0007	0.0009	0.0013	0.0014	0.0017	0.0019	0.0022	0.0024	0.0029	0.0039
			Profiling @ 2 x D Axial / ≤ .15 D Radial	325	3	0.0007	0.0010	0.0013	0.0017	0.0019	0.0023	0.0026	0.0030	0.0033	0.0040	0.0054
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	275	3	0.0006	0.0008	0.0011	0.0015	0.0017	0.0021	0.0023	0.0026	0.0029	0.0035	0.0047
			Profiling @ 2 x D Axial / ≤ .15 D Radial	350	3	0.0008	0.0011	0.0015	0.0022	0.0024	0.0029	0.0032	0.0036	0.0040	0.0048	0.0064
	Martensitic	403, 410, 416	Slotting @ ≤ .5 x D	300	3	0.0006	0.0009	0.0012	0.0016	0.0018	0.0023	0.0025	0.0028	0.0031	0.0037	0.0050
			Profiling @ 2 x D Axial / ≤ .15 D Radial	375	3	0.0009	0.0013	0.0016	0.0023	0.0025	0.0031	0.0034	0.0039	0.0043	0.0051	0.0069
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	110	3	0.0003	0.0003	0.0004	0.0006	0.0007	0.0009	0.0010	0.0012	0.0013	0.0015	0.0021
			Profiling @ 2 x D Axial / ≤ .15 D Radial	150	3	0.0003	0.0003	0.0006	0.0005	0.0006	0.0011	0.0012	0.0014	0.0015	0.0019	0.0025
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ ≤ .5 x D	75	3	0.0004	0.0002	0.0006	0.0008	0.0009	0.0014	0.0016	0.0014	0.0015	0.0025	0.0025
			Profiling @ 2 x D Axial / ≤ .15 D Radial	115	3	0.0004	0.0003	0.0006	0.0009	0.0010	0.0015	0.0017	0.0015	0.0017	0.0021	0.0021
	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting @ ≤ .5 x D	95	3	0.0004	0.0004	0.0008	0.0012	0.0013	0.0016	0.0018	0.0020	0.0022	0.0027	0.0036
			Profiling @ 2 x D Axial / ≤ .15 D Radial	130	3	0.0004	0.0004	0.0009	0.0014	0.0015	0.0018	0.0020	0.0023	0.0025	0.0030	0.0041
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	300	3	0.0006	0.0008	0.0012	0.0016	0.0018	0.0023	0.0025	0.0028	0.0031	0.0037	0.0050
			Profiling @ 2 x D Axial / ≤ .15 D Radial	375	3	0.0009	0.0012	0.0016	0.0023	0.0025	0.0031	0.0034	0.0039	0.0043	0.0051	0.0069
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	275	3	0.0005	0.0007	0.0010	0.0014	0.0015	0.0019	0.0021	0.0023	0.0026	0.0031	0.0042
			Profiling @ 2 x D Axial / ≤ .15 D Radial	350	3	0.0007	0.0010	0.0014	0.0019	0.0021	0.0025	0.0028	0.0032	0.0036	0.0043	0.0058
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ .5 x D	325	3	0.0005	0.0004	0.0011	0.0017	0.0019	0.0022	0.0024	0.0031	0.0034	0.0039	0.0049
			Profiling @ 2 x D Axial / ≤ .15 D Radial	400	3	0.0005	0.0004	0.0014	0.0021	0.0023	0.0026	0.0029	0.0035	0.0039	0.0049	0.0059
Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ .5 x D	325	3	0.0007	0.0009	0.0013	0.0018	0.0020	0.0024	0.0027	0.0031	0.0034	0.0041	0.0055	
		Profiling @ 2 x D Axial / ≤ .15 D Radial	400	3	0.0010	0.0014	0.0018	0.0025	0.0028	0.0033	0.0037	0.0042	0.0047	0.0056	0.0075	
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ ≤ .5 x D	400	3	0.0005	0.0007	0.0009	0.0013	0.0014	0.0017	0.0019	0.0022	0.0024	0.0029	0.0039
			Profiling @ 2 x D Axial / ≤ .15 D Radial	550	3	0.0007	0.0009	0.0013	0.0017	0.0019	0.0023	0.0026	0.0030	0.0033	0.0040	0.0054
	Cast Iron	SAE J431, ASTM A48	Slotting @ ≤ .5 x D	450	3	0.0006	0.0009	0.0011	0.0015	0.0017	0.0021	0.0023	0.0026	0.0029	0.0035	0.0047
			Profiling @ 2 x D Axial / ≤ .15 D Radial	600	3	0.0008	0.0011	0.0015	0.0022	0.0024	0.0029	0.0032	0.0036	0.0040	0.0048	0.0064
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ .5 x D	175	3	0.0005	0.0006	0.0008	0.0012	0.0013	0.0015	0.0017	0.0020	0.0022	0.0027	0.0036
			Profiling @ 2 x D Axial / ≤ .15 D Radial	275	3	0.0006	0.0009	0.0012	0.0016	0.0018	0.0022	0.0024	0.0027	0.0030	0.0037	0.0049

For 5553, decrease SFM and IPM by 25%



# SPEED & FEED INFORMATION

**Notes**

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MPMG

DESCRIPTION: 4 FLUTE - VARIABLE FLUTE - BEST PERFORMANCE IN A WIDE VARIETY OF MATERIALS

Material Guide		Condition	SFM	FL	CHIP PER TOOTH										
					1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ $\leq .5 \times D$	250	4	0.0007	0.0012	0.0014	0.0019	0.0022	0.0026	0.0029	0.0036	0.0043	0.0058
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	325	4	0.0010	0.0016	0.0020	0.0026	0.0029	0.0035	0.0039	0.0049	0.0059	0.0079
	Austenitic	302, 303, 304L, 316L	Slotting @ $\leq .5 \times D$	275	4	0.0009	0.0013	0.0017	0.0023	0.0026	0.0031	0.0035	0.0043	0.0052	0.0069
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	350	4	0.0012	0.0017	0.0023	0.0030	0.0036	0.0043	0.0048	0.0059	0.0071	0.0094
	Martensitic	403, 410, 416	Slotting @ $\leq .5 \times D$	300	4	0.0009	0.0014	0.0019	0.0024	0.0027	0.0033	0.0038	0.0046	0.0055	0.0074
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	375	4	0.0013	0.0020	0.0025	0.0032	0.0038	0.0045	0.0051	0.0064	0.0075	0.0101
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ $\leq .5 \times D$	110	4	0.0004	0.0006	0.0007	0.0009	0.0012	0.0014	0.0016	0.0020	0.0023	0.0032
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	150	4	0.0004	0.0006	0.0010	0.0013	0.0010	0.0012	0.0019	0.0023	0.0029	0.0038
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ $\leq .5 \times D$	75	4	0.0006	0.0004	0.0010	0.0013	0.0014	0.0017	0.0025	0.0023	0.0038	0.0038
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	115	4	0.0006	0.0006	0.0010	0.0013	0.0016	0.0019	0.0026	0.0026	0.0032	0.0032
	Iron Base	Inconel 800-802, Multimet N-155, Timken 16-26-6	Slotting @ $\leq .5 \times D$	95	4	0.0006	0.0007	0.0013	0.0017	0.0020	0.0024	0.0027	0.0033	0.0040	0.0053
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	130	4	0.0006	0.0007	0.0014	0.0019	0.0023	0.0028	0.0030	0.0038	0.0045	0.0061
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ $\leq .5 \times D$	300	4	0.0009	0.0013	0.0019	0.0024	0.0027	0.0033	0.0038	0.0046	0.0055	0.0074
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	375	4	0.0013	0.0019	0.0025	0.0032	0.0038	0.0045	0.0051	0.0064	0.0075	0.0101
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ $\leq .5 \times D$	275	4	0.0007	0.0012	0.0016	0.0021	0.0023	0.0028	0.0032	0.0039	0.0046	0.0062
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	350	4	0.0010	0.0016	0.0022	0.0028	0.0032	0.0038	0.0042	0.0053	0.0064	0.0085
	Medium Alloy Steels	200, 250, 300	Slotting @ $\leq .75 \times D$	325	4	0.0007	0.0007	0.0017	0.0023	0.0029	0.0035	0.0036	0.0051	0.0058	0.0072
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	400	4	0.0007	0.0007	0.0022	0.0028	0.0035	0.0042	0.0043	0.0058	0.0072	0.0087
Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ $\leq .75 \times D$	325	4	0.0010	0.0014	0.0020	0.0026	0.0030	0.0036	0.0040	0.0051	0.0061	0.0081	
		Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	400	4	0.0014	0.0022	0.0027	0.0036	0.0042	0.0050	0.0055	0.0069	0.0082	0.0110	
ISO-K	Ductile Iron	ASTM A536, ASTM 897	Slotting @ $1 \times D$	400	4	0.0007	0.0012	0.0014	0.0019	0.0022	0.0026	0.0029	0.0036	0.0043	0.0058
	Ductile Cast Iron		Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	550	4	0.0010	0.0014	0.0020	0.0026	0.0029	0.0035	0.0039	0.0049	0.0059	0.0079
	Cast Iron	SAE J431, ASTM A48	Slotting @ $1 \times D$	450	4	0.0009	0.0014	0.0017	0.0023	0.0026	0.0031	0.0035	0.0043	0.0052	0.0069
	Grey Cast Iron		Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	600	4	0.0012	0.0017	0.0023	0.0030	0.0036	0.0043	0.0048	0.0059	0.0071	0.0094
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ $\leq .5 \times D$	175	4	0.0007	0.0010	0.0013	0.0017	0.0020	0.0024	0.0026	0.0033	0.0040	0.0053
			Profiling @ $2 \times D$ Axial / $\leq .3 D$ Radial	275	4	0.0009	0.0014	0.0019	0.0024	0.0027	0.0033	0.0036	0.0045	0.0055	0.0072

