



Power. Precision. Performance.

**enDURO**  
**STREAKERS**  
**OMEGA-6**  
**POW•R•FEED**  
**INCONEX**

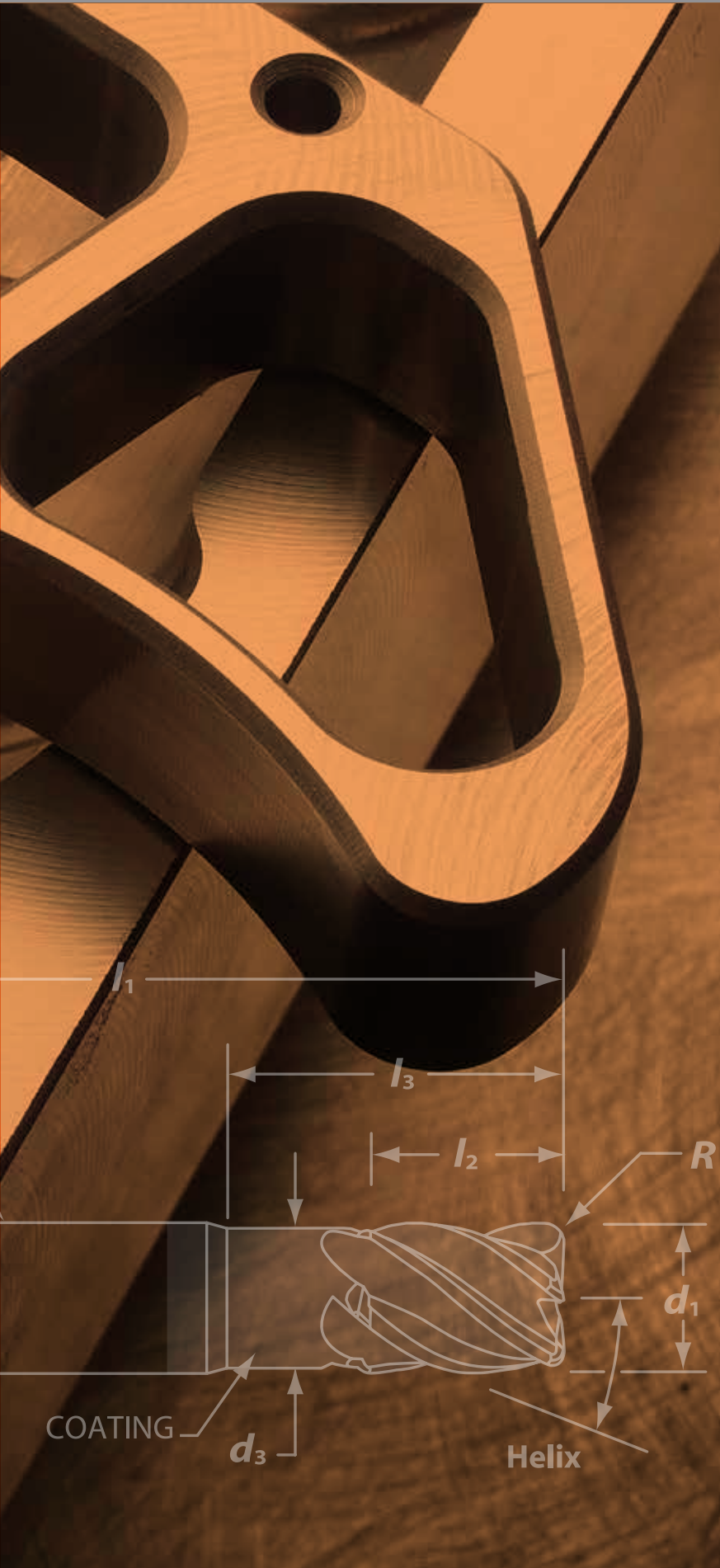
**PRODUCTIVITY-DRIVEN**  
**SOLUTIONS**  
**2014**

**THE NEW BREED OF**  
**ADVANCED CUTTING TOOLS**



PLAIN

$d_2$



## Strategic cutting solutions for 21st-century machining.

This catalog is an overview/round-up of IMCO's advanced hybrid cutting tools. Each line is a tested and proven solution for today's increasingly tougher machining challenges. They're products of IMCO's hands-on machining expertise, advanced technology and an entrepreneurial approach to problem-solving.

### What's new?

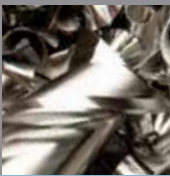
We're introducing INCONEX M8 Series end mills, engineered specifically for machining in Inconel.



New designs in the POW•R•FEED M9 Series for even greater productivity results no matter what size your operation.



Line extensions in the enDURO M5, OMEGA-6 M7 and STREAKERS M2 series, offering more cutting tool options to maximize productivity.



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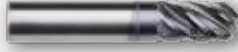
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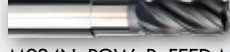
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# Tool Selection Guide

Pick the right tool for your material and application.

ISO Classification	Work Material	Type of Cut	POW•R•FEED	enDURO					OMEGA-6	INCONEX	STREAKERS	
			M924	M525	M525C	M527	M527C	M726	M806	M202	M203	
<b>K</b>	Cast Iron - Gray	Conventional Roughing	●●●	●●		●						
		Conventional Finishing	●	●●		●●●						
	Cast Iron - Malleable	Conventional Roughing	●	●●●		●●						
		Conventional Finishing	●	●●		●●●						
		HEM	●	●●		●●●						
<b>P</b>	Low Carbon Steels < 48 HRC 1018, 12L14, 8620	Conventional Roughing	●●●	●●		●						
		Conventional Finishing	●	●●		●●		●●●				
		HEM	●	●●●		●●						
	Medium Carbon Steels < 48 HRC 4140, 4340	Conventional Roughing	●●●	●●		●						
		Conventional Finishing	●	●		●●		●●●				
		HEM	●	●●		●●●						
	Tool & Die Steels < 48 HRC A2, D2, H13, P20	Conventional Roughing	●●●	●●								
		Conventional Finishing	●	●		●●		●●●				
		HEM	●	●●		●●●						
	Martensitic Stainless Steel 416, 410, 440C	Conventional Roughing	●	●●●		●●						
		Conventional Finishing	●	●		●●		●●●				
		HEM	●	●●		●●●		●				
<b>H</b>	Tool & Die Steels 48 - 62 HRC A2, D2, H13	Conventional Roughing				●		●●●				
		Conventional Finishing				●		●●●				
<b>M</b>	Austenitic Stainless Steels 303, 304, 316	Conventional Roughing	●●●	●●	●●	●	●					
		Conventional Finishing	●	●		●●		●●●				
		HEM	●	●●	●●	●●●	●●●					
	PH & Martensitic Stainless Steels 17-4 PH, 15-5 PH, 13-8 PH 416, 410, 440C	Conventional Roughing	●	●●	●●	●●●	●●●					
		HEM		●●	●●	●●●	●●●	●●●				
<b>S</b>	Titanium Alloys 6Al4V	Conventional Roughing	●	●●	●●	●●●	●●●					
		Conventional Finishing		●●		●●●						
		HEM		●●	●●	●●●	●●●					
	Hi-Temperature Alloys Inconel, A286, Stellite, Hastalloy	Conventional Roughing		●		●			●●●			
		Conventional Finishing				●		●●●				
		HEM		●		●			●●●			
<b>N</b>	Aluminum Alloys 2024, 6061, 7075	Conventional Roughing								●●●	●●●	
		Conventional Finishing									●●●	
	High Silicon Aluminum A380, A390	Conventional Roughing									●●●	●●●
		Conventional Finishing									●●●	●●●
	Copper Alloys Brass, Bronze	Conventional Roughing	●●									●●
		Conventional Finishing	●	●●		●●		●				●●

Maximum Performance: ●●●

Excellent Performance: ●●

Good Performance: ●

## ADVANCED TECHNOLOGY

# It's called "high-efficiency machining" because it is.

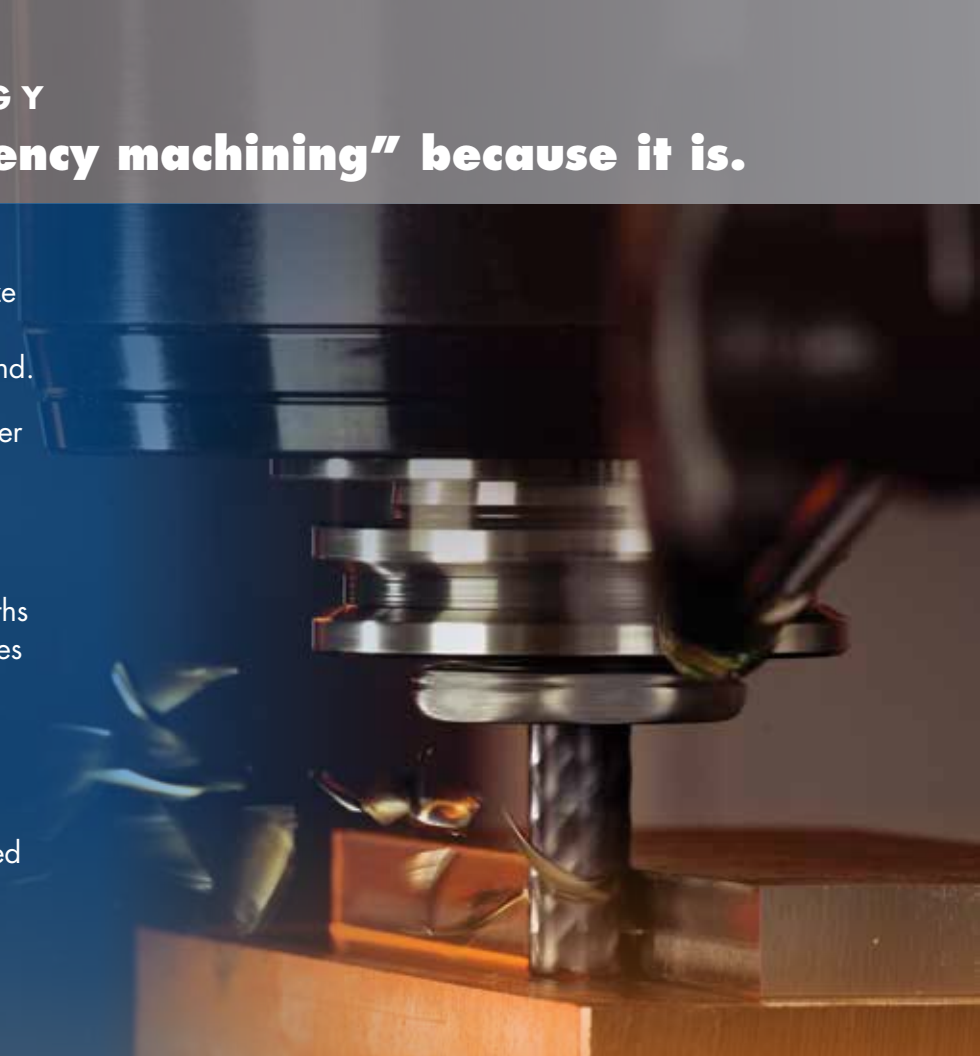
High-efficiency machining methods maximize tool performance and get more out of every machining minute and every dollar you spend.

**Remove more material** – Tools can cut deeper with light stepovers, allowing for faster speeds, higher feed rates, and increased metal removal rates.

**Improve surface finish** – Continuous tool paths keep more cutting edges engaged at all times and better tool stability.