For 5553, decrease SFM and IPM by 25%

# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: MPMG5

DESCRIPTION: 5 FLUTE - VARIABLE FLUTE - BEST PERFORMANCE IN A WIDE VARIETY OF MATERIALS

Material Guide		Condition	SFM	FL	CHIP PER TOOTH										
					1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	250	5	0.0007	0.0012	0.0014	0.0019	0.0022	0.0026	0.0029	0.0036	0.0043	0.0058
			Profiling @ 2 x D Axial / ≤ .3 D Radial	325	5	0.0010	0.0016	0.0020	0.0026	0.0029	0.0035	0.0039	0.0049	0.0059	0.0079
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	275	5	0.0009	0.0013	0.0017	0.0023	0.0026	0.0031	0.0035	0.0043	0.0052	0.0069
			Profiling @ 2 x D Axial / ≤ .3 D Radial	350	5	0.0012	0.0017	0.0023	0.0030	0.0036	0.0043	0.0048	0.0059	0.0071	0.0094
	Martensitic	403, 410, 416	Slotting @ ≤ .5 x D	300	5	0.0009	0.0014	0.0019	0.0024	0.0027	0.0033	0.0038	0.0046	0.0055	0.0074
			Profiling @ 2 x D Axial / ≤ .3 D Radial	375	5	0.0013	0.0020	0.0025	0.0032	0.0038	0.0045	0.0051	0.0064	0.0075	0.0101
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	110	5	0.0004	0.0006	0.0007	0.0009	0.0012	0.0014	0.0016	0.0020	0.0023	0.0032
			Profiling @ 2 x D Axial / ≤ .3 D Radial	150	5	0.0004	0.0006	0.0010	0.0013	0.0010	0.0012	0.0019	0.0023	0.0029	0.0038
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Slotting @ ≤ .5 x D	75	5	0.0006	0.0004	0.0010	0.0013	0.0014	0.0017	0.0025	0.0023	0.0038	0.0038
			Profiling @ 2 x D Axial / ≤ .3 D Radial	115	5	0.0006	0.0006	0.0010	0.0013	0.0016	0.0019	0.0026	0.0026	0.0032	0.0032
	Iron Base	Inconel 800-802, Multimet N-155, Timken 16-26-6	Slotting @ ≤ .5 x D	95	5	0.0006	0.0007	0.0013	0.0017	0.0020	0.0024	0.0027	0.0033	0.0040	0.0053
			Profiling @ 2 x D Axial / ≤ .3 D Radial	130	5	0.0006	0.0007	0.0014	0.0019	0.0023	0.0028	0.0030	0.0038	0.0045	0.0061
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	300	5	0.0009	0.0013	0.0019	0.0024	0.0027	0.0033	0.0038	0.0046	0.0055	0.0074
			Profiling @ 2 x D Axial / ≤ .3 D Radial	375	5	0.0013	0.0019	0.0025	0.0032	0.0038	0.0045	0.0051	0.0064	0.0075	0.0101
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	275	5	0.0007	0.0012	0.0016	0.0021	0.0023	0.0028	0.0032	0.0039	0.0046	0.0062
			Profiling @ 2 x D Axial / ≤ .3 D Radial	350	5	0.0010	0.0016	0.0022	0.0028	0.0032	0.0038	0.0042	0.0053	0.0064	0.0085
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ .75 x D	325	5	0.0007	0.0007	0.0017	0.0023	0.0029	0.0035	0.0036	0.0051	0.0058	0.0072
			Profiling @ 2 x D Axial / ≤ .3 D Radial	400	5	0.0007	0.0007	0.0022	0.0028	0.0035	0.0042	0.0043	0.0058	0.0072	0.0087
Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ .75 x D	325	5	0.0010	0.0014	0.0020	0.0026	0.0030	0.0036	0.0040	0.0051	0.0061	0.0081	
		Profiling @ 2 x D Axial / ≤ .3 D Radial	400	5	0.0014	0.0022	0.0027	0.0036	0.0042	0.0050	0.0055	0.0069	0.0082	0.0110	
ISO-K	Ductile Iron Ductile Cast Iron	ASTM A536, ASTM 897	Slotting @ 1 x D	400	5	0.0007	0.0012	0.0014	0.0019	0.0022	0.0026	0.0029	0.0036	0.0043	0.0058
			Profiling @ 2 x D Axial / ≤ .3 D Radial	550	5	0.0010	0.0014	0.0020	0.0026	0.0029	0.0035	0.0039	0.0049	0.0059	0.0079
	Cast Iron Grey Cast Iron	SAE J431, ASTM A48	Slotting @ 1 x D	450	5	0.0009	0.0014	0.0017	0.0023	0.0026	0.0031	0.0035	0.0043	0.0052	0.0069
			Profiling @ 2 x D Axial / ≤ .3 D Radial	600	5	0.0012	0.0017	0.0023	0.0030	0.0036	0.0043	0.0048	0.0059	0.0071	0.0094
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting @ ≤ .5 x D	175	5	0.0007	0.0010	0.0013	0.0017	0.0020	0.0024	0.0026	0.0033	0.0040	0.0053
			Profiling @ 2 x D Axial / ≤ .3 D Radial	275	5	0.0009	0.0014	0.0019	0.0024	0.0027	0.0033	0.0036	0.0045	0.0055	0.0072

For 5553, decrease SFM and IPM by 25%

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: CRMG

DESCRIPTION: MULTI FLUTE - FINE PROFILE ROUGHING END MILL

Material Guide		Condition	SFM	CHIP PER TOOTH								
				3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	175	0.0008	0.0011	0.0013	0.0016	0.0022	0.0028	0.0034	0.0046
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0012	0.0015	0.0016	0.0022	0.0030	0.0039	0.0047
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	225	0.0009	0.0013	0.0017	0.0020	0.0027	0.0034	0.0041	0.0055
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0013	0.0018	0.0023	0.0028	0.0037	0.0047	0.0056
	Martensitic	403, 410, 416	Slotting @ ≤ .5 x D	200	0.0011	0.0014	0.0018	0.0021	0.0029	0.0036	0.0043	0.0059
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0015	0.0019	0.0023	0.0029	0.0040	0.0050	0.0060
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	85	0.0004	0.0005	0.0006	0.0008	0.0012	0.0015	0.0018	0.0025
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0004	0.0048	0.0007	0.0007	0.0014	0.0018	0.0022
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, Permannickel 300, Inconel 600	Slotting @ ≤ .5 x D	60	0.0002	0.0007	0.0008	0.0011	0.0019	0.0018	0.0029	0.0029
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0004	0.0007	0.0009	0.0012	0.0020	0.0020	0.0025
	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting @ ≤ .5 x D	70	0.0005	0.0009	0.0013	0.0015	0.0021	0.0026	0.0032	0.0042
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0005	0.0011	0.0013	0.0018	0.0023	0.0029	0.0035
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	225	0.0009	0.0014	0.0013	0.0021	0.0029	0.0036	0.0043	0.0059
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0014	0.0019	0.0021	0.0029	0.0040	0.0050	0.0060
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	200	0.0008	0.0012	0.0014	0.0018	0.0025	0.0030	0.0036	0.0049
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0012	0.0016	0.0021	0.0025	0.0033	0.0042	0.0050
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ .5 x D	250	0.0005	0.0013	0.0018	0.0022	0.0028	0.0040	0.0046	0.0057
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0005	0.0016	0.0022	0.0027	0.0034	0.0046	0.0057
Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ .5 x D	265	0.0011	0.0015	0.0023	0.0023	0.0032	0.0040	0.0048	0.0064	
				Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0016	0.0021	0.0029	0.0033	0.0043	0.0055	0.0066	0.0088

Material Guide		Condition	M/ MIN	CHIP PER TOOTH - METRIC										
				4mm	6mm	8mm	10mm	12mm	14mm	16mm	18mm	20mm	25mm	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	53	0.0208	0.0268	0.0330	0.0429	0.0562	0.0628	0.0714	0.0749	0.0793	0.0904
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0297	0.0386	0.0463	0.0562	0.0759	0.0858	0.0980	0.1062	0.1089
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	68	0.0238	0.0326	0.0397	0.0495	0.0693	0.0793	0.0862	0.0923	0.0958	0.1092
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0327	0.0446	0.0594	0.0727	0.0958	0.1089	0.1113	0.1057	0.1089
	Martensitic	403, 410, 416	Slotting @ ≤ .5 x D	61	0.0267	0.0356	0.0429	0.0528	0.0759	0.0858	0.0922	0.0963	0.1023	0.1166
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0386	0.0476	0.0628	0.0759	0.1023	0.1156	0.1278	0.1316	0.1387
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	26	0.0089	0.0118	0.0165	0.0198	0.0298	0.0363	0.0386	0.0406	0.0429	0.0489
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0089	0.0178	0.0165	0.0165	0.0363	0.0429	0.0446	0.0471	0.0495
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, Permannickel 300, Inconel 600	Slotting @ ≤ .5 x D	18	0.0059	0.0178	0.0198	0.0264	0.0463	0.0463	0.0446	0.0547	0.0660	0.0753
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0089	0.0178	0.0231	0.0298	0.0495	0.0495	0.0506	0.0534	0.0562
	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting @ ≤ .5 x D	21	0.0059	0.0238	0.0298	0.0397	0.0528	0.0594	0.0654	0.0697	0.0727	0.0828
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0119	0.0268	0.0363	0.0463	0.0594	0.0660	0.0744	0.0785	0.0826
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	68	0.0238	0.0356	0.0429	0.0528	0.0759	0.0826	0.0922	0.0961	0.0991	0.1129
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0357	0.0476	0.0628	0.0759	0.1023	0.1156	0.1278	0.1349	0.1387
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	61	0.0208	0.0298	0.0330	0.0463	0.0628	0.0693	0.0772	0.0802	0.0826	0.0941
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0297	0.0416	0.0528	0.0628	0.0826	0.0924	0.1070	0.1121	0.1188
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ .5 x D	76	0.0119	0.0326	0.0429	0.0562	0.0727	0.0858	0.1010	0.1056	0.1089	0.1242
					Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0119	0.0416	0.0562	0.0693	0.0858	0.0991	0.1160	0.1244	0.1288
Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ .5 x D	80	0.0267	0.0386	0.0495	0.0594	0.0793	0.0924	0.1010	0.1093	0.1156	0.1317	
				Profiling @ 2 x D Axial / ≤ .5 D Radial	0.0416	0.0528	0.0660	0.0826	0.1089	0.1255	0.1396	0.1460	0.1518	0.1731

# SPEED & FEED INFORMATION

Notes

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## SPEED & FEEDS FOR SERIES: CRFMG

DESCRIPTION: MULTI FLUTE - ROUGHER FINISHER

Material Guide			Condition	SFM	CHIP PER TOOTH							
					3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	175	0.0006	0.0008	0.0010	0.0013	0.0017	0.0022	0.0026	0.0035
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0009	0.0012	0.0012	0.0017	0.0023	0.0030	0.0036	0.0049
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	225	0.0007	0.0010	0.0013	0.0015	0.0021	0.0026	0.0032	0.0042
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0010	0.0014	0.0018	0.0022	0.0029	0.0036	0.0043	0.0058
	Martensitic	403, 410, 416	Slotting @ ≤ .5 x D	200	0.0008	0.0011	0.0014	0.0016	0.0023	0.0028	0.0033	0.0045
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0012	0.0014	0.0018	0.0023	0.0031	0.0039	0.0046	0.0062
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	85	0.0003	0.0004	0.0005	0.0006	0.0009	0.0012	0.0014	0.0019
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0003	0.0037	0.0005	0.0005	0.0011	0.0014	0.0017	0.0023
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, Permanickel 300, Inconel 600	Slotting @ ≤ .5 x D	60	0.0002	0.0005	0.0007	0.0008	0.0014	0.0014	0.0023	0.0023
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0003	0.0005	0.0007	0.0009	0.0015	0.0015	0.0019	0.0019
	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting @ ≤ .5 x D	70	0.0004	0.0007	0.0010	0.0012	0.0016	0.0020	0.0024	0.0032
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0004	0.0008	0.0010	0.0014	0.0018	0.0023	0.0027	0.0037
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	225	0.0007	0.0011	0.0010	0.0016	0.0023	0.0028	0.0033	0.0045
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0011	0.0014	0.0016	0.0023	0.0031	0.0039	0.0046	0.0062
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	200	0.0006	0.0009	0.0011	0.0014	0.0019	0.0023	0.0028	0.0038
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0009	0.0013	0.0016	0.0019	0.0025	0.0032	0.0039	0.0052
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ .5 x D	250	0.0004	0.0010	0.0014	0.0017	0.0022	0.0031	0.0035	0.0044
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0004	0.0013	0.0017	0.0021	0.0026	0.0035	0.0044	0.0053
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ .5 x D	265	0.0008	0.0012	0.0018	0.0018	0.0024	0.0031	0.0037	0.0050
			Profiling @ 2 x D Axial / ≤ .5 D Radial		0.0013	0.0016	0.0022	0.0025	0.0033	0.0042	0.0050	0.0068

Material Guide			Condition	M/ MIN	FL	CHIP PER TOOTH - METRIC						
						6mm	8mm	10mm	12mm	14mm	16mm	20mm
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Slotting @ ≤ .5 x D	53	4	0.0206	0.0254	0.0330	0.0432	0.0483	0.0549	0.0610
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0297	0.0356	0.0432	0.0584	0.0660	0.0754	0.0838
	Austenitic	302, 303, 304L, 316L	Slotting @ ≤ .5 x D	68	4	0.0251	0.0305	0.0381	0.0533	0.0610	0.0663	0.0737
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0343	0.0457	0.0559	0.0737	0.0838	0.0914	0.0838
	Martensitic	403, 410, 416	Slotting @ ≤ .5 x D	61	4	0.0274	0.0330	0.0406	0.0584	0.0660	0.0709	0.0787
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0366	0.0483	0.0584	0.0787	0.0889	0.0983	0.1067
ISO-S	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting @ ≤ .5 x D	26	4	0.0091	0.0127	0.0152	0.0229	0.0279	0.0297	0.0330
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0137	0.0127	0.0127	0.0279	0.0330	0.0343	0.0381
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, Permanickel 300, Inconel 600	Slotting @ ≤ .5 x D	18	4	0.0137	0.0152	0.0203	0.0356	0.0356	0.0343	0.0508
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0137	0.0178	0.0229	0.0381	0.0381	0.0389	0.0432
	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting @ ≤ .5 x D	21	4	0.0183	0.0229	0.0305	0.0406	0.0457	0.0503	0.0559
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0206	0.0279	0.0356	0.0457	0.0508	0.0572	0.0635
ISO-P	High Strength Steels	4140, 4340, 52100	Slotting @ ≤ .5 x D	68	4	0.0274	0.0330	0.0406	0.0584	0.0635	0.0709	0.0762
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0366	0.0483	0.0584	0.0787	0.0889	0.0983	0.1067
	High Alloy Steels - Mold & Die	A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ .5 x D	61	4	0.0229	0.0254	0.0356	0.0483	0.0533	0.0594	0.0635
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0320	0.0406	0.0483	0.0635	0.0711	0.0823	0.0914
	Medium Alloy Steels	200, 250, 300	Slotting @ ≤ .5 x D	76	4	0.0251	0.0330	0.0432	0.0559	0.0660	0.0777	0.0838
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0320	0.0432	0.0533	0.0660	0.0762	0.0892	0.0991
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Slotting @ ≤ .5 x D	80	4	0.0297	0.0381	0.0457	0.0610	0.0711	0.0777	0.0889
			Profiling @ 2 x D Axial / ≤ .5 D Radial		4	0.0406	0.0508	0.0635	0.0838	0.0965	0.1074	0.1168

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## SPEED & FEEDS FOR SERIES: HMG1-\_-SF-R

DESCRIPTION: 2 FLUTE - CORNER RADIUS FOR MULTI AXIS MACHINING

	Material Guide	SFM	FL	CHIP PER TOOTH								
		Standard Machining		1/32"	0.0394"	3/64"	1/16"	5/64"	3/32"	1/8"	3/16"	1/2"
ISO-H	Hardened Steels 25-35 HRc	375	2	0.0004	0.0008	0.0008	0.0009	0.0015	0.0016	0.0019	0.0028	0.0038
	Hardened Steels 35-45 HRc	300	2	0.0004	0.0007	0.0007	0.0008	0.0015	0.0016	0.0019	0.0028	0.0038
ISO-H	Hardened Steels 45-55 HRc	275	2	0.0003	0.0007	0.0007	0.0007	0.0012	0.0013	0.0015	0.0022	0.0030
	Hardened Steels 55-65 HRc	250	2	0.0003	0.0006	0.0006	0.0006	0.0011	0.0012	0.0014	0.0021	0.0028

	Material Guide	M/MIN	FL	CHIP PER TOOTH - METRIC								
		Standard Machining		.8mm	1mm	1.2mm	1.5mm	2mm	2.5mm	3mm	4mm	6mm
ISO-H	Hardened Steels 25-35 HRc	115	2	0.0102	0.0203	0.0203	0.0229	0.0381	0.0406	0.0483	0.0711	0.0965
	Hardened Steels 35-45 HRc	92	2	0.0102	0.0178	0.0178	0.0203	0.0381	0.0406	0.0483	0.0711	0.0965
ISO-H	Hardened Steels 45-55 HRc	84	2	0.0076	0.0178	0.0178	0.0178	0.0305	0.0330	0.0381	0.0559	0.0762
	Hardened Steels 55-65 HRc	76	2	0.0076	0.0152	0.0152	0.0152	0.0279	0.0305	0.0356	0.0533	0.0711

## SPEED & FEEDS FOR SERIES: HMG1-\_-SF-B

DESCRIPTION: 2 FLUTE - BALL NOSE FOR Z-AXIS MACHINING

	Material Guide	SFM	FL	CHIP PER TOOTH											
		Standard Machining		1/64"	0.0200"	1/32"	0.0394"	3/64"	1/16"	5/64"	3/32"	0.1181"	1/8"	3/16"	1/4"
ISO-H	Hardened Steels 25-35 HRc	375	2	0.0010	0.0010	0.0010	0.0015	0.0020	0.0020	0.0030	0.0030	0.0030	0.0032	0.0040	0.0045
	Hardened Steels 35-45 HRc	300	2	0.0010	0.0010	0.0010	0.0015	0.0020	0.0020	0.0030	0.0030	0.0030	0.0032	0.0040	0.0045
ISO-H	Hardened Steels 45-55 HRc	275	2	0.0010	0.0010	0.0010	0.0015	0.0020	0.0020	0.0030	0.0030	0.0030	0.0032	0.0040	0.0045
	Hardened Steels 55-65 HRc	250	2	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0020	0.0020	0.0020	0.0022	0.0030	0.0035

	Material Guide	M/MIN	FL	CHIP PER TOOTH - METRIC										
		Standard Machining		.5mm	.6mm	.8mm	1mm	1.5mm	2mm	2.5mm	3mm	4mm	5mm	6mm
ISO-H	Hardened Steels 25-35 HRc	115	2	0.0254	0.0254	0.0254	0.0381	0.0508	0.0762	0.0762	0.0762	0.0813	0.1016	0.1143
	Hardened Steels 35-45 HRc	92	2	0.0254	0.0254	0.0254	0.0381	0.0508	0.0762	0.0762	0.0762	0.0813	0.1016	0.1143
ISO-H	Hardened Steels 45-55 HRc	84	2	0.0254	0.0254	0.0254	0.0381	0.0508	0.0762	0.0762	0.0762	0.0813	0.1016	0.1143
	Hardened Steels 55-65 HRc	76	2	0.0254	0.0254	0.0254	0.0254	0.0254	0.0508	0.0508	0.0508	0.0559	0.0762	0.0889

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Notes

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## SPEED & FEEDS FOR SERIES: HMG-\_-B

DESCRIPTION: 2 FLUTE - BALL NOSE FOR HARD MILLING - MOLD & DIE APPLICATIONS

Material Guide	Condition	SFM		FL	CHIP PER TOOTH							
		High Speed Machining	Standard Machining		1/32"	3/32"	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"
ISO-H Hardened Steels 55-65 HRC	Roughing ≤ .04 x D doc and .25 x D woc	240		2	0.0040	0.0010	0.0020	0.0020	0.0030	0.0040	0.0050	0.0060
	Roughing ≤ .03 x D doc and .25 x D woc		120	2	0.0040	0.0010	0.0020	0.0020	0.0030	0.0040	0.0050	0.0050
	Roughing ≤ .02 x D doc and .2 x D woc	160		2	0.0040	0.0010	0.0020	0.0020	0.0030	0.0040	0.0050	0.0060
	Roughing ≤ .03 x D doc and .2 x D woc		80	2	0.0040	0.0010	0.0010	0.0020	0.0030	0.0040	0.0050	0.0050
ISO-H Hardened Steels 65 HRC and above	Finishing ≤ .04 x D doc and .4 x D woc	250		2	0.0010	0.0020	0.0020	0.0030	0.0040	0.0040	0.0050	0.0050
	Finishing ≤ .02 x D doc and .4 x D woc		150	2	0.0010	0.0020	0.0020	0.0030	0.0040	0.0040	0.0050	0.0050
	Finishing ≤ .03 x D doc and .02-.03 x D woc	200		2	0.0010	0.0020	0.0020	0.0030	0.0040	0.0040	0.0050	0.0050
	Finishing ≤ .03 x D doc and .02-.03 x D woc		120	2	0.0010	0.0020	0.0020	0.0030	0.0040	0.0040	0.0050	0.0050

Material Guide	Condition	M/MIN		FL	CHIP PER TOOTH - METRIC							
		High Speed Machining	Standard Machining		1mm	2mm	3mm	4mm	6mm	8mm	10mm	12mm
ISO-H Hardened Steels 55-65 HRC	Roughing ≤ .04 x D doc and .25 x D woc	73		2	0.1016	0.0254	0.0254	0.0508	0.0762	0.1016	0.1270	0.1524
	Roughing ≤ .03 x D doc and .25 x D woc		36	2	0.1016	0.0254	0.0254	0.0508	0.0762	0.1016	0.1270	0.1270
	Roughing ≤ .02 x D doc and .2 x D woc	48		2	0.1016	0.0254	0.0254	0.0508	0.0762	0.1016	0.1270	0.1524
	Roughing ≤ .03 x D doc and .2 x D woc		24	2	0.1016	0.0254	0.0254	0.0508	0.0762	0.1016	0.1270	0.1270
ISO-H Hardened Steels 65 HRC and above	Finishing ≤ .04 x D doc and .4 x D woc	76		2	0.0254	0.0508	0.0508	0.0762	0.1016	0.1016	0.1270	0.1270
	Finishing ≤ .02 x D doc and .4 x D woc		45	2	0.0254	0.0508	0.0508	0.0762	0.1016	0.1016	0.1270	0.1270
	Finishing ≤ .03 x D doc and .02-.03 x D woc	60		2	0.0254	0.0508	0.0508	0.0762	0.1016	0.1016	0.1270	0.1270
	Finishing ≤ .03 x D doc and .02-.03 x D woc		36	2	0.0254	0.0508	0.0508	0.0762	0.1016	0.1016	0.1270	0.1270

For light periphery profiling ≤ .005 x D increase above profiling chip load by 20%-25%

# SPEED & FEED INFORMATION

## SPEED & FEEDS FOR SERIES: CCMG45

DESCRIPTION: 6 FLUTE - 45° PROFILING END MILL - DIE & MOLD APPLICATIONS

### Notes

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	Material Guide	Condition	SFM		CHIP PER TOOTH							
			High Speed Machining	Standard Machining	1/8"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
ISO-H	Hardened Steels 55-65 HRC	Profiling $\leq 1.5 \times D$ doc and $.02 \times D$ woc	180		0.0010	0.0020	0.0020	0.0030	0.0030	0.0040	0.0050	0.0060
		Profiling $\leq 1.5 \times D$ doc and $.04 \times D$ woc		80	0.0010	0.0010	0.0020	0.0020	0.0020	0.0030	0.0030	0.0035
	Hardened Steels 65 HRc and above	Profiling $\leq 1.5 \times D$ doc and $.02 \times D$ woc	130		0.0010	0.0020	0.0020	0.0030	0.0030	0.0030	0.0040	0.0045
		Profiling $\leq 1.5 \times D$ doc and $.04 \times D$ woc		60	0.0010	0.0010	0.0020	0.0020	0.0020	0.0020	0.0030	0.0030

	Material Guide	Condition	M/MIN		CHIP PER TOOTH - METRIC						
			High Speed Machining	Standard Machining	3mm	6mm	8mm	10mm	12mm	16mm	20mm
ISO-H	Hardened Steels 55-65 HRC	Profiling $\leq 1.5 \times D$ doc and $.02 \times D$ woc	60 M/MIN		0.0254	0.0508	0.0508	0.0762	0.0762	0.1016	0.1270
		Profiling $\leq 1.5 \times D$ doc and $.04 \times D$ woc		24 M/MIN	0.0254	0.0254	0.0508	0.0508	0.0508	0.0762	0.0762
	Hardened Steels 65 HRc and above	Profiling $\leq 1.5 \times D$ doc and $.02 \times D$ woc	40 M/MIN		0.0254	0.0508	0.0508	0.0762	0.0762	0.0762	0.1016
		Profiling $\leq 1.5 \times D$ doc and $.04 \times D$ woc		18 M/MIN	0.0254	0.0254	0.0508	0.0508	0.0508	0.0508	0.0762

For light periphery profiling  $\leq .005 \times D$  increase above profiling chip load by 20-35%

# SPEED & FEED INFORMATION

Notes

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## SPEED & FEEDS FOR SERIES: DIAMOND

DESCRIPTION: DIAMOND COATED TOOLS

Material Guide	Condition	SFM	CHIP PER TOOTH								
			1/32"	1/16"	3/32"	1/8"	3/16"	1/4"	5/16"	3/8"	
ISO-N	Aluminum 5-8% Si	Rough	2000	0.0008	0.0010	0.0012	0.0013	0.0014	0.0014	0.0018	0.0022
		Finish	3000	0.0011	0.0013	0.0015	0.0018	0.0022	0.0029	0.0036	0.0039
	Aluminum Cast 8-12% Si	Rough	2000	0.0008	0.0010	0.0012	0.0013	0.0014	0.0014	0.0018	0.0022
		Finish	2500	0.0011	0.0013	0.0015	0.0018	0.0022	0.0029	0.0036	0.0039
	Graphite	Rough	1200	0.0005	0.0008	0.0012	0.0016	0.0020	0.0002	0.0028	0.0032
		Finish	2000	0.0010	0.0012	0.0014	0.0018	0.0022	0.0030	0.0034	0.0040
	Green Ceramic		1150	0.0010	0.0012	0.0015	0.0018	0.0022	0.0030	0.0034	0.0040