**Reduce deflection** – Reducing cutting forces increases stability for straighter walls.

**Better tool life** – Consistent chip size, reduced cutting forces, less tool wear.



## How it works.

### Use a light radial depth of cut ( $a_e$ )

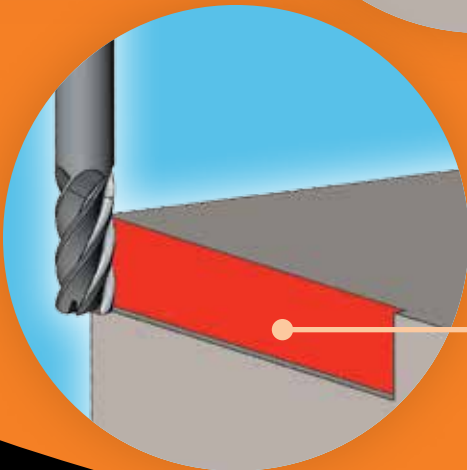
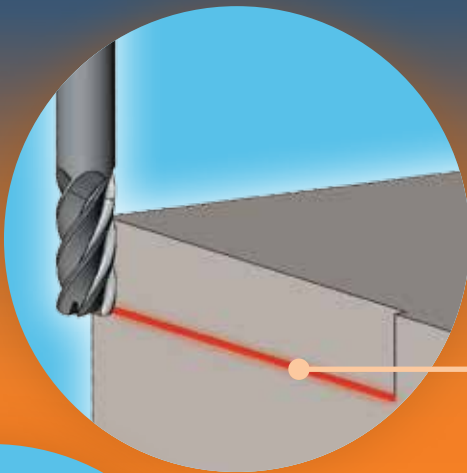
Programming stepovers at 5% to 15% of the tool diameter (varies per the material) generates higher feed rates.

- Reduces the heat in the cutting zone and in the work piece, which reduces part distortion.
- Improves tool stability by reducing radial cutting forces.

### Take deeper-than-normal axial depths of cut ( $a_p$ )

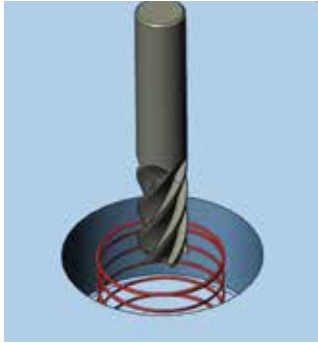
Programming axial depths of cut of 1.5x to 2x the mill diameter generates higher metal removal rates.

- Increases tool engagement and stability.
- Reduces the number of passes to achieve final Z depth.



## High-efficiency machining tool paths

Maximize time and tool performance by using HEM tool paths when pocketing and slotting.

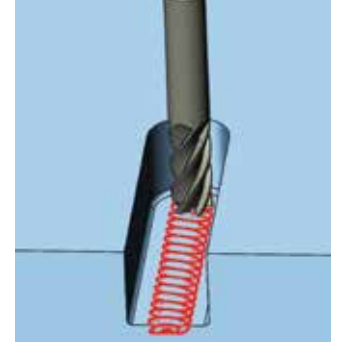
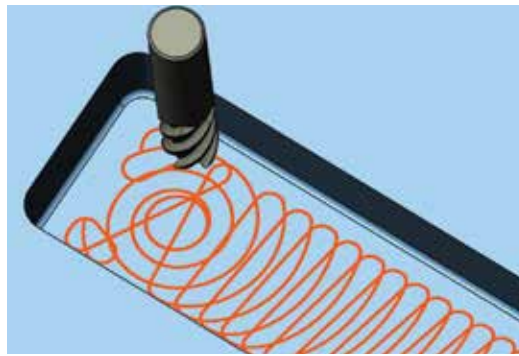


### Step 1 Helical Ramp Entry

Using a ramp angle of  $2^{\circ}$ – $3^{\circ}$ , a mill can helical ramp to a depth of 2x the mill diameter, eliminating the need for drilling and the time for a tool change.

### Step 2 HEM Elliptical Tool Paths

Lighter stepovers reduce stress and cutting forces as well as heat in the cutting zone, allowing for higher feed rates. Elliptical paths also eliminate sharp turns and changes in tool direction. Even the corners are created with fast, light cuts.



### Step 3 - Slotting

HEM tool paths allow the use of a tool smaller than the slot width to machine the part (e.g. a  $\frac{1}{2}$ " tool making a  $\frac{3}{4}$ " wide slot). Deeper depths of cut – up to 2x the tool diameter – also help save machine time and money.

## AUTODESK: INTEGRATED CAM SOLUTIONS

### Adaptive clearing up to 3X faster.

Traditional roughing tool paths call for wide cuts – up to 100% of the end mill diameter. This heavy tool engagement creates a lot of cutting pressure, requiring slower-than-optimum feed rates and depths of cut that are less than or equal to the mill diameter - leaving much of the flute length cutting nothing but air. Even slower speeds are required as cutting pressure increases when milling inside radii in pockets.

Tool paths generated using Adaptive Clearing techniques from HSMWorks and Autodesk reduce chatter by engaging more of the flute length, and reduce cutting pressures by maintaining a smaller but constant step-over, regardless of the feature being milled. The result is longer tool life, better finishes, and much higher metal removal rates!



As seen here, with traditional roughing programs, the amount of mill diameter engaged in cutting changes as it moves along the tool path. The changing cutting pressures require "programming for worst-case conditions" and don't optimize the tool or the machine. Note that Adaptive Clearing keeps the mill diameter engagement constant – reducing cutting pressure and increasing metal removal rates up to 3x that of traditional paths.

Pick the right tool and the right program for the job and see better cycle times, better tool life and lots of cost savings. Learn more about HSMWorks – pioneers of modern high-speed machining – and Adaptive Clearing at [cam.autodesk.com](http://cam.autodesk.com).

# INCONEX<sup>®</sup>

## M8 Series

## NEW TOOL

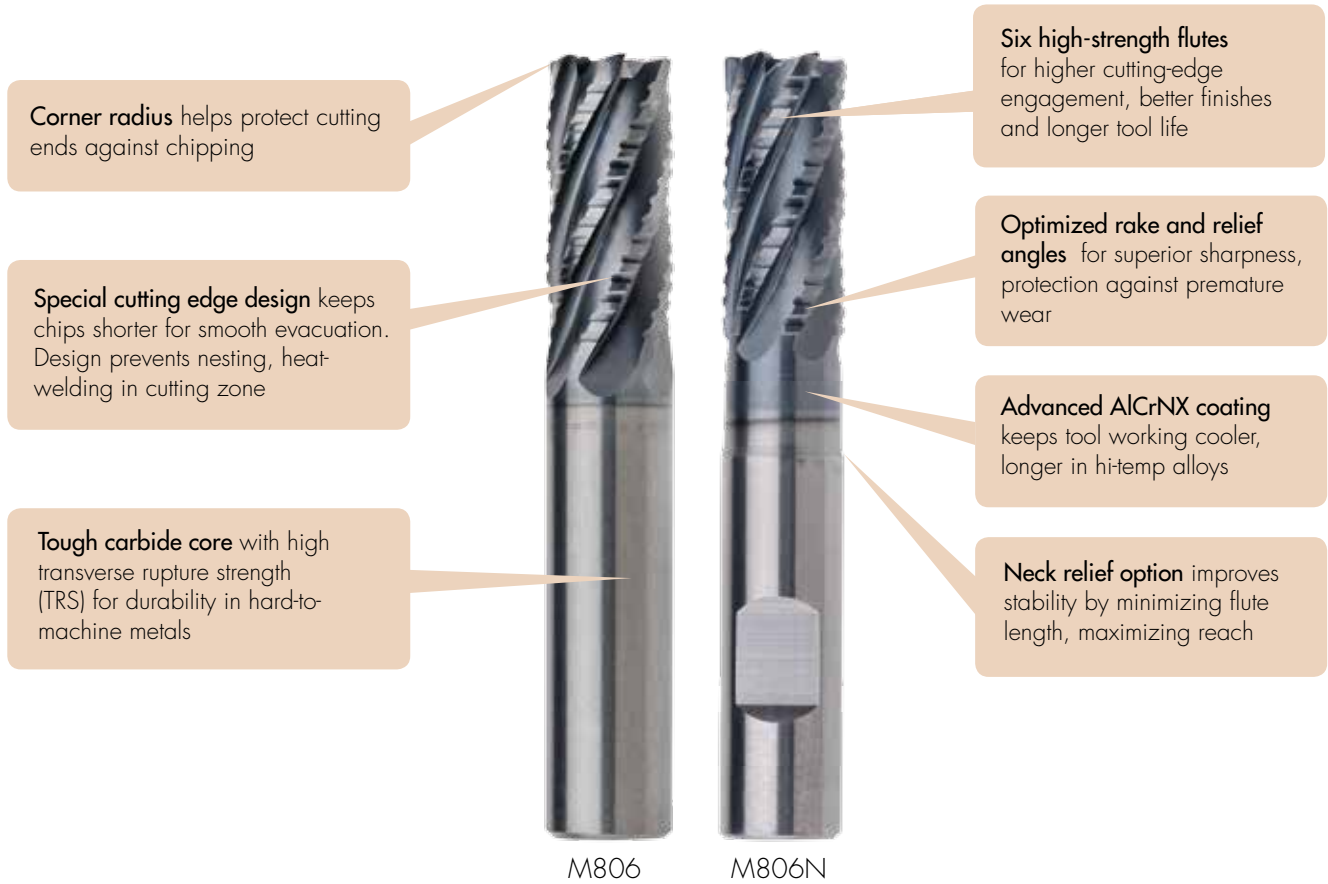
**Work EXtra long  
in EXtra hard metals.**

New INCONEX™ M8 end mills are designed specifically for higher productivity in all hi-temp alloys. Optimized geometries, advanced chip management and proven performance. INCONEX M8 end mills are the best choice for success in difficult-to-machine metals.





# INCONEX M8 Series Features



## Options

### Corner radius

Helps prevent corner chipping

### H6 tolerance shanks

Fits all collets and conform to shrink-fit requirements. Some styles offered with flats for Weldon-style holders.

## Choose the length for the job.

**Extra rigidity** – Choose stub length.

**Medium-to-deep cuts** – Order standard, long or oextra-long flute length and reach.

**Neck relief** – Better clearance in deep cavities, easier machining against tight walls.

## Excellent performance in Inconel.



The only specially made choice for working in:

- Inconel
- Hastalloy
- Waspalloy
- And all other hi-temp alloys

For applications in Titanium Alloys, please see our M5 series starting on page 16.

# Model Code: M806

## 6-Flute w/Corner Radius



# M806

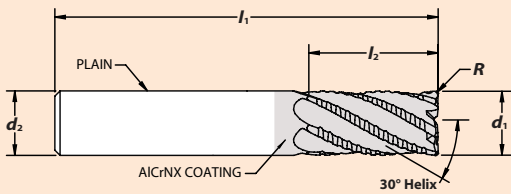
## Corner Radius



### 6 - FLUTE

For high-performance roughing of hi-temp alloys. Designed with chip control notches and corner radii to protect the cutting edges, and the advanced coating reduces heat buildup. Combine with the M726 to get great roughing and finishing tool performance.