## SPEED & FEEDS FOR SERIES: DLC

DESCRIPTION: DIAMOND LIKE COATED TOOLS

Material Guide	Condition	SFM	CHIP PER TOOTH														
			1/32"	1/16"	3/32"	1/8"	5/32"	3/16"	7/32"	1/4"	9/32"	5/16"	11/32"	3/8"	7/16"	1/2"	
ISO-N	Aluminum 5-8% Si	Rough	1500	0.0008	0.0010	0.0012	0.0013	0.0014	0.0014	0.0015	0.0015	0.0016	0.0018	0.0019	0.0022	0.0024	0.0026
		Finish	2500	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0025	0.0029	0.0032	0.0036	0.0037	0.0039	0.0042	0.0044
	Aluminum Cast 8-12% Si	Rough	1400	0.0008	0.0010	0.0012	0.0013	0.0014	0.0014	0.0015	0.0015	0.0016	0.0018	0.0019	0.0022	0.0024	0.0026
		Finish	2000	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0025	0.0029	0.0032	0.0036	0.0037	0.0039	0.0040	0.0041
	Graphite	Rough	800	0.0005	0.0008	0.0012	0.0016	0.0018	0.0020	0.0022	0.0002	0.0016	0.0028	0.0030	0.0032	0.0034	0.0036
		Finish	1500	0.0010	0.0012	0.0014	0.0018	0.0020	0.0022	0.0027	0.0030	0.0032	0.0034	0.0037	0.0040	0.0045	0.0050
	Green Ceramic		850	0.0010	0.0012	0.0015	0.0018	0.0020	0.0022	0.0025	0.0030	0.0032	0.0034	0.0037	0.0040	0.0045	0.0050



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## SPEED & FEEDS FOR SERIES: CRMGD

DESCRIPTION: MULTI FLUTE - COMPOSITE ROUTER FOR CARBON FIBER

	Material Guide	Condition	SFM	CHIP PER TOOTH					
				1/8"	3/16"	1/4"	5/16"	3/8"	1/2"
ISO-N	Aramid Fiber / Carbon Fiber - CRFP & AFRP	Slotting	440	0.0030	0.0050	0.0060	0.0075	0.0090	0.0120
		Profiling	525	0.0030	0.0050	0.0060	0.0075	0.0090	0.0120
	Fiberglass - GFRP	Slotting	340	0.0030	0.0050	0.0060	0.0075	0.0090	0.0120
		Profiling	440	0.0030	0.0050	0.0060	0.0075	0.0090	0.0120
	Plastics	Slotting	525	0.0050	0.0060	0.0075	0.0090	0.0110	0.0140
		Profiling	650	0.0050	0.0060	0.0075	0.0090	0.0110	0.0140

	Material Guide	Condition	M/MIN	CHIP PER TOOTH					
				3mm	5mm	6mm	8mm	10mm	12mm
ISO-N	Aramid Fiber / Carbon Fiber - CRFP & AFRP	Slotting	135	0.0762	0.1270	0.1524	0.1905	0.2286	0.3048
		Profiling	160	0.0762	0.1270	0.1524	0.1905	0.2286	0.3048
	Fiberglass - GFRP	Slotting	104	0.0762	0.1270	0.1524	0.1905	0.2286	0.3048
		Profiling	135	0.0762	0.1270	0.1524	0.1905	0.2286	0.3048
	Plastics	Slotting	160	0.1270	0.1524	0.1905	0.2286	0.2794	0.3556
		Profiling	200	0.1270	0.1524	0.1905	0.2286	0.2794	0.3556

# SPEED & FEED INFORMATION

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## SPEED & FEEDS FOR SERIES: FRMG

DESCRIPTION: MULTI FLUTE FIBERGLASS ROUTERS

	Material Guide	Condition	SFM	CHIP PER TOOTH				
				1/8"	3/16"	1/4"	3/8"	1/2"
ISO-N	Fiberglass	Uncoated	1200	0.0006	0.0011	0.0016	0.0040	0.0060
		Diamond Like Coating	2600	0.0006	0.0011	0.0016	0.0040	0.0060
	Carbon Fiber	Uncoated	1400	0.0012	0.0020	0.0032	0.0057	0.0072
		Diamond Like Coating	3000	0.0012	0.0020	0.0032	0.0057	0.0072
	Graphite	Uncoated	500	0.0012	0.0014	0.0016	0.0052	0.0070
		Diamond Like Coating	600	0.0012	0.0014	0.0016	0.0052	0.007
	Composites	Uncoated	1200	0.0006	0.0009	0.0013	0.004	0.006
		Diamond Like Coating	2600	0.0006	0.0009	0.0013	0.0040	0.0060
	Hardened Plastics	Uncoated	1200	0.0012	0.0021	0.0032	0.0057	0.0062
		Diamond Like Coating	2300	0.0012	0.0021	0.0032	0.0057	0.0062

DOC = (1xDia - suggested chip load) ( 2 x Dia reduce chip load by 25%) (3 x Dia reduce chip load by 50%)

# SPEED & FEED INFORMATION

## SPEED & FEEDS FOR SERIES: VBMG

### DESCRIPTION: SPHERICAL BALL END MILLS

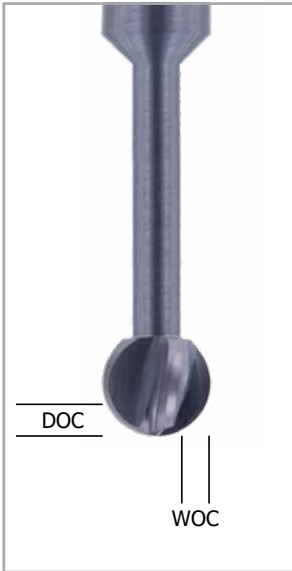
**Notes**

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

	Material Guide	Condition	SFM		CHIP PER TOOTH						
			High Speed Machining	Standard Machining	1/16"	3/32"	1/8"	3/16"	1/4"	3/8"	1/2"
ISO-H	Pre Hardened Steels 25-45 HRc	Roughing $\leq .06 \times D$ doc and $.3 \times D$ woc	340		0.0008	0.0010	0.0020	0.0030	0.0040	0.0060	0.0070
		Roughing $\leq .06 \times D$ doc and $.3 \times D$ woc		180	0.0008	0.0010	0.0020	0.0030	0.0040	0.0060	0.0070
	Pre Hardened Steels 25-45 HRc	Finishing $\leq .07 \times D$ doc and $.02-.6 \times D$ woc	350		0.0020	0.0020	0.0030	0.0040	0.0040	0.0050	0.0060
		Finishing $\leq .07 \times D$ doc and $.02-.6 \times D$ woc		200	0.0020	0.0020	0.0030	0.0040	0.0040	0.0050	0.0060

	Material Guide	Condition	M/MIN		CHIP PER TOOTH - METRIC				
			High Speed Machining	Standard Machining	4mm	6mm	8mm	10mm	12mm
ISO-H	Pre Hardened Steels 25-45 HRc	Roughing $\leq .06 \times D$ doc and $.3 \times D$ woc	104		0.0508	0.1016	0.1270	0.1524	0.1778
		Roughing $\leq .06 \times D$ doc and $.3 \times D$ woc		54	0.0508	0.1016	0.1270	0.1524	0.1778
	Pre Hardened Steels 25-45 HRc	Finishing $\leq .07 \times D$ doc and $.02-.6 \times D$ woc	106		0.0762	0.1016	0.1270	0.1270	0.1524
		Finishing $\leq .07 \times D$ doc and $.02-.6 \times D$ woc		60	0.0762	0.1016	0.1270	0.1270	0.1524

For light periphery profiling  $\leq .005 \times D$  increase above profiling chip load by 20%



# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: HXMG2

### DESCRIPTION: 2 FLUTE HIGH FEED CARBIDE END MILL

Material Guide			Condition	FL	CHIP PER TOOTH					SFM
					1/8"	1/4"	3/8"	1/2"	5/8"	
ISO-M	Precipitation <35 HRc	13-8, 15-5, 17-4PH	Axial Depth Max & 75% Cutting Width	2	0.0070	0.0110	0.0180	0.0220	0.0260	725
	Precipitation >35 HRc	13-8, 15-5, 17-4PH	Axial Depth Max & 75% Cutting Width	2	0.0060	0.0090	0.0140	0.0170	0.0220	525
	Austenitic <28 HRc	302, 303, 304L, 316L	Axial Depth Max & 75% Cutting Width	2	0.0070	0.0100	0.0150	0.0220	0.0260	350
ISO-P	High Strength Steels	4140, 4340, 52100	Axial Depth Max & 75% Cutting Width	2	0.0070	0.0110	0.0180	0.0220	0.0260	1050
	High Alloy Steels Mold & Die <50 HRc	A-2, P20, 01, 02, 06, D2, H-13	Axial Depth Max & 75% Cutting Width	2	0.0070	0.0100	0.0170	0.0200	0.0220	1200
	High Alloy Steels Mold & Die >50 HRc	A-2, P20, 01, 02, 06, D2, H-13	Axial Depth Max & 75% Cutting Width	2	0.0060	0.0090	0.0130	0.0180	0.0200	600
	Medium Alloy Steels	200, 250, 300	Axial Depth Max & 75% Cutting Width	2	0.0080	0.0120	0.0190	0.0250	0.0280	1350
ISO-K	Cast Iron <40 HRc Grey Cast Iron	SAE J431, ASTM A48	Axial Depth Max & 75% Cutting Width	2	0.0060	0.0100	0.0160	0.0200	0.0220	2650
	Cast Iron >40 HRc Grey Cast Iron	SAE J431, ASTM A48	Axial Depth Max & 75% Cutting Width	2	0.0060	0.0100	0.0160	0.0200	0.0220	1200
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Axial Depth Max & 75% Cutting Width	2	0.0060	0.0100	0.0160	0.0200	0.0220	450

Material Guide			Condition	FL	CHIP PER TOOTH - METRIC					M/ MIN
					3mm	6mm	8mm	10mm	12mm	
ISO-M	Precipitation <35 HRc	13-8, 15-5, 17-4PH	Axial Depth Max & 75% Cutting Width	2	0.1700	0.2600	0.3700	0.4800	0.5300	225
	Precipitation >35 HRc	13-8, 15-5, 17-4PH	Axial Depth Max & 75% Cutting Width	2	0.1400	0.2100	0.2900	0.3700	0.4100	160
	Austenitic <28 HRc	302, 303, 304L, 316L	Axial Depth Max & 75% Cutting Width	2	0.1700	0.2400	0.3200	0.4000	0.5300	100
ISO-P	High Strength Steels	4140, 4340, 52100	Axial Depth Max & 75% Cutting Width	2	0.1700	0.2600	0.3700	0.4800	0.5300	300
	High Alloy Steels Mold & Die <50 HRc	A-2, P20, 01, 02, 06, D2, H-13	Axial Depth Max & 75% Cutting Width	2	0.1900	0.2900	0.4000	0.5100	0.6000	385
	High Alloy Steels Mold & Die >50 HRc	A-2, P20, 01, 02, 06, D2, H-13	Axial Depth Max & 75% Cutting Width	2	0.1700	0.2400	0.3500	0.4500	0.4800	320
	Medium Alloy Steels	200, 250, 300	Axial Depth Max & 75% Cutting Width	2	0.1400	0.2100	0.2800	0.3500	0.4300	165
ISO-K	Cast Iron <40 HRc Grey Cast Iron	SAE J431, ASTM A48	Axial Depth Max & 75% Cutting Width	2	0.1400	0.2400	0.3300	0.4300	0.4800	700
	Cast Iron >40 HRc Grey Cast Iron	SAE J431, ASTM A48	Axial Depth Max & 75% Cutting Width	2	0.1400	0.2400	0.3300	0.4300	0.4800	325
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Axial Depth Max & 75% Cutting Width	2	0.1400	0.2400	0.3300	0.4300	0.4800	155