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code by Corner Radius (R)		EZ-ID Number		
					.015 CR	.030 CR	M806-xxx-xxx-xxx	d1	l2
1/4	1/4	3/8	2	Plain	68731		M806-0250-0375-015		
		3/4	2-1/2	Plain	68732		M806-0250-0750-015		
5/16	5/16	7/16	2	Plain	68733		M806-0312-0437-015		
		13/16	2-1/2	Plain	68734		M806-0312-0812-015		
3/8	3/8	1/2	2	Plain		68735	M806-0375-0500-030		
		7/8	2-1/2	Plain		68736	M806-0375-0875-030		
				Weldon		68737	M806-0375-0875-030-W		
		1-1/4	3	Plain		68738	M806-0375-1250-030		
				Weldon		68739	M806-0375-1250-030-W		
1/2	1/2	5/8	2-1/2	Plain		68740	M806-0500-0625-030		
		1-1/4	3	Plain		68741	M806-0500-1125-030		
				Weldon		68742	M806-0500-1125-030-W		
		1-5/8	3-1/2	Plain		68743	M806-0500-1625-030		
				Weldon		68744	M806-0500-1625-030-W		
5/8	5/8	3/4	3	Plain		68745	M806-0625-0750-030		
		1-3/8	3-1/2	Plain		68746	M806-0625-1375-030		
				Weldon		68747	M806-0625-1375-030-W		
		2	4	Plain		68748	M806-0625-2000-030		
				Weldon		68749	M806-0625-2000-030-W		
3/4	3/4	1	3	Plain		68750	M806-0750-1000-030		
		1-5/8	4	Plain		68751	M806-0750-1625-030		
				Weldon		68752	M806-0750-1625-030-W		
		2-3/8	5	Plain		68753	M806-0750-2375-030		
				Weldon		68754	M806-0750-2375-030-W		
1	1	1-1/2	4	Plain		68755	M806-1000-1500-030		
				Weldon		68756	M806-1000-1500-030-W		
		2-1/2	5	Plain		68757	M806-1000-2500-030		
				Weldon		68758	M806-1000-2500-030-W		



in	d1 +0.000 / -0.002	d2 -0.0001 / -0.0004
mm	d1 +0.000 / -0.050	d2 -0.0025 / -0.0100

**Model Code: M806**  
**6-Flute w/Corner Radius**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code by Corner Radius (R)		EZ-ID Number M806-xxx-xxx-xxx d1 l2 R
					0,5 CR	1,0 CR	
6	6	13	57	Plain	68759		M806-060-013-050
				Weldon	68760		M806-060-013-050-W
		19	63	Plain	68761		M806-060-019-050
				Weldon	68762		M806-060-019-050-W
8	8	19	63	Plain	68763		M806-080-019-050
				Weldon	68764		M806-080-019-050-W
		25	75	Plain	68765		M806-080-025-050
				Weldon	68766		M806-080-025-050-W
10	10	22	72	Plain	68767		M806-100-022-100
				Weldon	68768		M806-100-022-100-W
		32	80	Plain	68769		M806-100-032-100
				Weldon	68770		M806-100-032-100-W
12	12	26	83	Plain	68771		M806-120-026-100
				Weldon	68772		M806-120-026-100-W
		38	93	Plain	68773		M806-120-038-100
				Weldon	68774		M806-120-038-100-W
16	16	34	92	Plain	68775		M806-160-034-100
				Weldon	68776		M806-160-034-100-W
		50	108	Plain	68777		M806-160-050-100
				Weldon	68778		M806-160-050-100-W
20	20	42	104	Plain	68779		M806-200-042-100
				Weldon	68780		M806-200-042-100-W
		62	125	Plain	68781		M806-200-062-100
				Weldon	68782		M806-200-062-100-W
25	25	52	120	Plain	68783		M806-250-052-100
				Weldon	68784		M806-250-052-100-W

# CASE STUDY

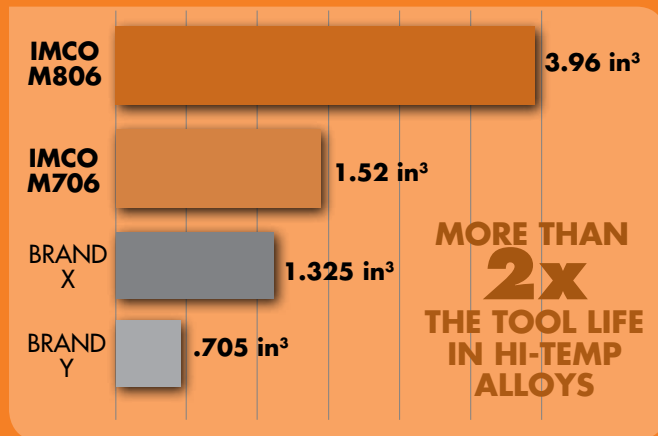
# M806N

## INCONEX: Going the Extra Mile in Hi-Temp Alloys.

In tool development tests against our own tool (M706) and the leading competitors' products for hi-temp alloys, the INCONEX far outlasted all challengers in tool life.

Using our competitors' suggested speeds and feeds (80 SFM at 6 imp) the INCONEX tools averaged over 2x the tool life of the other brands – even surpassing our own Omega-6 M706.

### Metal Removal Rate (MRR)



1/4" Tool in Inconel 718

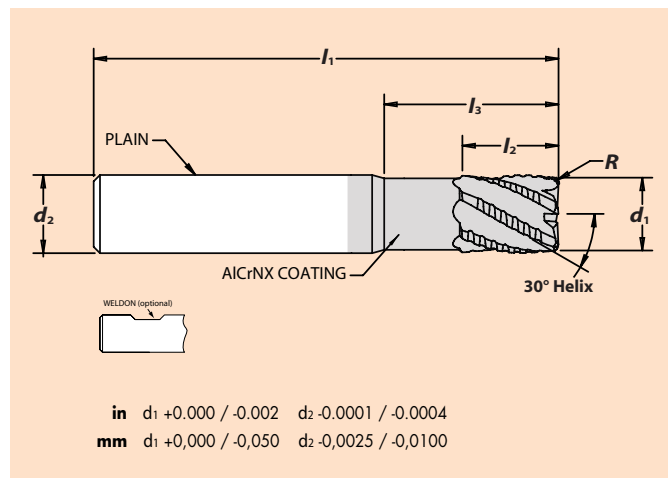


## Corner Radius w/Neck Relief

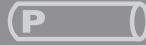


### 6-FLUTE

Necked shank to permit clearance in deeper cavities. The combination of neck relief and short flute length gives increased stability to the end mill in deep and difficult cuts.



## Model Code: M806N 6-Flute w/Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Neck Style	Order Code by Corner Radius (R)		EZ-ID Number M806-xxx-xxx-xxx d1 l2 R
						.015 CR	.030 CR	
1/4	1/4	1/2	3	3/4	Short	68785		M806-0250-0500-N0750-015
				1-3/8	Long	68786		M806-0250-0500-N1375-015
			4	3/4	Short	68787		M806-0250-0500-N0750-015-L4
				2-3/8	Long	68788		M806-0250-0500-N2375-015-L4
3/8	3/8	3/4	3	1	Short	68789	68789	M806-0375-0750-N1000-030
				1-3/8	Long	68791	68791	M806-0375-0750-N1375-030
			4	1	Short	68793	68793	M806-0375-0750-N1000-030-L4
				2-3/8	Long	68795	68795	M806-0375-0750-N2375-030-L4
1/2	1/2	1	4	1-1/4	Short	68797	68797	M806-0500-1000-N1250-030
				2-1/4	Long	68799	68799	M806-0500-1000-N2250-030
			5	1-1/4	Short	68801	68801	M806-0500-1000-N1250-030-L5
				3-1/4	Long	68803	68803	M806-0500-1000-N3250-030-L5
			6	1-1/4	Short	68805	68805	M806-0500-1000-N1250-030-L6
				4-1/4	Long	68807	68807	M806-0500-1000-N4250-030-L6
5/8	5/8	1-1/4	4	1-1/2	Short	68809	68809	M806-0625-1250-N1500-030
				2-1/8	Long	68811	68811	M806-0625-1250-N2125-030
			5	1-1/2	Short	68813	68813	M806-0625-1250-N1500-030-L5
				3-1/8	Long	68815	68815	M806-0625-1250-N3125-030-L5
3/4	3/4	1-1/2	5	1-3/4	Short	68817	68817	M806-0750-1500-N1750-030
				2-7/8	Long	68819	68819	M806-0750-1500-N2875-030
			6	1-3/4	Short	68821	68821	M806-0750-1500-N1750-030-L6
				3-7/8	Long	68823	68823	M806-0750-1500-N3875-030-L6
1	1	1-3/4	5	2-5/8	Long	68825	68825	M806-1000-1750-N2625-030
		2	6	2-1/4	Short	68827	68827	M806-1000-2000-N2250-030
				3-5/8	Long	68829	68829	M806-1000-2000-N3625-030

## Model Code: M806N 6-Flute w/Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Neck Style	Order Code .030 CR	EZ-ID Number M806-xxx-xxx-xxx d1 l2 R
3/8	3/8	3/4	3	1	Short	68790	M806-0375-0750-N1000-030-W
				1-3/8	Long	68792	M806-0375-0750-N1375-030-W
			4	1	Short	68794	M806-0375-0750-N1000-030-L4-W
				2-3/8	Long	68796	M806-0375-0750-N2375-030-L4-W
1/2	1/2	1	4	1-1/4	Short	68798	M806-0500-1000-N1250-030-W
				2-1/4	Long	68800	M806-0500-1000-N2250-030-W
			5	1-1/4	Short	68802	M806-0500-1000-N1250-030-L5-W
				3-1/4	Long	68804	M806-0500-1000-N3250-030-L5-W
			6	1-1/4	Short	68806	M806-0500-1000-N1250-030-L6-W
				4-1/4	Long	68808	M806-0500-1000-N4250-030-L6-W
5/8	5/8	1-1/4	4	1-1/2	Short	68810	M806-0625-1250-N1500-030-W
				2-1/8	Long	68812	M806-0625-1250-N2125-030-W
			5	1-1/2	Short	68814	M806-0625-1250-N1500-030-L5-W
				3-1/8	Long	68816	M806-0625-1250-N3125-030-L5-W
3/4	3/4	1-1/2	5	1-3/4	Short	68818	M806-0750-1500-N1750-030-W
				2-7/8	Long	68820	M806-0750-1500-N2875-030-W
			6	1-3/4	Short	68822	M806-0750-1500-N1750-030-L6-W
				3-7/8	Long	68824	M806-0750-1500-N3875-030-L6-W
1	1	1-3/4	5	2-5/8	Long	68826	M806-1000-1750-N2625-030-W
		2	6	2-1/4	Short	68828	M806-1000-2000-N2250-030-W
				3-5/8	Long	68830	M806-1000-2000-N3625-030-W

# Model Code: M806N

## 6-Flute w/Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut L2	Overall Length L1	Reach/ LBS L3	Neck Style	Order Code by Corner Radius (R)		EZ-ID Number M806-xxx-xxx-xxx d1 L2 R			
						0,5 CR	1,0 CR				
6	6	12	75	18	Short	68831		M806-060-012-N018-050			
				39	Long	68833		M806-060-012-N039-050			
			100	18	Short	68835		M806-060-012-N018-050-L100			
				64	Long	68837		M806-060-012-N064-050-L100			
8	8	16	75	22	Short	68839		M806-080-016-N022-050			
				39	Long	68841		M806-080-016-N039-050			
			100	22	Short	68843		M806-080-016-N022-050-L100			
				64	Long	68845		M806-080-016-N064-050-L100			
			10	10	20	88	26	Short	68847		M806-100-020-N026-100
							48	Long	68849		M806-100-020-N048-100
100	26	Short				68851		M806-100-020-N026-100-L100			
	60	Long				68853		M806-100-020-N060-100-L100			
12	12	24	100	30	Short	68855		M806-120-024-N030-100			
				55	Long	68857		M806-120-024-N055-100			
			125	30	Short	68859		M806-120-024-N030-100-L125			
				80	Long	68861		M806-120-024-N080-100-L125			
			150	30	Short	68863		M806-120-024-N030-100-L150			
				105	Long	68865		M806-120-024-N105-100-L150			
			16	16	32	110	38	Short	68867		M806-160-032-N038-100
							62	Long	68869		M806-160-032-N062-100
150	38	Short				68871		M806-160-032-N038-100-L150			
	102	Long				68873		M806-160-032-N102-100-L150			
20	20	40				125	46	Short	68875		M806-200-040-N046-100
							75	Long	68877		M806-200-040-N075-100
			150	46	Short	68879		M806-200-040-N046-100-L150			
				100	Long	68881		M806-200-040-N100-100-L150			
25	25	50	120	56	Short	68883		M806-250-050-N056-100			
				64	Long	68885		M806-250-050-N064-100			
			150	56	Short	68887		M806-250-050-N056-100-L150			
				94	Long	68889		M806-250-050-N094-100-L150			

### Common Machining Formulas

$$RPM = \frac{SFM \times 3.82}{D}$$

$$SFM = RPM \times D \times .262$$

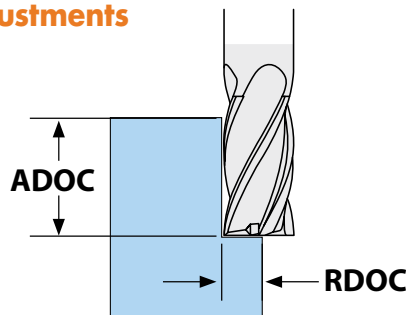
$$IPM = RPM \times IPT \times Z$$

$$MRR = RDOC \times ADOC \times IPM$$

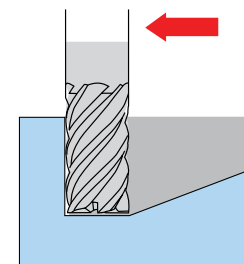
Radial Chip Thinning Adjustment 
$$IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$$

- D Tool Cutting Diameter
- R Tool Radius
- Z Number of Flutes
- RPM Revolutions per Minute
- SFM Surface Feet per Minute
- IPM Inches per Minute
- MRR Metal Removal Rate
- RDOC Radial Depth of Cut
- ADOC Axial Depth of Cut

### Adjustments



1. Apply chip thinning adjustment when RDOC < D



2. Ramp entry into work piece

- Ramp at 1.5°–2.5° angle
- Reduce chipload by 20% of recommended slotting rate

# Model Code: M806N

## 6-Flute w/Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Neck Style	Order Code by Corner Radius (R)		EZ-ID Number M806-xxx-xxx-xxx d1 l2 R
						0,5 CR	1,0 CR	
6	6	12	75	18	Short	68832		M806-060-012-N018-050-W
				39	Long	68834		M806-060-012-N039-050-W
			100	18	Short	68836		M806-060-012-N018-050-L100-W
				64	Long	68838		M806-060-012-N064-050-L100-W
8	8	16	75	22	Short	68840		M806-080-016-N022-050-W
				39	Long	68842		M806-080-016-N039-050-W
			100	22	Short	68844		M806-080-016-N022-050-L100-W
				64	Long	68846		M806-080-016-N064-050-L100-W
10	10	20	88	26	Short		68848	M806-100-020-N026-100-W
				48	Long		68850	M806-100-020-N048-100-W
			100	26	Short		68852	M806-100-020-N026-100-L100-W
				60	Long		68854	M806-100-020-N060-100-L100-W
12	12	24	100	30	Short		68856	M806-120-024-N030-100-W
				55	Long		68858	M806-120-024-N055-100-W
			125	30	Short		68860	M806-120-024-N030-100-L125-W
				80	Long		68862	M806-120-024-N080-100-L125-W
			150	30	Short		68864	M806-120-024-N030-100-L150-W
				105	Long		68866	M806-120-024-N105-100-L150-W
16	16	32	110	38	Short		68868	M806-160-032-N038-100-W
				62	Long		68870	M806-160-032-N062-100-W
			150	38	Short		68872	M806-160-032-N038-100-L150-W
				102	Long		68874	M806-160-032-N102-100-L150-W
20	20	40	125	46	Short		68876	M806-200-040-N046-100-W
				75	Long		68878	M806-200-040-N075-100-W
			150	46	Short		68880	M806-200-040-N046-100-L150-W
				100	Long		68882	M806-200-040-N100-100-L150-W
25	25	50	120	56	Short		68884	M806-250-050-N056-100-W
				64	Long		68886	M806-250-050-N064-100-W
			150	56	Short		68888	M806-250-050-N056-100-L150-W
				94	Long		68890	M806-250-050-N094-100-L150-W

## M8 Series Application Guide - Speed & Feed (inch and metric)

	Type of Cut	INCH							METRIC						
		EM Dia.	Axial Depth	Radial Depth	Speed (SFM)	RPM	IPT	IPM	EM Dia.	Axial Depth	Radial Depth	Speed (M/Min)	RPM	MMPT	MM/Min
<b>S</b>	Rough Slot	1/4	1.25 x D	.2 x D	80	1222	0.0008	5.87	6,0	1.25 x D	.2 x D	24.38	1239	0.019	141.2
			0.165		80	1222	0.00050	3.67		4.15		24.38	1239	0.0127	94.4
	Rough Slot	5/16	1.25 x D	.2 x D	80	978	0.0010	5.87	8,0	1.25 x D	.2 x D	24.38	970	0.025	145.5
			0.205		80	978	0.00063	3.67		5.20		24.38	970	0.0160	93.1
	Rough Slot	3/8	1.25 x D	.2 x D	80	815	0.0012	5.87	10,0	1.25 x D	.2 x D	24.38	776	0.031	144.3
			0.250		80	815	0.00075	3.67		6.35		24.38	776	0.0190	88.5
	Rough Slot	1/2	1.25 x D	.2 x D	80	611	0.0016	5.87	12,0	1.25 x D	.2 x D	24.38	647	0.037	143.6
			0.330		80	611	0.00100	3.67		8.35		24.38	647	0.0254	98.5
Rough Slot	5/8	1.25 x D	.2 x D	80	489	0.0020	5.87	16,0	1.25 x D	.2 x D	24.38	485	0.050	145.5	
		0.415		80	489	0.00125	3.67		10.50		24.38	485	0.0317	92.2	
Rough Slot	3/4	1.25 x D	.2 x D	80	407	0.0024	5.87	20,0	1.25 x D	.2 x D	24.38	388	0.061	142.1	
		1.500		80	407	0.00150	3.67		12.70		24.38	388	0.0380	88.4	
Rough Slot	1	1.25 x D	.2 x D	80	306	0.0032	5.87	25,0	1.25 x D	.2 x D	24.38	310	0.080	148.8	
		1.665		80	306	0.00200	3.67		16.90		24.38	310	0.0508	94.4	

For applications in Titanium Alloys, please see our M5 series starting on page 16.

# enDURO®

## M5 Series

**Muscle to hustle in titanium  
and other nasty-hard metals.**

Advanced high-shear cutting edges and amazing corner strength make enDURO end mills the best choice for milling hard-to-machine materials, whether you use high-efficiency machining or traditional techniques.





# enDURO M5 Series Features



## Options

### Corner radius

Helps prevent corner chipping.

### Square end

For routine machining, finishing.

### Ball end (M525 only)

Minimizes tool deflection, boosts productivity contouring deep cavities

## Choose the length for the job.

**Extra rigidity** – Choose stub length.

**Medium-to-deep cuts** - Order standard, long or extra-long flute length and reach.

**Finishing passes** - Order extra-long flute length.

**Neck Relief** - Better clearance in deep cavities, easier machining against tight walls.

## Advanced tooling for aerospace and medical parts manufacturing.

Your first choice of tooling in these materials:



### Titanium alloys

Titanium and titanium alloys.



### Stainless steels

Austenitic and precipitation hardening stainless steels.

With plenty of muscle to hustle in:



### Carbon and tool steels

All tool steels and carbon steels under 50 HRC.



### Cast iron

Malleable and gray cast irons.

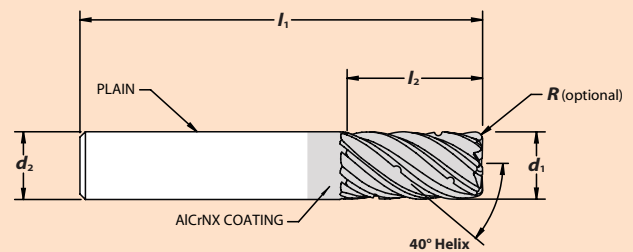
## enDURO M527C with CHIP MANAGEMENT SYSTEM: Winning Combo.

IMCO's advanced technology brings you a new, distinctive flute pattern designed to save you time and money. Our unique flute design breaks the material into smaller chips to prevent machine clogging and chip recutting in the work piece. Together, the CMS and the 7-flute design of the M527 create a high-output combination when HEM tool paths are used.

### Square End and Corner Radius with Chip Management System (CMS)

#### 7-FLUTE

IMCO's Chip Management System (CMS) helps to eliminate the long, stringy chips that can occur when taking deep cuts in titanium and stainless steels. The CMS saves you time and money by breaking the chips to prevent "bird-nesting" and also by aiding the flow of coolant to the cutting zone, which helps wash away the chips.



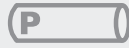
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<b>mm</b>	d <sub>1</sub> +0,000 / -0,050	d <sub>2</sub> -0,0025 / -0,0100

## Model Code: M527C 7-Flute w/Square End



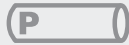
Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number	
					M527C-xxxx - d1	xxxx - SQ l2
1/2	1/2	2-1/8	4	66492	M527C-0500-2125-SQ	
		2-5/8	5	66497	M527C-0500-2625-SQ	
5/8	5/8	2-1/8	4	66502	M527C-0625-2125-SQ	
		2-5/8	5	66507	M527C-0625-2625-SQ	
		3-1/4	6	66512	M527C-0625-3250-SQ	
3/4	3/4	2-3/8	5	66517	M527C-0750-2375-SQ	
		3-1/4	6	66522	M527C-0750-3250-SQ	
		4-1/8	7	66527	M527C-0750-4125-SQ	
1	1	2-1/4	5	66532	M527C-1000-2250-SQ	
		3-1/4	6	66537	M527C-1000-3250-SQ	
		4-1/8	7	66542	M527C-1000-4125-SQ	

## Model Code: M527C 7-Flute w/Square End



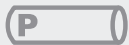
Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number	
					M527C-xxx - d1	xxx - SQ l2
12	12	50	100	66547	M527C-120-050-SQ	
		66	125	66555	M527C-160-066-SQ	
16	16	50	108	66551	M527C-160-050-SQ	
		62	125	66559	M527C-200-062-SQ	
20	20	82	150	66563	M527C-200-082-SQ	
		52	120	66567	M527C-250-052-SQ	
25	25	82	150	66571	M527C-250-082-SQ	

## Model Code: M527C 7-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R)				EZ-ID Number		
				.015 CR	.030 CR	.060 CR	.125 CR	M527C-xxx-xxx-xxx	d1	l2
1/2	1/2	2-1/8	4	66493	66494	66495	66496	M527C-0500-2125-xxx		
		2-5/8	5	66498	66499	66500	66501	M527C-0500-2625-xxx		
5/8	5/8	2-1/8	4	66503	66504	66505	66506	M527C-0625-2125-xxx		
		2-5/8	5	66508	66509	66510	66511	M527C-0625-3250-xxx		
		3-1/4	6	66513	66514	66515	66516	M527C-0625-3250-xxx		
3/4	3/4	2-3/8	5	66518	66519	66520	66521	M527C-0750-2375-xxx		
		3-1/4	6	66523	66524	66525	66526	M527C-0750-3250-xxx		
		4-1/8	7	66528	66529	66530	66531	M527C-0750-4125-xxx		
1	1	2-1/4	5	66533	66534	66535	66536	M527C-1000-2250-xxx		
		3-1/4	6	66538	66539	66540	66541	M527C-1000-3250-xxx		
		4-1/8	7	66543	66544	66545	66546	M527C-1000-4125-xxx		

## Model Code: M527C 7-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R)			EZ-ID Number		
				0,5 CR	1,0 CR	1,5 CR	M527C-xxx-xxx-xxx	d1	l2
12	12	50	100	66548	66549	66550	M527C-120-050-xxx		
		66	125	66552	66553	66554	M527C-160-050-xxx		
16	16	50	108	66556	66557	66558	M527C-160-066-xxx		
		62	125	66560	66561	66562	M527C-200-062-xxx		
20	20	82	150	66564	66565	66566	M527C-200-082-xxx		
		52	120	66568	66569	66570	M527C-250-052-xxx		
25	25	82	150	66572	66573	66574	M527C-250-082-xxx		

# M527

## Square and Corner Radius



### 7-FLUTE

For high-performance and high-efficiency machining, especially in stainless steels and titanium. Designed with a thick core for stability and additional flutes for higher feed rates. Corner radii options available for HEM and semi-roughing, and square corner available for general finishing operations.