# SPEED & FEED INFORMATION

Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: HXMG4

### DESCRIPTION: 4 FLUTE HIGH FEED CARBIDE END MILL

Material Guide		Condition	SFM	FL	CHIP PER TOOTH					
					1/8"	1/4"	3/8"	1/2"	5/8"	
ISO-M	Precipitation <35 HRC	13-8, 15-5, 17-4PH	Axial Depth Max & 75% Cutting Width	725	4	0.0070	0.0110	0.0180	0.0220	0.0260
	Precipitation >35 HRC	13-8, 15-5, 17-4PH	Axial Depth Max & 75% Cutting Width	525	4	0.0060	0.0090	0.0140	0.0170	0.0220
	Austenitic <28 HRC	302, 303, 304L, 316L	Axial Depth Max & 75% Cutting Width	350	4	0.0070	0.0100	0.0150	0.0220	0.0260
ISO-P	High Strength Steels	4140, 4340, 52100	Axial Depth Max & 75% Cutting Width	1050	4	0.0070	0.0110	0.0180	0.0220	0.0260
	High Alloy Steels Mold & Die <50 HRC	A-2, P20, 01, 02, 06, D2, H-13	Axial Depth Max & 75% Cutting Width	1200	4	0.0070	0.0100	0.0170	0.0200	0.0220
	High Alloy Steels Mold & Die >50 HRC	A-2, P20, 01, 02, 06, D2, H-13	Axial Depth Max & 75% Cutting Width	600	4	0.0060	0.0090	0.0130	0.0180	0.0200
	Medium Alloy Steels	200, 250, 300	Axial Depth Max & 75% Cutting Width	1350	4	0.0080	0.0120	0.0190	0.0250	0.0280
ISO-K	Cast Iron <40 HRC Grey Cast Iron	SAE J431, ASTM A48	Axial Depth Max & 75% Cutting Width	2650	4	0.0060	0.0100	0.0160	0.0200	0.0220
	Cast Iron >40 HRC Grey Cast Iron	SAE J431, ASTM A48	Axial Depth Max & 75% Cutting Width	1200	4	0.0060	0.0100	0.0160	0.0200	0.0220
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Axial Depth Max & 75% Cutting Width	450	4	.003-.006	.006-.011	.009-.016	.012-.022	.012-.024

Material Guide		Condition	M/ MIN	FL	CHIP PER TOOTH - METRIC					
					3mm	6mm	8mm	10mm	12mm	
ISO-M	Precipitation <35 HRC	13-8, 15-5, 17-4PH	Axial Depth Max & 75% Cutting Width	225	4	0.1700	0.2600	0.3700	0.4800	0.5300
	Precipitation >35 HRC	13-8, 15-5, 17-4PH	Axial Depth Max & 75% Cutting Width	160	4	0.1400	0.2100	0.2900	0.3700	0.4100
	Austenitic <28 HRC	302, 303, 304L, 316L	Axial Depth Max & 75% Cutting Width	100	4	0.1700	0.2400	0.3200	0.4000	0.5300
ISO-P	High Strength Steels	4140, 4340, 52100	Axial Depth Max & 75% Cutting Width	300	4	0.1700	0.2600	0.3700	0.4800	0.5300
	High Alloy Steels Mold & Die <50 HRC	A-2, P20, 01, 02, 06, D2, H-13	Axial Depth Max & 75% Cutting Width	385	4	0.1900	0.2900	0.4000	0.5100	0.6000
	High Alloy Steels Mold & Die >50 HRC	A-2, P20, 01, 02, 06, D2, H-13	Axial Depth Max & 75% Cutting Width	320	4	0.1700	0.2400	0.3500	0.4500	0.4800
	Medium Alloy Steels	200, 250, 300	Axial Depth Max & 75% Cutting Width	165	4	0.1400	0.2100	0.2800	0.3500	0.4300
ISO-K	Cast Iron <40 HRC Grey Cast Iron	SAE J431, ASTM A48	Axial Depth Max & 75% Cutting Width	700	4	0.1400	0.2400	0.3300	0.4300	0.4800
	Cast Iron >40 HRC Grey Cast Iron	SAE J431, ASTM A48	Axial Depth Max & 75% Cutting Width	325	4	0.1400	0.2400	0.3300	0.4300	0.4800
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Axial Depth Max & 75% Cutting Width	155	4	0.1400	0.2400	0.3300	0.4300	0.4800

# SPEED & FEED INFORMATION

## SPEED & FEEDS FOR SERIES: CDR & MDR

### DESCRIPTION: 2 FLUTE - 140° POINT DRILLS - WITH & WITHOUT COOLANT HOLE

#### Notes

**Note:** All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

	Material Guide		Material Hardness	SFM		FL	INCHES PER REV (IPR)					
				Non-Coolant	Coolant Fed		1/16" - 1/8"	1/8" - 1/4"	1/4" - 3/8"	3/8" - 1/2"	1/2" - 5/8"	5/8" - 3/4"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Under 35 HRC	225	300	2	.0005 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0045	.0040 - .0055
			Over 35 HRC	175	240	2	.0002 - .0005	.0005 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0045
	Austenitic	302, 303, 304L, 316L	Under 35 HRC	125	175	2	.0005 - .0010	.0010 - .0015	.0015 - .0020	.0020 - .0030	.0030 - .0040	.0025 - .0040
			Over 35 HRC	80	100	2	.0001 - .0003	.0003 - .0010	.0010 - .0015	.0015 - .0025	.0025 - .0035	.0020 - .0040
ISO-S	Martensitic	403, 410, 416	Under 35 HRC	225	300	2	.0007 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0045	.0040 - .0055
			Over 35 HRC	175	240	2	.0002 - .0005	.0005 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0045
	Cobalt Base	Stellite, Haynes 25, 188, X-40	Under 35 HRC	185	225	2	.0005 - .0010	.0010 - .0020	.0020 - .0030	.0025 - .0035	.0030 - .0040	.0035 - .0055
			Over 35 HRC	125	180	2	.0002 - .0005	.0005 - .0015	.0015 - .0025	.0020 - .0030	.0025 - .0035	.0030 - .0045
ISO-P	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Monel 400, 405, K-Monel, Inconel 600	Under 35 HRC	150	225	2	.0005 - .0010	.0010 - .0020	.0020 - .0030	.0025 - .0035	.0030 - .0040	.0035 - .0055
			Over 35 HRC	125	180	2	.0002 - .0005	.0005 - .0015	.0015 - .0025	.0020 - .0030	.0025 - .0035	.0030 - .0045
	Iron Base	Incoloy 800-802, Multimet N-155	Under 35 HRC	200	300	2	.0007 - .0015	.0015 - .0025	.0025 - .0030	.0025 - .0035	.0035 - .0045	.0035 - .0055
			Over 35 HRC	150	240	2	.0002 - .0005	.0005 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0030 - .0045
ISO-K	High Strength Steels	4140, 4340, 52100	Under 35 HRC	200	300	2	.0007 - .0015	.0015 - .0025	.0025 - .0030	.0025 - .0030	.0035 - .0045	.0045 - .0055
			Over 35 HRC	175	240	2	.0002 - .0005	.0005 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0045
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	Under 35 HRC	200	300	2	.0005 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0045	.0045 - .0055
			Over 35 HRC	175	240	2	.0002 - .0005	.0005 - .0015	.0015 - .0025	.0020 - .0030	.0025 - .0035	.0030 - .0045
ISO-S	Medium Alloy Steels	200, 250, 300, 8620	Under 35 HRC	200	300	2	.0005 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0045	.0045 - .0055
			Over 35 HRC	175	240	2	.0002 - .0005	.0005 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0045
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Under 35 HRC	200	300	2	.0007 - .0015	.0015 - .0025	.0025 - .0030	.0025 - .0035	.0035 - .0045	.0045 - .0055
			Over 35 HRC	175	240	2	.0002 - .0005	.0005 - .0015	.0015 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0045
ISO-N	Ductile Iron	ASTM A536, ASTM 897	Under 35 HRC	250	350	2	.0013 - .0025	.0025 - .0035	.0035 - .0045	.0035 - .0045	.0045 - .0055	.0065 - .0075
			Over 35 HRC	250	400	2	.0013 - .0025	.0025 - .0035	.0035 - .0045	.0035 - .0045	.0045 - .0055	.0065 - .0075
	Cast Iron Grey Cast Iron	SAE J431, ASTM A48	Under 35 HRC	250	400	2	.0013 - .0025	.0025 - .0035	.0035 - .0045	.0035 - .0045	.0045 - .0055	.0065 - .0075
Over 35 HRC			250	400	2	.0013 - .0025	.0025 - .0035	.0035 - .0045	.0035 - .0045	.0045 - .0055	.0065 - .0075	
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Under 35 HRC	225	350	2	.0005 - .0010	.0010 - .0020	.0020 - .0030	.0025 - .0035	.0030 - .0040	.0035 - .0055
			Over 35 HRC	225	350	2	.0005 - .0010	.0010 - .0020	.0020 - .0030	.0025 - .0035	.0030 - .0040	.0035 - .0055
For 5553, decrease SFM and IPM by 25%												
ISO-N	Copper Alloys		Under 35 HRC	300	400	2	.0015 - .0025	.0025 - .0035	.0035 - .0045	.0035 - .0045	.0045 - .0055	.0065 - .0075
			Over 35 HRC	300	400	2	.0015 - .0025	.0025 - .0035	.0035 - .0045	.0035 - .0045	.0045 - .0055	.0065 - .0075
	Brass Short Chips		Under 35 HRC	200	300	2	.0015 - .0025	.0025 - .0035	.0035 - .0045	.0035 - .0045	.0045 - .0055	.0065 - .0075
			Over 35 HRC	200	300	2	.0015 - .0025	.0025 - .0035	.0035 - .0045	.0035 - .0045	.0045 - .0055	.0065 - .0075
	Bronze Short Chips		Under 35 HRC	200	300	2	.0015 - .0025	.0025 - .0035	.0035 - .0045	.0035 - .0045	.0045 - .0055	.0065 - .0075
			Over 35 HRC	150	250	2	.0007 - .0015	.0015 - .0025	.0025 - .0035	.0025 - .0035	.0045 - .0055	.0065 - .0075
	Magnesium		Under 35 HRC	300	400	2	.0020 - .0035	.0035 - .0045	.0045 - .0055	.0065 - .0075	.0085 - .0095	.0085 - .0095
Over 35 HRC			300	400	2	.0020 - .0035	.0035 - .0045	.0045 - .0055	.0065 - .0075	.0085 - .0095	.0085 - .0095	
Aluminum	6061-T6, 7075 Die Cast	Under 35 HRC	400	500	2	.0020 - .0035	.0035 - .0045	.0045 - .0055	.0065 - .0075	.0085 - .0095	.0085 - .0095	
		Over 35 HRC	300	400	2	.0015 - .0025	.0025 - .0035	.0035 - .0045	.0055 - .0065	.0075 - .0085	.0075 - .0085	

	Material Guide		Material Hardness	M/MIN		FL	MILLIMETERS PER REV (mmPR)					
				Non-Coolant	Coolant Fed		1.5mm-3mm	3mm-6.5mm	6.5mm-10mm	10mm-13mm	13mm-16mm	16mm-20mm
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Under 35 HRC	68	90	2	.0127-.0381	.0381-.0635	.0635-.0762	.0762-.0889	.0889-.1143	.1016-.1397
			Over 35 HRC	53	73	2	.0050-.0203	.0127-.0381	.0381-.0635	.0635-.0762	.0762-.0889	.0889-.1143
	Austenitic	302, 303, 304L, 316L	Under 35 HRC	38	53	2	.0127-.0254	.0254-.0381	.0381-.0508	.0508-.0762	.0762-.1016	.0635-.1016
			Over 35 HRC	24	30	2	.0025-.0076	.0076-.0254	.0254-.0381	.0381-.0635	.0635-.0889	.0508-.1016
ISO-S	Martensitic	403, 410, 416	Under 35 HRC	67	90	2	.0177-.0381	.0381-.0635	.0635-.0762	.0762-.0889	.0889-.1016	.1016-.1397
			Over 35 HRC	53	73	2	.0058-.0127	.0127-.0381	.0381-.0635	.0635-.0762	.0762-.0889	.0889-.1143
	Cobalt Base	Stellite, Haynes 25, 188, X-40	Under 35 HRC	56	69	2	.0127-.0254	.0254-.0508	.0508-.0762	.0635-.0889	.0762-.1016	.0889-.1397
			Over 35 HRC	38	55	2	.0050-.0254	.0127-.0381	.0381-.0635	.0508-.0762	.0635-.0889	.0762-.1016
ISO-P	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Monel 400, 405, K-Monel, Inconel 600	Under 35 HRC	45	69	2	.0127-.0254	.0254-.0508	.0508-.0762	.0635-.0889	.0762-.1143	.0889-.1397
			Over 35 HRC	38	55	2	.0050-.0127	.0127-.0381	.0381-.0635	.0508-.0762	.0635-.0889	.0762-.1143
	Iron Base	Incoloy 800-802, Multimet N-155	Under 35 HRC	60	90	2	.0177-.0381	.0381-.0635	.0635-.0762	.0635-.0889	.0889-.1143	.0889-.1397
			Over 35 HRC	45	73	2	.0050-.0127	.0127-.0381	.0381-.0635	.0635-.0762	.0762-.0889	.0762-.1143
ISO-K	High Strength Steels	4140, 4340, 52100	Under 35 HRC	60	90	2	.0177-.0381	.0381-.0635	.0635-.0762	.0762-.0889	.0889-.1143	.1143-.1397
			Over 35 HRC	53	73	2	.0050-.0127	.0127-.0381	.0381-.0635	.0635-.0762	.0762-.0889	.0889-.1143
	High Alloy Steels Mold & Die	A-2, P20, 01, 02, 06, D2, H-13	Under 35 HRC	60	90	2	.0127-.0381	.0381-.0635	.0635-.0762	.0635-.0762	.0762-.0889	.0889-.1143
			Over 35 HRC	53	73	2	.0050-.0127	.0127-.0381	.0281-.0635	.0635-.0762	.0762-.0889	.0889-.1143
ISO-S	Medium Alloy Steels	200, 250, 300, 8620	Under 35 HRC	60	90	2	.0127-.0381	.0381-.0635	.0635-.0762	.0762-.0889	.0889-.1143	.1143-.1397
			Over 35 HRC	53	73	2	.0050-.0127	.0127-.0381	.0281-.0635	.0635-.0762	.0762-.0889	.0889-.1143
	Low Alloy Steels-Maraging	10XX, 11XX, 13XX	Under 35 HRC	60	90	2	.0177-.0381	.0381-.0635	.0635-.0762	.0762-.0889	.0889-.1143	.1143-.1397
			Over 35 HRC	53	73	2	.0050-.0127	.0127-.0381	.0281-.0635	.0635-.0762	.0762-.0889	.0889-.1143
ISO-N	Ductile Iron	ASTM A536, ASTM 897	Under 35 HRC	76	106	2	.0330-.0635	.0635-.0889	.0889-.1143	.0889-.1143	.1143-.1397	.1651-.1905
			Over 35 HRC	76	122	2	.0330-.0635	.0635-.0889	.0889-.1143	.0889-.1143	.1143-.1397	.1651-.1905
	Cast Iron Grey Cast Iron	SAE J431, ASTM A48	Under 35 HRC	76	122	2	.0330-.0635	.0635-.0889	.0889-.1143	.0889-.1143	.1143-.1397	.1651-.1905
Over 35 HRC			76	122	2	.0330-.0635	.0635-.0889	.0889-.1143	.0889-.1143	.1143-.1397	.1651-.1905	
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Under 35 HRC	68	106	2	.0127-.0254	.0254-.0508	.0508-.0672	.0635-.0889	.0762-.1016	.0889-.1397
			Over 35 HRC	68	106	2	.0127-.0254	.0254-.0508	.0508-.0672	.0635-.0889	.0762-.1016	.0889-.1397
For 5553, decrease SFM and IPM by 25%												
ISO-N	Copper Alloys		Under 35 HRC	90	122	2	.0381-.0635	.0635-.0889	.0889-.1143	.0889-.1143	.1143-.1397	.1651-.1905
			Over 35 HRC	90	122	2	.0381-.0889	.0889-.1143	.1143-.1397	.1651-.1905	.2159-.2413	.2519-.2413
	Brass Short Chips		Under 35 HRC	60	90	2	.0254-.0635	.0635-.0889	.0889-.1143	.1397-.1651	.1905-.2159	.1905-.2159
			Over 35 HRC	60	90	2	.0254-.0635	.0635-.0889	.0889-.1143	.0889-.1143	.1397-.1651	.1905-.2159
	Bronze Short Chips		Under 35 HRC	60	90	2	.0254-.0635	.0635-.0889	.0889-.1143	.0889-.1143	.1397-.1651	.1905-.2159
			Over 35 HRC	45	76	2	.0177-.0381	.0381-.0635	.0365-.0889	.0635-.0889	.1143-.1397	.1651-.1905
	Magnesium		Under 35 HRC	90	122	2	.0580-.0889	.0889-.1143	.1143-.1397	.1651-.1905	.2159-.2413	.2159-.2413
Over 35 HRC			90	122	2	.0580-.0889	.0889-.1143	.1143-.1397	.1651-.1905	.2159-.2413	.2159-.2413	
Aluminum	6061-T6, 7075 Die Cast	Under 35 HRC	122	152	2	.0580-.0889	.0889-.1143	.1143-.1397	.1651-.1905	.2159-.2413	.2159-.2413	
		Over 35 HRC	90	122	2	.0254-.0635	.0635-.0889	.0889-.1143	.1397-.1651	.1905-.2159	.1905-.2159	

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: DA - 60°

### DESCRIPTION: 4 & 6 FLUTE - 60° SPECIAL USE DOUBLE ANGLE MILLS

Material Guide			Condition	SFM	CHIP PER TOOTH						
					1/8"	5/32"	3/16"	1/4"	5/16"	3/8"	1/2"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Deburring	150	0.0003	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011
			Circular Groove Interpolating		0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0007
	Austenitic	304, 316	Deburring	200	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0019
			Circular Groove Interpolating		0.0004	0.0004	0.0005	0.0007	0.0009	0.0011	0.0015
	Martensitic	403, 410, 416	Deburring	325	0.0004	0.0005	0.0007	0.0008	0.0011	0.0013	0.0018
			Circular Groove Interpolating		0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0012
ISO-S	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Deburring	70	0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0012
			Circular Groove Interpolating		0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0007
ISO-P	High Alloy Steels Mold & Die	A-2, P20, H-13	Deburring	200	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0019
			Circular Groove Interpolating		0.0003	0.0003	0.0004	0.0005	0.0007	0.0008	0.0012
	High Alloy Steels Carbon Steels	4140, 8620	Deburring	225	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0019
			Circular Groove Interpolating		0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0012
	High Alloy Steels Tool Steels	S7, D2	Deburring	150	0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0012
			Circular Groove Interpolating		0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0007
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Deburring	160	0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0012
			Circular Groove Interpolating		0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0007
ISO-N	Copper Alloys	Brass, Aluminum Bronze	Deburring	500	0.0009	0.0011	0.0014	0.0018	0.0023	0.0027	0.0039
			Circular Groove Interpolating		0.0006	0.0007	0.0009	0.0011	0.0015	0.0017	0.0024
	Aluminum	8-12% Silicon Content	Deburring	650	0.0010	0.0012	0.0016	0.0020	0.0026	0.0030	0.0043
			Circular Groove Interpolating		0.0006	0.0008	0.0010	0.0013	0.0017	0.0019	0.0028
	Aluminum	6061, 7075	Deburring	900	0.0012	0.0014	0.0019	0.0024	0.0031	0.0036	0.0052
			Circular Groove Interpolating		0.0007	0.0009	0.0011	0.0015	0.0019	0.0022	0.0031

# SPEED & FEED INFORMATION

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

## SPEED & FEEDS FOR SERIES: DA - 90°

### DESCRIPTION: 2, 4 & 6 FLUTE - 90° SPECIAL USE DOUBLE ANGLE MILLS

Material Guide			Condition	SFM	CHIP PER TOOTH												
					1/16"	5/64"	3/32"	3mm	1/8"	5/32"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"
ISO-M	Precipitation	13-8, 15-5, 17-4PH	Deburring	150	0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0005	0.0007	0.0008	0.0010	0.0011	0.0014
			Circular Groove Interpolating		0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0007	0.0007	0.0009
	Austenitic	304, 316	Deburring	200	0.0002	0.0003	0.0004	0.0004	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0017	0.0019	0.0023
			Circular Groove Interpolating		0.0002	0.0002	0.0003	0.0004	0.0004	0.0004	0.0005	0.0007	0.0009	0.0011	0.0014	0.0015	0.0019
	Martensitic	403, 410, 416	Deburring	325	0.0002	0.0003	0.0004	0.0004	0.0004	0.0005	0.0007	0.0008	0.0011	0.0013	0.0016	0.0018	0.0022
			Circular Groove Interpolating		0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0011	0.0012	0.0015
ISO-S	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Inconel 600	Deburring	70	0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0011	0.0012	0.0015
			Circular Groove Interpolating		0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0007	0.0007	0.0009
ISO-P	High Alloy Steels Mold & Die	A-2, P20, H-13	Deburring	200	0.0002	0.0003	0.0004	0.0004	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0017	0.0019	0.0023
			Circular Groove Interpolating		0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0012	0.0014
	High Alloy Steels Carbon Steels	4140, 8620	Deburring	225	0.0002	0.0003	0.0004	0.0004	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0017	0.0019	0.0023
			Circular Groove Interpolating		0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0011	0.0012	0.0015
	High Alloy Steels Tool Steels	S7, D2	Deburring	150	0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0011	0.0012	0.0015
			Circular Groove Interpolating		0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
ISO-S	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-2S	Deburring	160	0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0011	0.0012	0.0015
			Circular Groove Interpolating		0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0007	0.0007	0.0009
ISO-N	Copper Alloys	Brass, Aluminum Bronze	Deburring	500	0.0005	0.0006	0.0008	0.0009	0.0009	0.0011	0.0014	0.0018	0.0023	0.0027	0.0035	0.0039	0.0048
			Circular Groove Interpolating		0.0003	0.0004	0.0005	0.0006	0.0006	0.0007	0.0009	0.0011	0.0015	0.0017	0.0022	0.0024	0.0030
	Aluminum	8-12% Silicon Content	Deburring	650	0.0005	0.0007	0.0008	0.0010	0.0010	0.0012	0.0016	0.0020	0.0026	0.0030	0.0039	0.0043	0.0053
			Circular Groove Interpolating		0.0003	0.0004	0.0005	0.0006	0.0006	0.0008	0.0010	0.0013	0.0017	0.0019	0.0025	0.0028	0.0034
	Aluminum	6061, 7075	Deburring	900	0.0006	0.0008	0.0010	0.0012	0.0012	0.0014	0.0019	0.0024	0.0031	0.0036	0.0047	0.0052	0.0064
			Circular Groove Interpolating		0.0004	0.0005	0.0006	0.0007	0.0007	0.0009	0.0011	0.0015	0.0019	0.0022	0.0028	0.0031	0.0039