## Model Code: M527 7-Flute w/Square End

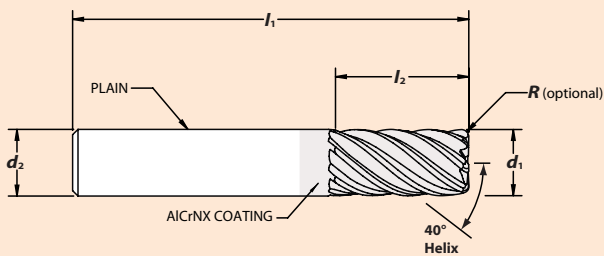


Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number
					M527-xxxx - xxxx - SQ d1 l2
3/8	3/8	1/2	2	65920	M527-0375-0500-SQ
		7/8	2-1/2	65968	M527-0375-0875-SQ
		1-1/4	3	65976	M527-0375-1250-SQ
1/2	1/2	5/8	2-1/2	66000	M527-0500-0625-SQ
		1-1/4	3	66045	M527-0500-1250-SQ
		1-5/8	3-1/2	66054	M527-0500-1625-SQ
		2-1/8	4	66072	M527-0500-2125-SQ
		2-5/8	5	66081	M527-0500-2625-SQ
		3/4	3	66090	M527-0625-0750-SQ
5/8	5/8	1-3/8	3-1/2	66130	M527-0625-1375-SQ
		2-1/8	4	66140	M527-0625-2125-SQ
		2-5/8	5	66160	M527-0625-2625-SQ
		3-1/4	6	66170	M527-0625-3250-SQ
		1	3	66180	M527-0750-1000-SQ
3/4	3/4	1-5/8	4	66220	M527-0750-1625-SQ
		2-3/8	5	66230	M527-0750-2375-SQ
		3-1/4	6	66250	M527-0750-3250-SQ
		4-1/8	7	66260	M527-0750-4125-SQ
1	1	1-3/4	4	66314	M527-1000-1750-SQ
		2-1/4	5	66325	M527-1000-2250-SQ
		3-1/4	6	66347	M527-1000-3250-SQ
		4-1/8	7	66358	M527-1000-4125-SQ
1-1/4	1-1/4	2	4-1/2	66402	M527-1250-2000-SQ
		3-1/4	6	66413	M527-1250-3250-SQ
		5	8	66424	M527-1250-5000-SQ

## Model Code: M527 7-Flute w/Square End

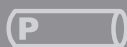


Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number
					M527-xxx - xxx - SQ d1 l2
10	10	22	72	66440	M527-100-022-SQ
		32	80	66444	M527-100-032-SQ
12	12	26	83	66448	M527-120-026-SQ
		38	93	66452	M527-120-038-SQ
		50	100	66456	M527-120-050-SQ
16	16	34	92	66460	M527-160-034-SQ
		50	108	66464	M527-160-050-SQ
		66	125	66468	M527-160-066-SQ
20	20	42	104	66472	M527-200-042-SQ
		62	125	66476	M527-200-062-SQ
25	25	82	150	66480	M527-200-082-SQ
		52	120	66484	M527-250-052-SQ
		82	150	66488	M527-250-082-SQ



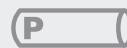
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**mm** d1 +0.000 / -0.050 d2 -0.0025 / -0.0100

## Model Code: M527 7-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R)					EZ-ID Number M527-xxx-xxx-xxx		
				.015 CR	.030 CR	.060 CR	.090 CR	.125 CR	d1	l2	R
3/8	3/8	1/2	2	65921	65922	65923	65924	65925	M527-0375-0500-xxx		
		7/8	2-1/2	65969	65970	65971	65972	65973	M527-0375-0875-xxx		
		1-1/4	3	65977	65978	65979	65980	65981	M527-0375-1250-xxx		
1/2	1/2	5/8	2-1/2	66001	66002	66003	66004	66005	M527-0500-0625-xxx		
		1-1/4	3	66046	66047	66048	66049	66050	M527-0500-1250-xxx		
		1-5/8	3-1/2	66055	66056	66057	66058	66059	M527-0500-1625-xxx		
		2-1/8	4	66073	66074	66075	66076	66077	M527-0500-2125-xxx		
		2-5/8	5	66082	66083	66084	66085	66086	M527-0500-2625-xxx		
5/8	5/8	3/4	3	66091	66092	66093	66094	66095	M527-0625-0750-xxx		
		1-3/8	3-1/2	66131	66132	66133	66134	66135	M527-0625-1375-xxx		
		2-1/8	4	66141	66142	66143	66144	66145	M527-0625-2125-xxx		
		2-5/8	5	66161	66162	66163	66164	66165	M527-0625-2625-xxx		
3/4	3/4	3-1/4	6	66171	66172	66173	66174	66175	M527-0625-3250-xxx		
		1	3	66181	66182	66183	66184	66185	M527-0750-1000-xxx		
		1-5/8	4	66221	66222	66223	66224	66225	M527-0750-1625-xxx		
		2-3/8	5	66231	66232	66233	66234	66235	M527-0750-2375-xxx		
		3-1/4	6	66251	66252	66253	66254	66255	M527-0750-3250-xxx		
1	1	4-1/8	7	66261	66262	66263	66264	66265	M527-0750-4125-xxx		
		1-3/4	4	66315	66316	66317	66318	66319	M527-1000-1750-xxx		
		2-1/4	5	66326	66327	66328	66329	66330	M527-1000-2250-xxx		
		3-1/4	6	66348	66349	66350	66351	66352	M527-1000-3250-xxx		
1-1/4	1-1/4	4-1/8	7	66359	66360	66361	66362	66363	M527-1000-4125-xxx		
		2	4-1/2	66403	66404	66405	66406	66407	M527-1250-2000-xxx		
		3-1/4	6	66414	66415	66416	66417	66418	M527-1250-3250-xxx		
		5	8	66425	66426	66427	66428	66429	M527-1250-5000-xxx		

## Model Code: M527 7-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R)			EZ-ID Number M527-xxx-xxx-xxx		
				0,5 CR	1,0 CR	1,5 CR	d1	l2	R
10	10	22	72	66441	66442	66443	M527-100-022-xxx		
		32	80	66445	66446	66447	M527-100-032-xxx		
12	12	26	83	66449	66450	66451	M527-120-026-xxx		
		38	93	66453	66454	66455	M527-120-038-xxx		
		50	100	66457	66458	66459	M527-120-050-xxx		
16	16	34	92	66461	66462	66463	M527-160-034-xxx		
		50	108	66465	66466	66467	M527-160-050-xxx		
		66	125	66469	66470	66471	M527-160-066-xxx		
20	20	42	104	66473	66474	66475	M527-200-042-xxx		
		62	125	66477	66478	66479	M527-200-062-xxx		
		82	150	66481	66482	66483	M527-200-082-xxx		
25	25	52	120	66485	66486	66487	M527-250-052-xxx		
		82	150	66489	66490	66491	M527-250-082-xxx		

# M527 Application Guide - Speed & Feed (inch)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	No. of Flutes	Speed (SFM)	Feed (Inches per Tooth)						
							1/8	1/4	3/8	1/2	5/8	3/4	1
<b>S</b>	Titanium Alloys 6Al-4V, 6-2-4	Slotting	.5 x D	1 x D	7	250	.0003	.0007	.0010	.0013	.0016	.0020	.0026
		Peripheral - Rough	1 x D	.3 x D	7	300	.0004	.0009	.0013	.0018	.0022	.0027	.0036
		Peripheral - HEM*	3 x D	.05 x D	7	330	.0016	.0032	.0047	.0063	.0079	.0095	.0126
		Finish	1.5 x D	.015 x D	7	300	.0005	.0009	.0014	.0018	.0023	.0027	.0036
	Difficult-to-Machine Titanium Alloys 10-2-3	Slotting	.25 x D	1 x D	7	200	.0002	.0005	.0007	.0010	.0012	.0015	.0019
		Peripheral - Rough	1 x D	.25 x D	7	250	.0004	.0007	.0011	.0014	.0018	.0021	.0028
		Peripheral - HEM*	3 x D	.05 x D	7	275	.0012	.0024	.0037	.0049	.0061	.0073	.0098
		Finish	1.5 x D	.01 x D	7	250	.0004	.0008	.0012	.0016	.0021	.0025	.0033
<b>M</b>	Austenitic Stainless Steels, FeNi Alloys 303, 304, 316, Invar, Kovar	Slotting	.5 x D	1 x D	7	275	.0004	.0009	.0013	.0017	.0021	.0026	.0034
		Peripheral - Rough	1.25 x D	.3 x D	7	350	.0006	.0012	.0018	.0023	.0029	.0035	.0047
		Peripheral - HEM*	3 x D	.05 x D	7	390	.0021	.0042	.0063	.0083	.0104	.0125	.0167
		Finish	2 x D	.015 x D	7	350	.0006	.0012	.0018	.0024	.0030	.0036	.0048
	Precipitation Hardening Stainless Steels 17-4, 15-5, 13-8	Slotting	.5 x D	1 x D	7	250	.0004	.0007	.0011	.0014	.0018	.0021	.0029
		Peripheral - Rough	1.25 x D	.3 x D	7	325	.0005	.0010	.0015	.0019	.0024	.0029	.0039
		Peripheral - HEM*	3 x D	.05 x D	7	360	.0017	.0033	.0050	.0067	.0083	.0100	.0133
		Finish	1.5 x D	.015 x D	7	325	.0005	.0010	.0015	.0020	.0025	.0030	.0040
<b>P</b>	Low Carbon Steels <= 38 Rc 1018, 1020, 12L14, 5120, 8620	Slotting	.5 x D	1 x D	7	325	.0005	.0010	.0015	.0020	.0025	.0030	.0040
		Peripheral - Rough	1.25 x D	.3 x D	7	400	.0007	.0014	.0020	.0027	.0034	.0041	.0055
		Peripheral - HEM*	3 x D	.05 x D	7	450	.0022	.0044	.0066	.0088	.0109	.0131	.0175
		Finish	2 x D	.015 x D	7	400	.0007	.0014	.0021	.0028	.0035	.0042	.0056
	Medium Carbon Steels <= 48 HRC 1045, 4140, 4340, 5140	Slotting	.5 x D	1 x D	7	300	.0005	.0009	.0014	.0018	.0023	.0027	.0037
		Peripheral - Rough	1.25 x D	.3 x D	7	375	.0006	.0012	.0019	.0025	.0031	.0037	.0050
		Peripheral - HEM*	3 x D	.05 x D	7	415	.0021	.0043	.0064	.0086	.0107	.0129	.0172
		Finish	2 x D	.015 x D	7	375	.0006	.0013	.0019	.0025	.0032	.0038	.0051
	Tool and Die Steels <= 48 Rc A2, D2, O1, S7, P20, H13	Slotting	.5 x D	1 x D	7	275	.0004	.0008	.0012	.0015	.0019	.0023	.0031
		Peripheral - Rough	1.25 x D	.3 x D	7	350	.0005	.0011	.0016	.0021	.0026	.0032	.0042
		Peripheral - HEM*	3 x D	.05 x D	7	390	.0018	.0037	.0055	.0074	.0092	.0110	.0147
		Finish	2 x D	.015 x D	7	350	.0005	.0011	.0016	.0021	.0027	.0032	.0043
	Martensitic & Ferritic Stainless Steels 410, 416, 440	Slotting	.5 x D	1 x D	7	300	.0005	.0009	.0014	.0018	.0023	.0027	.0037
		Peripheral - Rough	1.25 x D	.3 x D	7	375	.0006	.0012	.0019	.0025	.0031	.0037	.0050
		Peripheral - HEM*	3 x D	.05 x D	7	415	.0021	.0043	.0064	.0086	.0107	.0129	.0172
		Finish	2 x D	.015 x D	7	375	.0006	.0013	.0019	.0025	.0032	.0038	.0051
<b>K</b>	Cast Iron Gray	Slotting	.5 x D	1 x D	7	300	.0004	.0009	.0013	.0018	.0022	.0027	.0035
		Peripheral - Rough	1.25 x D	.3 x D	7	375	.0006	.0012	.0018	.0023	.0029	.0035	.0047
		Finish	2 x D	.015 x D	7	450	.0006	.0012	.0018	.0024	.0030	.0036	.0048
	Cast Iron Malleable	Slotting	.5 x D	1 x D	7	275	.0004	.0007	.0011	.0014	.0018	.0021	.0029
		Peripheral - Rough	1.25 x D	.3 x D	7	350	.0005	.0010	.0015	.0019	.0024	.0029	.0039
		Peripheral - HEM*	3 x D	.05 x D	7	390	.0014	.0028	.0043	.0057	.0071	.0085	.0114
	Finish	2 x D	.015 x D	7	350	.0005	.0010	.0015	.0020	.0025	.0030	.0040	

D = Tool Diameter \*HEM= High-efficiency machining (chip thinning calculations have already been applied to HEM parameters shown)

## Common Machining Formulas

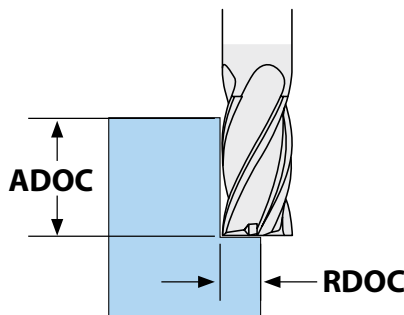
$$RPM = \frac{SFM \times 3.82}{D}$$

$$SFM = RPM \times D \times .262$$

$$IPM = RPM \times IPT \times Z$$

$$MRR = RDOC \times ADOC \times IPM$$

$$\text{Radial Chip Thinning Adjustment } IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$$



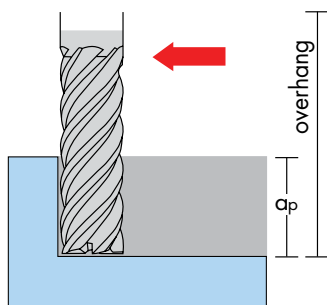
Apply chip thinning adjustment when RDOC < D

# M527 Application Guide - Speed & Feed (metric)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	No. of Flutes	Speed (M/min)	Feed (MM per Tooth)					
							6,0	10,0	12,0	16,0	20,0	25,0
S	Titanium Alloys 6Al-4V, 6-2-4	Slotting	.5 x D	1 x D	7	76	.0167	.0277	.0334	.0444	.0554	.0668
		Peripheral - Rough	1 x D	.3 x D	7	91	.0228	.0378	.0455	.0606	.0756	.0911
		Peripheral - HEM*	3 x D	.05 x D	7	101	.0802	.1331	.1603	.2132	.2662	.3207
		Finish	1.5 x D	.015 x D	7	91	.0232	.0385	.0463	.0616	.0769	.0927
	Difficult-to-Machine Titanium Alloys 10-2-3	Slotting	.25 x D	1 x D	7	61	.0123	.0205	.0247	.0328	.0409	.0493
		Peripheral - Rough	1 x D	.25 x D	7	76	.0178	.0296	.0356	.0474	.0591	.0712
		Peripheral - HEM*	3 x D	.05 x D	7	84	.0622	.1032	.1244	.1654	.02064	.2487
		Finish	1.5 x D	.01 x D	7	76	.0209	.0347	.0418	.0556	.0695	.0837
M	Austenitic Stainless Steels, FeNi Alloys 303, 304, 316, Invar, Kovar	Slotting	.5 x D	1 x D	7	84	.0218	.0361	.0435	.0579	.0723	.0871
		Peripheral - Rough	1.25 x D	.3 x D	7	107	.0297	.0493	.0594	.0790	.0986	.1188
		Peripheral - HEM*	3 x D	.05 x D	7	119	.1058	.1757	.2117	.2815	.3514	.4233
		Finish	2 x D	.015 x D	7	107	.0302	.0502	.0605	.0804	.1004	.1209
	Precipitation Hardening Stainless Steels 17-4, 15-5, 13-8	Slotting	.5 x D	1 x D	7	76	.0181	.0301	.0363	.0483	.0602	.0726
		Peripheral - Rough	1.25 x D	.3 x D	7	99	.0247	.0411	.0495	.0658	.0822	.0990
		Peripheral - HEM*	3 x D	.05 x D	7	110	.0847	.1405	.1693	.2252	.2811	.3387
		Finish	1.5 x D	.015 x D	7	99	.0252	.0418	.0504	.0670	.0836	.1008
P	Low Carbon Steels <= 38 Rc 1018, 1020, 12L14, 5120, 8620	Slotting	.5 x D	1 x D	7	99	.0254	.0422	.0508	.0676	.0843	.1016
		Peripheral - Rough	1.25 x D	.3 x D	7	122	.0346	.0575	.0693	.0921	.1150	.1386
		Peripheral - HEM*	3 x D	.05 x D	7	137	.1111	.1845	.2223	.2957	.3690	.4446
		Finish	2 x D	.015 x D	7	122	.0353	.0585	.0705	.0938	.1171	.1411
	Medium Carbon Steels <= 48 HRC 1045, 4140, 4340, 5140	Slotting	.5 x D	1 x D	7	91	.0232	.0386	.0465	.0618	.0771	.0929
		Peripheral - Rough	1.25 x D	.3 x D	7	114	.0317	.0526	.0634	.0843	.1052	.1267
		Peripheral - HEM*	3 x D	.05 x D	7	126	.1089	.1808	.2178	.2897	.3616	.4357
		Finish	2 x D	.015 x D	7	114	.0322	.0535	.0645	.0858	.1071	.1290
	Tool and Die Steels <= 48 Rc A2, D2, O1, S7, P20, H13	Slotting	.5 x D	1 x D	7	84	.0196	.0325	.0392	.0521	.0651	.0784
		Peripheral - Rough	1.25 x D	.3 x D	7	107	.0267	.0444	.0535	.0711	.0887	.1069
		Peripheral - HEM*	3 x D	.05 x D	7	119	.0934	.1550	.1867	.2483	.3100	.3735
		Finish	2 x D	.015 x D	7	107	.0272	.0452	.0544	.0724	.0903	.1088
	Martensitic & Ferritic Stainless Steels 410, 416, 440	Slotting	.5 x D	1 x D	7	91	.0232	.0386	.0465	.0618	.0771	.0929
		Peripheral - Rough	1.25 x D	.3 x D	7	114	.0317	.0526	.0634	.0843	.1052	.1267
		Peripheral - HEM*	3 x D	.05 x D	7	126	.1089	.1808	.2178	.2897	.3616	.4357
		Finish	2 x D	.015 x D	7	114	.0322	.0535	.0645	.0858	.1071	.1290
K	Cast Iron Gray	Slotting	.5 x D	1 x D	7	91	.0225	.0374	.0450	.0599	.0747	.0900
		Peripheral - Rough	1.25 x D	.3 x D	7	114	.0298	.0495	.0596	.0792	.0989	.1192
		Finish	2 x D	.015 x D	7	137	.0303	.0503	.0607	.0807	.1007	.1213
	Cast Iron Malleable	Slotting	.5 x D	1 x D	7	84	.0181	.0301	.0363	.0483	.0602	.0726
		Peripheral - Rough	1.25 x D	.3 x D	7	107	.0247	.0411	.0495	.0658	.0822	.0990
		Peripheral - HEM*	3 x D	.05 x D	7	119	.0722	.1199	.1445	.1922	.2399	.2890
		Finish	2 x D	.015 x D	7	107	.0252	.0418	.0504	.0670	.0836	.1008

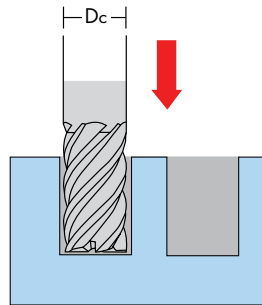
D = Tool Diameter \*HEM = High-efficiency machining (chip thinning calculations have already been applied to HEM parameters shown)

## Adjustments - Apply these adjustments when programming the following applications.



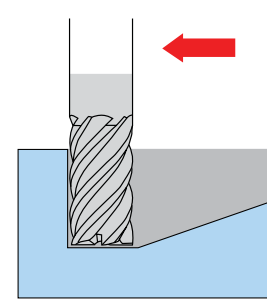
### 1. Long reach mills with large overhang

- Reduce speed rate and chipload by 10%



### 2. Plunge entry into work piece

- Reduce chipload by 80% of recommended slotting rate
- Peck mill if axial DOC ( $A_p$ ) exceeds 50% of  $D_c$



### 3. Ramp entry into work piece

- Ramp at 1.5°-2.5° angle
- Reduce chipload by 20% of recommended slotting rate

## enDURO M525C with CHIP MANAGEMENT SYSTEM:

# Shear Power.

IMCO's advanced technology brings you a new, distinctive flute pattern designed to save you time and money. Our unique flute design breaks the material into smaller chips to prevent machine clogging and chip recutting in the work piece. The smaller chips also helps prevent clogging in the machine auger that can lead to chip disposal problems.

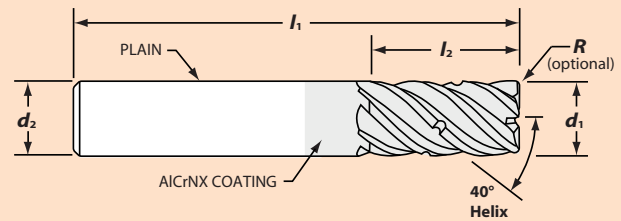


## Square End and Corner Radius with Chip Management System (CMS)



### 5 - FLUTE

IMCO's Chip Management System (CMS) helps to eliminate the long, stringy chips that can occur when taking deep cuts in titanium and stainless steels. The CMS saves you time and money by breaking the chips to prevent "bird-nesting" and also by aiding the flow of coolant to the cutting zone, which helps wash away the chips.