# SPEED & FEED INFORMATION

## SPEED & FEEDS FOR SERIES: TM

### DESCRIPTION: MULTI FLUTE 60° THREAD MILLS

#### Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE Team with questions

Material Guide		SFM	CHIP PER TOOTH									
			1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	175	0.0050	0.0010	0.0015	0.0021	0.0025	0.0030	0.0035	0.0040	0.0045
	Austenitic & Martensitic	303, 316, 321, 304, 410, 416, 422, 430	315	0.0005	0.0010	0.0015	0.0020	0.0030	0.0035	0.0040	0.0045	0.0050
ISO-S	Nickel Base	Inconel, Hastelloy, Monel	110	0.0003	0.0005	0.0008	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035
ISO-P	Medium Carbon Steels <46 HRC	1045, 4140, 4340, 52100	250	0.0003	0.0005	0.0008	0.0009	0.0010	0.0015	0.0020	0.0025	0.0030
	Medium Carbon Steels 25-35 HRC	1030, 4130, 40140	300	0.0005	0.0010	0.0015	0.0020	0.0030	0.0035	0.0040	0.0045	0.0050
	Low Carbon Steels <25 HRC	1018, 12L-14	500	0.0005	0.0010	0.0015	0.0020	0.0030	0.0035	0.0040	0.0045	0.0050
ISO-K	Ductile Iron Ductile Cast Iron	ASTM A536, ASTM 897	300	0.0006	0.0007	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040
	Cast Iron Grey Cast Iron	SAE J431, ASTM A48	500	0.0005	0.0006	0.0009	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035
ISO-S	Titanium Alloys	6AL-4V	225	0.0003	0.0005	0.0008	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035
ISO-N	Aluminum	T-6061, T7075	1000	0.0005	0.0010	0.0015	0.0020	0.0030	0.0035	0.0040	0.0045	0.0050
ISO-N	Brass	Free Machining	800	0.0005	0.0010	0.0015	0.0020	0.0030	0.0035	0.0040	0.0045	0.0050

Material Guide		M/MIN	CHIP PER TOOTH - METRIC									
			3.5mm	5mm	6.5mm	8mm	9.5mm	13mm	16mm	19mm	24mm	
ISO-M	Precipitation	13-8, 15-5, 17-4PH	53	0.01mm	0.03mm	0.04mm	0.05mm	0.06mm	0.08mm	0.09mm	0.10mm	0.11mm
	Austenitic & Martensitic	303, 316, 321, 304, 410, 416, 422, 430	95	0.01mm	0.03mm	0.04mm	0.05mm	0.08mm	0.09mm	0.10mm	0.11mm	0.13mm
ISO-S	Nickel Base	Inconel, Hastelloy, Monel	35	0.01mm	0.01mm	0.02mm	0.03mm	0.04mm	0.05mm	0.06mm	0.08mm	0.09mm
ISO-P	Medium Carbon Steels <46 HRC	1045, 4140, 4340, 52100	76	0.01mm	0.01mm	0.02mm	0.02mm	0.03mm	.04mm	0.05mm	0.06mm	0.08mm
	Medium Carbon Steels 25-35 HRC	1030, 4130, 40140	90	0.01mm	0.03mm	0.04mm	0.05mm	0.08mm	0.09mm	0.10mm	0.11mm	0.13mm
	Low Carbon Steels <25 HRC	1018, 12L-14	152	0.01mm	0.03mm	0.04mm	0.05mm	0.08mm	0.09mm	0.10mm	0.11mm	0.13mm
ISO-K	Ductile Iron Ductile Cast Iron	ASTM A536, ASTM 897	90	0.02mm	0.02mm	0.03mm	0.04mm	0.05mm	0.06mm	0.08mm	0.09mm	0.10mm
	Cast Iron Grey Cast Iron	SAE J431, ASTM A48	135	0.01mm	0.02mm	0.02mm	0.03mm	0.04mm	0.05mm	0.06mm	0.08mm	0.09mm
ISO-S	Titanium Alloys	6AL-4V	70	0.01mm	0.01mm	0.02mm	0.03mm	0.04mm	0.05mm	0.06mm	0.08mm	0.09mm
ISO-N	Aluminum	T-6061, T7075	305	0.01mm	0.03mm	0.04mm	0.05mm	0.08mm	0.09mm	0.10mm	0.11mm	0.13mm
ISO-N	Brass	Free Machining	244	0.01mm	0.03mm	0.04mm	0.05mm	0.08mm	0.09mm	0.10mm	0.11mm	0.13mm

# CALCULATION INFORMATION

End mill speed & feed formulas are the various individual equations that determine the proper overall machining setup or more specifically the speed of the cutting tool and the rate which it is fed into the work piece. Each individual formula is distinct in what it determines but coordinates with the others to ensure successful cutting tool application. You can visit the **TECHNICAL** section on [www.melintool.com](http://www.melintool.com) for more information.

## INCH

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{3.82 \times \text{SFM} / \text{Tool Dia}}$$

$$\text{SFM} = \frac{\text{Surface Foot Per Minute}}{.262 \times \text{RPM} \times \text{Tool Dia}}$$

$$\text{CPT or IPT} = \frac{\text{Chip-Load Per Tooth}}{\text{IPM} / \text{RPM} / \text{No. Of Flutes}}$$

$$\text{IPM} = \frac{\text{Inches Per Minute}}{\text{CPT} \times \text{RPM} \times \text{No. Of Flutes}}$$

$$\text{MRRCI} = \frac{\text{Metal Removal Rate Cubic Inches}}{\text{IPM} \times \text{Axial Doc} \times \text{Radial Woc}}$$

$$\text{IPR} = \frac{\text{Inches Per Revolution}}{\text{IPM} / \text{RPM}}$$

## METRIC

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{1000 \times \text{M/MIN} / (3.14 \times D)}$$

$$\text{M/MIN} = \frac{\text{Meters Per Minute}}{(3.14 \times D \times \text{RPM}) / 1000}$$

$$\text{Fz OR CPT} = \frac{\text{Chip-Load Per Tooth}}{\text{Feedrate (mm) per MIN} / (Z \times \text{RPM})}$$

$$\text{VF OR FPM} = \frac{\text{Feedrate (mm) Per Minute}}{\text{Feerate (mm) per Tooth} \times Z \times \text{RPM}}$$

D = Cutter Dia.  
Z = No. Of Teeth.

## Notes

**Note:** All technical data provided are suggested starting points. They may be increase or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our **TECHNICAL SERVICE** Team with questions

## EQUIVALENTS & CONVERSIONS:

ABBREVIATIONS	
RPM	Revolutions Per Minute
SFM	Surface Feet Per Minute
CPT	Chip Load Per Tooth
IPM	Inches Per Minute
$V_f$	Millimeters Per Minute
$ae$	Radial Width of Cut
$ap$	Axial Depth of Cut
$V_r$	Millimeters Per Minute
Vc	Surface Meters Per Minute
Fz	Metric Chip Load Per Tooth

$$N, n \text{ or } \text{Min}^{-1} = \text{RPM}$$

$$Vc \text{ or } \text{M/MIN} = \text{SFM}$$

$$Fz \text{ or } \text{mm/TOOTH} = \text{CPT}$$

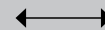
$$V_f \text{ or } \text{mm/MIN} = \text{IPM}$$

$$\text{SFM} / 3.281 = \text{M/MIN}$$

$$\text{M/MIN} \times 3.281 = \text{SFM}$$

$$\text{mm/MIN} / 25.4 = \text{IPM}$$

$$\text{mm/TOOTH} / 25.4 = \text{CPT}$$

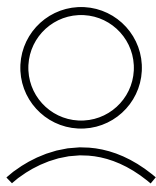


IMPERIAL                      METRIC

$$\text{Inch} \times 25.4 = \text{Millimeter}$$

$$\text{Millimeter} \times .03937 = \text{Inch}$$

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SERIES NAME	MATERIAL	FLUTE	DESCRIPTION	PAGE
ALMG	Aluminum Alloys	2 Flute	35° for light duty CNC Machines	47
AXMG45	Aluminum Alloys	2 Flute	45° SQ & Ball Nose End Mill	40
ELMG	Aluminum Alloys	3 Flute	35° for light duty CNC Machines	48
GXMG5	Aluminum Alloys	5 Flute	45° for Trochoidal Tool path For Aluminum	45
HVMG2	Aluminum Alloys	2 Flute	30° for High Velocity Machining	38
MAL3	Aluminum Alloys	3 Flute	39° SQ, Radius, or Ball for Roughing & Finishing	15
MAL3CB	Aluminum Alloys	3 Flute	39° SQ, Radius, or Ball for Roughing & Finishing - Chipbreaker	21
MAL3-RN	Aluminum Alloys	3 Flute	39° SQ, Radius, or Ball Reduced Neck	28
MAL3CB-RN	Aluminum Alloys	3 Flute	39° SQ, Radius, or Ball Reduced Neck - Chipbreaker	32
MAL3R	Aluminum Alloys	3 Flute	39° Rougher for High Velocity Machining	36
MAL3-RN	Aluminum Alloys	3 Flute	39° SQ, Radius, or Ball Reduced Neck	27
CCAC	Titanium Alloys	Multi Flute	Cobalt Aerocut Roughing End Mill	105
EMG35	Titanium Alloys	3 Flute	35° End Mill for Stainless Steel	102
GMG	Titanium Alloys	5 Flute	45° for Stainless Steel/Nickel Base Alloys	103
MTI4	Titanium Alloys	4 Flute	SQ & Radius Variable Helix for Roughing & Finishing	50
MTI4-__B	Titanium Alloys	4 Flute	Ball Nose Variable Helix for 3D Profiling Roughing and Finishing	55
MTI4-RN	Titanium Alloys	4 Flute	Sq & Radius Reduced Neck Variable Helix for Long Reach Roughing & Finishing	56
MTI4-RN-__B	Titanium Alloys	4 Flute	Ball Nose Reduced Neck Variable Helix Long Reach for 3D Profiling	62
MTI5	Titanium Alloys	5 Flute	SQ & Radius Variable Index for Roughing and Finishing	64
MTI5-__B	Titanium Alloys	5 Flute	Ball Nose Variable Index for 3D Profiling for Roughing & Finishing	70
MTI5-RN	Titanium Alloys	5 Flute	SQ & Radius Reduced Neck Variable Index for Long Reach Roughing & Finishing	71
MTI5-RN-__B	Titanium Alloys	5 Flute	Ball Nose Reduced Index for 3D Profiling for Roughing & Finishing	79
MTI5C	Titanium Alloys	5 Flute	Variable Index for Roughing & Finishing - Chipbreaker	80
MTI7	Titanium Alloys	7 Flute	Sq & Radius Variable Index for HEM Roughing & Profile Finishing	82
MTI7C	Titanium Alloys	7 Flute	Sq & Radius Variable Index for HEM Roughing & Profile Finishing - Chipbreaker	85
VXMG3T	Titanium Alloys	3 Flute	Variable FL, HP Roughing & Finishing Applications	94
VXMG6T	Titanium Alloys	6 Flute	Variable FL, Roughing & Finishing Applications	96
VXMG6TCB	Titanium Alloys	6 Flute	Variable FL, Roughing & Finishing Applications - Chipbreaker	97
VXMG7-nACRo	Titanium Alloys	7 Flute	Variable FL for High Efficiency Roughing & Finishing Applications -nACRo	98
VXMG9-nACRo	Titanium Alloys	9 Flute	Variable FL, Fine Finishing Applications -nACRo	100
MNI4	Inconel Alloys	4 Flute	Inconel Variable Helix for Roughing & Finishing	87
MNI4-__B	Inconel Alloys	4 Flute	Inconel Ball Nose Variable Helix for Roughing & Finishing	89
MNI5	Inconel Alloys	5 Flute	Inconel Variable Helix for Roughing & Finishing	90
MNI5-__B	Inconel Alloys	5 Flute	Inconel Ball Nose Variable Helix for Roughing and Finishing	93
CRFMG	Ferrous Materials	Multi Flute	Rougher Finisher	131
CRMG	Ferrous Materials	Multi Flute	Fine Profile Carbide Roughing End Mill	130
EMG60	Ferrous Materials	3 Flute	60° General Machining Application in Stainless Steels	129
MPMG	Ferrous Materials	4 Flute	SQ & Radius Performance End Mill	121
MPMG-__B	Ferrous Materials	4 Flute	Ball Nose Performance End Mill	124
MPMG5	Ferrous Materials	5 Flute	SQ & Radius Performance End Mill	125
MPMG5-__B	Ferrous Materials	5 Flute	Ball Nose Performance End Mill	128
VXMG4	Ferrous Materials	4 Flute	Variable FL for High Performance Roughing Applications	108
VXMG5	Ferrous Materials	5 Flute	Variable FL for High Performance Roughing Applications	114
VXMG7	Ferrous Materials	7 Flute	Variable FL for High Efficiency Roughing & Finishing Applications	117
VXMG9	Ferrous Materials	9 Flute	Variable FL for optimum fine finish profiling applications	119
CCMG45	Die & Mold Steels	6 Flute	45° Profiling End Mill (Hard Milling)	135
HMG-__B	Die & Mold Steels	2 Flute	Ball Nose for Hard Milling in Die & Mold Application	134
HMG1-__SF-B	Die & Mold Steels	2 Flute	Ball Nose for Z-Axis Machining- Rib Cutting	133
HMG1-__SF-R	Die & Mold Steels	2 Flute	Corner Rad for Multi Axis Machining - Rib Cutting	132
AMG-__DIA	Graphites & Composites	2 Flute	SQ and Ball Nose CVD Diamond Coating	136
AMG-__DLC	Graphites & Composites	2 Flute	SQ and Ball Nose DLC Amorphous Diamond Coating	142
CCMG-__DIA	Graphites & Composites	4 Flute	SQ and Ball Nose CVD Diamond Coating	138
CCMG-__DLC	Graphites & Composites	4 Flute	SQ and Ball Nose DLC Amorphous Diamond Coating	146
CRMGD	Graphites & Composites	Multi Flute	Composite Router For Carbon Fiber	140
EMG-__DLC	Graphites & Composites	3 Flute	SQ and Ball Nose DLC Amorphous Diamond Coating	144
FRMG	Graphites & Composites		Fiberglass Routers	141
CDR	Various Material	2 Flute	140° Point Carbide Coolant Hole Drill	164
CMG3H	Various Material	3 Flute	Chamfer Mill	158
CMG5H	Various Material	5 Flute	Chamfer Mill	159
DA	Various Material	Multi Flute	60° & 90° Special Use Double Angle Cutter	155
HDRNC	Various Material	2 Flute	142° NC Carbide Spotting Drill	163
HXMG_	Various Material	Multi Flute	High Feed Carbide End Mills	160
HXMG4-__HM	Various Material	4 Flute	High Feed Carbide End Mills (Hard Material)	162
MDR	Various Material	2 Flute	140° Pt Carbide Drill without Coolant hole	169
TM	Various Material	Multi Flute	Single Form Thread	175
TM-__H	Various Material	Multi Flute	60° Helical Flute, UN Thread	173
TM-__S	Various Material	Multi Flute	60° Straight Flute, UN Thread	172
TM-__NPT_	Various Material	Multi Flute	NPT Thread , Straight & Helical FL	176
TM-__NPTF-__	Various Material	Multi Flute	NPTF Thread , Straight & Helical FL	177
VBMG_	Various Material	Multi Flute	220° Spherical Ball End Mill	148
VBMG-__-270	Various Material	Multi Flute	270° Spherical Ball End Mill	150
VBMG-__-300	Various Material	Multi Flute	300° Spherical Ball End Mill	153

# DECIMAL EQUIVALENT CHART

SIZE	DECIMAL	SIZE	DECIMAL	SIZE	DECIMAL	SIZE	DECIMAL	SIZE	DECIMAL
97	.0059	54	.0550	25	.1495	6.7mm	.2638	<b>7/16"</b>	<b>.4375</b>
96	.0063	1.4mm	.0551	3.8mm	.1496	<b>17/64"</b>	<b>.2656</b>	11.5mm	.4528
95	.0067	1.45mm	.0571	24	.1520	6.75mm	.2657	<b>29/64"</b>	<b>.4531</b>
94	.0071	1.5mm	.0591	3.9mm	.1535	H	.2660	<b>15/32"</b>	<b>.4688</b>
93	.0075	53	.0595	23	.1540	6.8mm	.2677	12mm	.4724
92	.0079	1.55mm	.0610	<b>5/32"</b>	<b>.1562</b>	6.9mm	.2717	<b>31/64"</b>	<b>.4844</b>
.2mm	.0079	<b>1/16"</b>	<b>.0625</b>	22	.1570	I	.2720	12.5mm	.4921
91	.0083	1.6mm	.0630	4mm	.1575	7mm	.2756	<b>1/2"</b>	<b>.5000</b>
90	.0087	52	.0635	21	.1590	J	.2770	13mm	.5118
.22mm	.0087	1.65mm	.0650	20	.1610	7.1mm	.2795	<b>33/64"</b>	<b>.5156</b>
89	.0091	1.7mm	.0669	4.1mm	.1614	K	.2810	<b>17/32"</b>	<b>.5312</b>
88	.0095	51	.0670	4.2mm	.1654	<b>9/32"</b>	<b>.2812</b>	13.5mm	.5315
.25mm	.0098	1.75mm	.0689	19	.1660	7.2mm	.2835	<b>35/64"</b>	<b>.5469</b>
87	.0100	50	.0700	4.25mm	.1673	7.25mm	.2854	14mm	.5512
86	.0105	1.8mm	.0709	4.3mm	.1693	7.3mm	.2874	<b>9/16"</b>	<b>.5625</b>
85	.0110	1.85mm	.0728	18	.1695	L	.2900	14.5mm	.5709
.28mm	.0110	49	.0730	<b>11/64"</b>	<b>.1719</b>	7.4mm	.2913	<b>37/64"</b>	<b>.5781</b>
84	.0115	1.9mm	.0748	17	.1730	M	.2950	15mm	.5906
.3mm	.0118	48	.0760	4.4mm	.1732	7.5mm	.2953	<b>19/32"</b>	<b>.5938</b>
83	.0120	1.95mm	.0768	16	.1770	<b>19/64"</b>	<b>.2969</b>	<b>39/64"</b>	<b>.6094</b>
82	.0125	<b>5/64"</b>	<b>.0781</b>	4.5mm	.1772	7.6mm	.2992	15.5mm	.6102
.32mm	.0126	47	.0785	15	.1800	N	.3020	<b>5/8"</b>	<b>.6250</b>
81	.0130	2mm	.0787	4.6mm	.1811	7.7mm	.3031	16mm	.6299
80	.0135	2.05mm	.0807	14	.1820	7.75mm	.3051	<b>41/64"</b>	<b>.6406</b>
.35mm	.0138	46	.0810	13	.1850	7.8mm	.3071	16.5mm	.6496
79	.0145	45	.0820	4.7mm	.1850	7.9mm	.3110	<b>21/32"</b>	<b>.6562</b>
<b>1/64"</b>	<b>.0156</b>	2.1mm	.0827	4.75mm	.1870	<b>5/16"</b>	<b>.3125</b>	17mm	.6693
.4mm	.0157	2.15mm	.0846	<b>3/16"</b>	<b>.1875</b>	8mm	.3150	<b>43/64"</b>	<b>.6719</b>
78	.0160	44	.0860	4.8mm	.1890	O	.3160	<b>11/16"</b>	<b>.6875</b>
.45mm	.0177	2.2mm	.0866	12	.1890	8.1mm	.3189	17.5mm	.6890
77	.0180	2.25mm	.0886	11	.1910	8.2mm	.3228	<b>45/64"</b>	<b>.7031</b>
.5mm	.0197	43	.0890	4.9mm	.1929	P	.3230	18mm	.7087
76	.0200	2.3mm	.0906	10	.1935	8.25mm	.3248	<b>23/32"</b>	<b>.7188</b>
75	.0210	2.35mm	.0925	9	.1960	8.3mm	.3268	18.5mm	.7283
.55mm	.0217	42	.0935	5mm	.1969	<b>21/64"</b>	<b>.3281</b>	<b>47/64"</b>	<b>.7344</b>
74	.0225	<b>3/32"</b>	<b>.0938</b>	8	.1990	8.4mm	.3307	19mm	.7480
.6mm	.0236	2.4mm	.0945	5.1mm	.2008	Q	.3320	<b>3/4"</b>	<b>.7500</b>
73	.0240	41	.0960	7	.2010	8.5mm	.3346	<b>49/64"</b>	<b>.7656</b>
72	.0250	2.45mm	.0965	<b>13/64"</b>	<b>.2031</b>	8.6mm	.3386	19.5mm	.7677
.65mm	.0256	40	.0980	6	.2040	R	.3390	<b>25/32"</b>	<b>.7812</b>
71	.0260	2.5mm	.0984	5.2mm	.2047	8.7mm	.3425	20mm	.7874
.7mm	.0276	39	.0995	5	.2055	<b>11/32"</b>	<b>.3438</b>	<b>51/64"</b>	<b>.7969</b>
70	.0280	38	.1015	5.25mm	.2067	8.75mm	.3445	20.5mm	.8071
69	.0292	2.6mm	.1024	5.3mm	.2087	8.8mm	.3465	<b>13/16"</b>	<b>.8125</b>
.75mm	.0295	37	.1040	4	.2090	S	.3480	21mm	.8268
68	.0310	2.7mm	.1063	5.4mm	.2126	8.9mm	.3504	<b>53/64"</b>	<b>.8281</b>
<b>1/32"</b>	<b>.0312</b>	36	.1065	3	.2130	9mm	.3543	<b>27/32"</b>	<b>.8438</b>
.8mm	.0315	2.75mm	.1083	5.5mm	.2165	T	.3580	21.5mm	.8465
67	.0320	<b>7/64"</b>	<b>.1094</b>	<b>7/32"</b>	<b>.2188</b>	9.1mm	.3583	<b>55/64"</b>	<b>.8594</b>
66	.0330	35	.1100	5.6mm	.2205	<b>23/64"</b>	<b>.3594</b>	22mm	.8661
.85mm	.0335	2.8mm	.1102	2	.2210	9.2mm	.3622	<b>7/8"</b>	<b>.8750</b>
65	.0350	34	.1110	5.7mm	.2244	9.25mm	.3642	22.5mm	.8858
.9mm	.0354	33	.1130	5.75mm	.2264	9.3mm	.3661	<b>57/64"</b>	<b>.8906</b>
64	.0360	2.9mm	.1142	1	.2280	U	.3680	23mm	.9055
63	.0370	32	.1160	5.8mm	.2283	9.4mm	.3701	<b>29/32"</b>	<b>.9062</b>
.95mm	.0374	3mm	.1181	5.9mm	.2323	9.5mm	.3740	<b>59/64"</b>	<b>.9219</b>
62	.0380	31	.1200	A	.2340	<b>3/8"</b>	<b>.3750</b>	23.5mm	.9252
61	.0390	3.1mm	.1220	<b>15/64"</b>	<b>.2344</b>	V	.3770	<b>15/16"</b>	<b>.9375</b>
1mm	.0394	<b>1/8"</b>	<b>.1250</b>	6mm	.2362	9.6mm	.3780	24mm	.9449
60	.0400	3.2mm	.1260	B	.2380	9.7mm	.3819	<b>61/64"</b>	<b>.9531</b>
59	.0410	3.25mm	.1280	6.1mm	.2402	9.75mm	.3839	24.5mm	.9646
1.05mm	.0413	30	.1285	C	.2420	9.8mm	.3858	<b>31/32"</b>	<b>.9688</b>
58	.0420	3.3mm	.1299	6.2mm	.2441	W	.3860	25mm	.9843
57	.0430	3.4mm	.1339	D	.2460	9.9mm	.3898	<b>63/64"</b>	<b>.9844</b>
1.1mm	.0433	29	.1360	6.25mm	.2461	<b>25/64"</b>	<b>.3906</b>	<b>1"</b>	<b>1.0000</b>
1.15mm	.0453	3.5mm	.1378	6.3mm	.2480	10mm	.3937		
56	.0465	28	.1405	E	.2500	X	.3970		
<b>3/64"</b>	<b>.0469</b>	<b>9/64"</b>	<b>.1406</b>	<b>1/4"</b>	<b>.2500</b>	Y	.4040		
1.2mm	.0472	3.6mm	.1417	6.4mm	.2520	<b>13/32"</b>	<b>.4062</b>		
1.25mm	.0492	27	.1440	6.5mm	.2559	Z	.4130		
1.3mm	.0512	3.7mm	.1457	F	.2570	10.5mm	.4134		
55	.0520	26	.1470	6.6mm	.2598	<b>27/64"</b>	<b>.4219</b>		
1.35mm	.0531	3.75mm	.1476	G	.2610	11mm	.4331		





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