<b>in</b>	$d_1 +0.000 / -0.002$	$d_2 -0.0001 / -0.0004$
<b>mm</b>	$d_1 +0.000 / -0.050$	$d_2 -0.0025 / -0.0100$

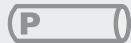


**Model Code: M525C**  
**5-Flute w/Square End**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number
					M525C - xxxx - xxxx - SQ d1 l2
1/2	1/2	2-1/8	4	68250	M525C-0500-2125-SQ
		2-5/8	5	68255	M525C-0500-2625-SQ
		3-1/4	6	68260	M525C-0500-3250-SQ
5/8	5/8	2-1/8	4	68265	M525C-0625-2125-SQ
		2-5/8	5	68270	M525C-0625-2625-SQ
		3-1/4	6	68275	M525C-0625-3250-SQ
3/4	3/4	2-3/8	5	68280	M525C-0750-2375-SQ
		3-1/4	6	68285	M525C-0750-3250-SQ
		4-1/8	7	68290	M525C-0750-4125-SQ
1	1	2-5/8	5	68295	M525C-1000-2625-SQ
		3-1/4	6	68300	M525C-1000-3250-SQ
		4-1/4	7	68305	M525C-1000-4250-SQ

**Model Code: M525C**  
**5-Flute w/Square End**



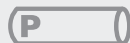
Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number
					M525C - xxxx - xxxx - SQ d1 l2
12	12	50	100	66900	M525C-120-050-SQ
		75	150	66904	M525C-120-075-SQ
16	16	55	110	66908	M525C-160-055-SQ
		75	150	66912	M525C-160-075-SQ
20	20	65	125	66916	M525C-200-065-SQ
		85	150	66920	M525C-200-085-SQ
25	25	55	120	66924	M525C-250-055-SQ
		85	150	66928	M525C-250-085-SQ

**Model Code: M525C**  
**5-Flute w/Corner Radius**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R)				EZ-ID Number
				.015 CR	.030 CR	.060 CR	.120 CR	M525C - xxxx - xxxx - xxx d1 l2 R
1/2	1/2	2-1/8	4	68251	68252	68253	68254	M525C-0500-2125-xxx
		2-5/8	5	68256	68257	68258	68259	M525C-0500-2625-xxx
		3-1/4	6	68261	68262	68263	68264	M525C-0500-3250-xxx
5/8	5/8	2-1/8	4	68266	68267	68268	68269	M525C-0625-2125-xxx
		2-5/8	5	68271	68272	68273	68274	M525C-0625-2625-xxx
		3-1/4	6	68276	68277	68278	68279	M525C-0625-3250-xxx
3/4	3/4	2-3/8	5	68281	68282	68283	68284	M525C-0750-2375-xxx
		3-1/4	6	68286	68287	68288	68289	M525C-0750-3250-xxx
		4-1/8	7	68291	68292	68293	68294	M525C-0750-4125-xxx
1	1	2-5/8	5	68296	68297	68298	68299	M525C-1000-2625-xxx
		3-1/4	6	68301	68302	68303	68304	M525C-1000-3250-xxx
		4-1/4	7	68306	68307	68308	68309	M525C-1000-4250-xxx

**Model Code: M525C**  
**5-Flute w/Corner Radius**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R)			EZ-ID Number
				0,75 CR	1,0 CR	1,5 CR	M525C - xxxx - xxxx - xxx d1 l2 R
12	12	50	100	66901	66902	66903	M525C-120-050-xxx
		75	150	66905	66906	66907	M525C-120-075-xxx
16	16	55	110	66909	66910	66911	M525C-160-055-xxx
		75	150	66913	66914	66915	M525C-160-075-xxx
20	20	65	125	66917	66918	66919	M525C-200-065-xxx
		85	150	66921	66922	66923	M525C-200-085-xxx
25	25	55	120	66925	66926	66927	M525C-250-055-xxx
		85	150	66929	66930	66931	M525C-250-085-xxx

**TOOL TIP**

**CMS: No More Cutting Zone Meltdowns**

Taking deep axial cuts and light step-overs with constant tool engagement is a great technique to achieve high MRRs and tool life. However, this type of tool path can lead to long, stringy chips. The M525C with CMS breaks up these chips, preventing issues with chip evacuation and re-cutting, and allows you to speed through the cuts – all without reducing your tool life.

Short chips created with the M525C tool. ▲



▲ Long chips made when using a normal tool.

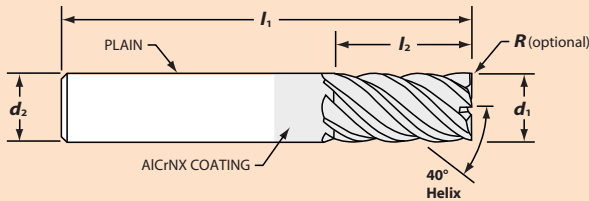
# M525

## Square End and Corner Radius



### 5-FLUTE

For high-performance and high-efficiency machining in materials ranging from titanium to low carbon steels. Large selection of corner radii to meet the demands of today's aerospace industry. Square corner available for general finishing operations.



**in** d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
**mm** d1 +0.000 / -0.050 d2 -0.0025 / -0.0100

Use M525 plain shank with milling chuck, collet or shrink-fit tool holders to minimize total indicator runout (TIR) when performing high-efficiency machining or finishing operations.

## Model Code: M525 5-Flute w/Square End



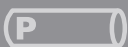
Cutter Dia d1	Shank Dia d2	Length of Cut L2	Overall Length L1	Order Code	EZ-ID Number		
					M525 - xxxx	- xxxx - SQ-Lxx	
					d1	L2	L1
1/8	1/8	1/4	1-1/2	65001	M525-0125-0250-SQ		
		1/2	1-1/2	65005	M525-0125-0500-SQ		
		3/4	2-1/2	65009	M525-0125-0750-SQ		
3/16	3/16	5/16	2	65013	M525-0187-0312-SQ		
		9/16	2	65017	M525-0187-0562-SQ		
		3/4	2-1/2	65021	M525-0187-0750-SQ		
1/4	1/4	3/8	2	65025	M525-0250-0375-SQ		
		3/4	2-1/2	65049	M525-0250-0750-SQ		
		1-1/8	3	65055	M525-0250-1125-SQ		
5/16	5/16	7/16	2	65061	M525-0312-0437-SQ		
		13/16	2-1/2	65067	M525-0312-0812-SQ		
		1-1/4	3	65073	M525-0312-1250-SQ		
		2-1/8	4	65079	M525-0312-2125-SQ		
3/8	3/8	1/2	2	65085	M525-0375-0500-SQ		
		1	2-1/2	65133	M525-0375-1000-SQ		
		1-1/4	3	65141	M525-0375-1250-SQ		
		1-5/8	3-1/2	65149	M525-0375-1625-SQ		
		1-5/8	4	65157	M525-0375-1625-SQ-L4		
		1-5/8	6	65165	M525-0375-1625-SQ-L6		
		2	4	65173	M525-0375-2000-SQ		
		2-1/2	6	65181	M525-0375-2500-SQ-L6		
		5/8	2-1/2	65189	M525-0437-0625-SQ		
		7/16	2-3/4	65197	M525-0437-1000-SQ		
1/2	1/2	2	4	65205	M525-0437-2000-SQ		
		5/8	2-1/2	65213	M525-0500-0625-SQ		
		1	3	65258	M525-0500-1000-SQ		
		1-1/4	3	65267	M525-0500-1250-SQ		
		1-5/8	4	65276	M525-0500-1625-SQ		
		1-5/8	6	65285	M525-0500-1625-SQ-L6		
		2-1/8	4	65294	M525-0500-2125-SQ		
		2-5/8	5	65303	M525-0500-2625-SQ		
		3-1/4	6	65312	M525-0500-3250-SQ		
		3/4	3	65321	M525-0625-0750-SQ		
5/8	5/8	1-5/8	3-1/2	65361	M525-0625-1625-SQ		
		2-1/8	4	65371	M525-0625-2125-SQ		
		2-1/8	6	65381	M525-0625-2125-SQ-L6		
		2-5/8	5	65391	M525-0625-2625-SQ		
		3-1/4	6	65401	M525-0625-3250-SQ		
3/4	3/4	4	6	65411	M525-0625-4000-SQ-L6		
		1	3	65421	M525-0750-1000-SQ		
		1-5/8	4	65461	M525-0750-1625-SQ		
		2-3/8	5	65471	M525-0750-2375-SQ		
		2-3/8	6	65481	M525-0750-2375-SQ-L6		
		3-1/4	6	65491	M525-0750-3250-SQ		
1	1	4-1/8	7	65501	M525-0750-4125-SQ		
		1-3/4	4	65555	M525-1000-1750-SQ		
		2-5/8	5	65566	M525-1000-2625-SQ		
		3-1/4	6	65588	M525-1000-3250-SQ		
1-1/4	1-1/4	4-1/4	7	65599	M525-1000-4250-SQ		
		2	4-1/2	65643	M525-1250-2000-SQ		
		3-1/4	6	65654	M525-1250-3250-SQ		
		5	8	65665	M525-1250-5000-SQ		

**Model Code: M525**  
**5-Flute w/Corner Radius**



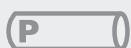
Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R) (replace -xxx in EZ-ID number with decimal size shown below)										EZ-ID Number	
				.015 CR	.030 CR	.060 CR	.090 CR	.120 CR	.156 CR	.190 CR	.250 CR	.375 CR	M525 -xxxx-d1	-xxxx-l2-R-l1	
1/8	1/8	1/4	1-1/2	65002	65003										M525-0125-0250-xxx
		1/2	1-1/2	65006	65007										M525-0125-0500-xxx
		3/4	2-1/2	65010	65011										M525-0125-0750-xxx
3/16	3/16	5/16	2	65014	65015										M525-0187-0312-xxx
		9/16	2	65018	65019										M525-0187-0562-xxx
		3/4	2-1/2	65022	65023										M525-0187-0750-xxx
1/4	1/4	3/8	2	65026	65027	65028	65029								M525-0250-0375-xxx
		3/4	2-1/2	65050	65051	65052	65053								M525-0250-0750-xxx
		1-1/8	3	65056	65057	65058	65059								M525-0250-1125-xxx
5/16	5/16	7/16	2	65062	65063	65064	65065								M525-0312-0437-xxx
		13/16	2-1/2	65068	65069	65070	65071								M525-0312-0812-xxx
		1-1/4	3	65074	65075	65076	65077								M525-0312-1250-xxx
		2-1/8	4	65080	65081	65082	65083								M525-0312-2125-xxx
3/8	3/8	1/2	2	65086	65087	65088	65089	65090	65091						M525-0375-0500-xxx
		1	2-1/2	65134	65135	65136	65137	65138	65139						M525-0375-1000-xxx
		1-1/4	3	65142	65143	65144	65145	65146	65147						M525-0375-1250-xxx
		1-5/8	3-1/2	65150	65151	65152	65153	65154	65155						M525-0375-1625-xxx
		1-5/8	4	65158	65159	65160	65161	65162	65163						M525-0375-1625-xxx-L4
		1-5/8	6	65166	65167	65168	65169	65170	65171						M525-0375-1625-xxx-L6
		2	4	65174	65175	65176	65177	65178	65179						M525-0375-2000-xxx
		2-1/2	6	65182	65183	65184	65185	65186	65187						M525-0375-2500-xxx-L6
7/16	7/16	5/8	2-1/2	65190	65191	65192	65193	65194	65195						M525-0437-0625-xxx
		1	2-3/4	65198	65199	65200	65201	65202	65203						M525-0437-1000-xxx
		2	4	65206	65207	65208	65209	65210	65211						M525-0437-2000-xxx
1/2	1/2	5/8	2-1/2	65214	65215	65216	65217	65218	65219	65220					M525-0500-0625-xxx
		1	3	65259	65260	65261	65262	65263	65264	65265					M525-0500-1000-xxx
		1-1/4	3	65268	65269	65270	65271	65272	65273	65274					M525-0500-1250-xxx
		1-5/8	4	65277	65278	65279	65280	65281	65282	65283					M525-0500-1625-xxx
		1-5/8	6	65286	65287	65288	65289	65290	65291	65292					M525-0500-1625-xxx-L6
		2-1/8	4	65295	65296	65297	65298	65299	65300	65301					M525-0500-2125-xxx
		2-5/8	5	65304	65305	65306	65307	65308	65309	65310					M525-0500-2625-xxx
		3-1/4	6	65313	65314	65315	65316	65317	65318	65319					M525-0500-3250-xxx
5/8	5/8	3/4	3	65322	65323	65324	65325	65326	65327	65328	65329				M525-0625-0750-xxx
		1-5/8	3-1/2	65362	65363	65364	65365	65366	65367	65368	65369				M525-0625-1625-xxx
		2-1/8	4	65372	65373	65374	65375	65376	65377	65378	65379				M525-0625-2125-xxx
		2-1/8	6	65382	65383	65384	65385	65386	65387	65388	65389				M525-0625-2125-xxx-L6
		2-5/8	5	65392	65393	65394	65395	65396	65397	65398	65399				M525-0625-2625-xxx
		3-1/4	6	65402	65403	65404	65405	65406	65407	65408	65409				M525-0625-3250-xxx
3/4	3/4	4	6	65412	65413	65414	65415	65416	65417	65418	65419				M525-0625-4000-xxx-L6
		1	3	65422	65423	65424	65425	65426	65427	65428	65429				M525-0750-1000-xxx
		1-5/8	4	65462	65463	65464	65465	65466	65467	65468	65469				M525-0750-1625-xxx
		2-3/8	5	65472	65473	65474	65475	65476	65477	65478	65479				M525-0750-2375-xxx
		2-3/8	6	65482	65483	65484	65485	65486	65487	65488	65489				M525-0750-2375-xxx-L6
		3-1/4	6	65492	65493	65494	65495	65496	65497	65498	65499				M525-0750-3250-xxx
1	1	4-1/8	7	65502	65503	65504	65505	65506	65507	65508	65509				M525-0750-4125-xxx
		1-3/4	4	65556	65557	65558	65559	65560	65561	65562	65563	65564			M525-1000-1750-xxx
		2-5/8	5	65567	65568	65569	65570	65571	65572	65573	65574	65575			M525-1000-2625-xxx
		3-1/4	6	65589	65590	65591	65592	65593	65594	65595	65596	65597			M525-1000-3250-xxx
1-1/4	1-1/4	4-1/4	7	65600	65601	65602	65603	65604	65605	65606	65607	65608			M525-1000-4250-xxx
		2	4-1/2	65644	65645	65646	65647	65648	65649	65650	65651	65652			M525-1250-2000-xxx
		3-1/4	6	65655	65656	65657	65658	65659	65660	65661	65662	65663			M525-1250-3250-xxx
		5	8	65666	65667	65668	65669	65670	65671	65672	65673	65674			M525-1250-5000-xxx

**Model Code: M525**  
**5-Flute w/Square End**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number
					M525 - xxx - xxx - SQ d1 l2
6	6	13	57	66655	M525-060-013-SQ
8	8	19	63	66660	M525-080-019-SQ
10	10	22	72	66665	M525-100-022-SQ
12	12	26	83	66671	M525-120-026-SQ
		50	100	66870	M525-120-050-SQ
		75	150	66874	M525-120-075-SQ
16	16	32	92	66678	M525-160-032-SQ
		55	110	66878	M525-160-055-SQ
		75	150	66882	M525-160-075-SQ
20	20	38	104	66685	M525-200-038-SQ
		65	125	66886	M525-200-065-SQ
		85	150	66890	M525-200-085-SQ
25	25	45	120	66693	M525-250-045-SQ
		85	150	66894	M525-250-085-SQ

**Model Code: M525**  
**5-Flute w/Corner Radius**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R) (replace -xxx in EZ-ID number with mm size shown below)								EZ-ID Number		
				0,5 CR	0,75 CR	1,0 CR	1,5 CR	2,0 CR	3,0 CR	4,0 CR	5,0 CR	M525 - xxx - xxx - xxx d1 l2 R		
6	6	13	57	66656	66657	66658	66659							M525-060-013-xxx
8	8	19	63	66661	66662	66663	66664							M525-080-019-xxx
10	10	22	72	66666	66667	66668	66669	66670						M525-100-022-xxx
12	12	26	83	66672	66673	66674	66675	66676	66677					M525-120-026-xxx
		50	100		66871	66872	66873							M525-120-050-xxx
		75	150		66875	66876	66877							M525-120-075-xxx
16	16	32	92		66679	66680	66681	66682	66683	66684				M525-160-032-xxx
		55	110		66879	66880	66881							M525-160-055-xxx
		75	150		66883	66884	66885							M525-160-075-xxx
20	20	38	104		66686	66687	66688	66689	66690	66691	66692			M525-200-038-xxx
		65	125		66887	66888	66889							M525-200-065-xxx
		85	150		66891	66892	66893							M525-200-085-xxx
25	25	45	120		66694	66695	66696	66697	66698	66699	66700			M525-250-045-xxx
		85	150		66895	66896	66897							M525-250-085-xxx

**PROFILE**

**Patrick Clewis & Mark Smith**

When **JAMCO America** got a new project making thin-walled parts in titanium (a material they had never worked with), they gave IMCO Representatives Mark Smith and Patrick Clewis a call.

Mark and Patrick were getting great results with enDURO® M525s in heat-treated 15-5 stainless. So they tested the M525s at the same speeds and feeds in titanium that JAMCO was running in aluminum.

**The results**

- **No warping, no scrap, great tool life.**  
*“They even bumped it up to 400 surface feet and 80 ipm, and the tool still ran smoothly.”*



JAMCO America's Production Supervisor Cory Dennis (front left), CNC Programmer Bill Aldrich (center) and Head Machinist Art Ostrum have full production underway, with the support of IMCO Representative Mark Smith (back, left) and Patrick Clewis (back, right).



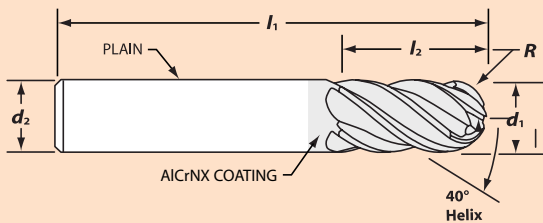
# M525B

## Ball End



### 5 - FLUTE

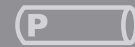
The M525B ball end is excellent for contouring applications in a variety of materials. Based on the same high-performance design but with a ball end.



**in** d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
**mm** d1 +0,000 / -0,050 d2 -0,0025 / -0,0100

As a general rule, when using the M525 ball end mill, reduce feed rates by 25% when the axial DOC exceeds 75% of the mill diameter. Refer to speed and feed information for more detail.

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number
					M525 - xxxx - xxxx - BN - Lxx d1 l2 l1
1/8	1/8	1/4	1-1/2	65004	M525-0125-0250-BN
		1/2	1-1/2	65008	M525-0125-0500-BN
		3/4	2-1/2	65012	M525-0125-0750-BN
3/16	3/16	5/16	2	65016	M525-0187-0312-BN
		9/16	2	65020	M525-0187-0562-BN
		3/4	2-1/2	65024	M525-0187-0750-BN
1/4	1/4	3/8	2	65030	M525-0250-0375-BN
		3/4	2-1/2	65054	M525-0250-0750-BN
		1-1/8	3	65060	M525-0250-1125-BN
5/16	5/16	7/16	2	65066	M525-0312-0437-BN
		13/16	2-1/2	65072	M525-0312-0812-BN
		1-1/4	3	65078	M525-0312-1250-BN
		2-1/8	4	65084	M525-0312-2125-BN
3/8	3/8	1/2	2	65092	M525-0375-0500-BN
		1	2-1/2	65140	M525-0375-1000-BN
		1-1/4	3	65148	M525-0375-1250-BN
		1-5/8	3-1/2	65156	M525-0375-1625-BN
		1-5/8	4	65164	M525-0375-1625-BN-L4
		1-5/8	6	65172	M525-0375-1625-BN-L6
		2	4	65180	M525-0375-2000-BN
		2-1/2	6	65188	M525-0375-2500-BN-L6
7/16	7/16	5/8	2-1/2	65196	M525-0437-0625-BN
		1	2-3/4	65204	M525-0437-1000-BN
1/2	1/2	2	4	65212	M525-0437-2000-BN
		5/8	2-1/2	65221	M525-0500-0625-BN
		1	3	65266	M525-0500-1000-BN
		1-1/4	3	65275	M525-0500-1250-BN
		1-5/8	4	65284	M525-0500-1625-BN
		1-5/8	6	65293	M525-0500-1625-BN-L6
		2-1/8	4	65302	M525-0500-2125-BN
		2-5/8	5	65311	M525-0500-2625-BN
		3-1/4	6	65320	M525-0500-3250-BN
		3/4	3	65330	M525-0625-0750-BN
5/8	5/8	1-5/8	3-1/2	65370	M525-0625-1625-BN
		2-1/8	4	65380	M525-0625-2125-BN
		2-1/8	6	65390	M525-0625-2125-BN-L6
		2-5/8	5	65400	M525-0625-2625-BN
		3-1/4	6	65410	M525-0625-3250-BN
		4	6	65420	M525-0625-4000-BN-L6
3/4	3/4	1	3	65430	M525-0750-1000-BN
		1-5/8	4	65470	M525-0750-1625-BN
		2-3/8	5	65480	M525-0750-2375-BN
		2-3/8	6	65490	M525-0750-2375-BN-L6
		3-1/4	6	65500	M525-0750-3250-BN
1	1	4-1/8	7	65510	M525-0750-4125-BN
		1-3/4	4	65565	M525-1000-1750-BN
		2-5/8	5	65576	M525-1000-2625-BN
		3-1/4	6	65598	M525-1000-3250-BN
1-1/4	1-1/4	4-1/4	7	65609	M525-1000-4250-BN
		2	4-1/2	65653	M525-1250-2000-BN
		3-1/4	6	65664	M525-1250-3250-BN
		5	8	65675	M525-1250-5000-BN



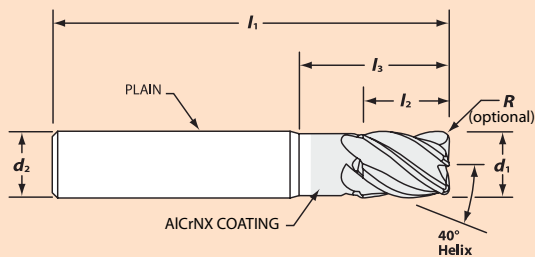
# M525N

## Square End and Corner Radius with Neck Relief



### 5-FLUTE

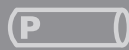
M525N permits clearance in deeper cavities and easier machining tight against walls. Neck relief and short flute length mean increased end mill stability in the cut for more precise tolerances.



in	d1 +0.000 / -0.002	d2 -0.0001 / -0.0004
mm	d1 +0.000 / -0.050	d2 -0.0025 / -0.0100

Cutter Dia d1	Shank Dia d2	Length of Cut L2	Overall Length L1	Reach/ LBS L3	Neck Style	Order Code	EZ-ID Number						
							M525	-xxxx	-xxxx	-Nxxxx -SQ-Lxx			
							d1	L2	L3	L1			
1/4	1/4	3/8	2-1/2	5/8	Short	65031	M525-0250-0375-N0625-SQ						
				1-1/8	Long	65680	M525-0250-0375-N1125-SQ						
			3	5/8	Short	65037	M525-0250-0375-N0625-SQ-L3						
				1-3/8	Long	65686	M525-0250-0375-N1375-SQ-L3						
			4	5/8	Short	65043	M525-0250-0375-N0625-SQ-L4						
				2-3/8	Long	65692	M525-0250-0375-N2375-SQ-L4						
3/8	3/8	1/2	3	3/4	Short	65101	M525-0375-0500-N0750-SQ						
				1-3/8	Long	65706	M525-0375-0500-N1375-SQ						
			4	3/4	Short	65109	M525-0375-0500-N0750-SQ-L4						
				2-3/8	Long	65714	M525-0375-0500-N2375-SQ-L4						
			5	3/4	Short	65117	M525-0375-0500-N0750-SQ-L5						
				3-3/8	Long	65722	M525-0375-0500-N3375-SQ-L5						
			6	3/4	Short	65125	M525-0375-0500-N0750-SQ-L6						
				4-3/8	Long	65730	M525-0375-0500-N4375-SQ-L6						
			1/2	1/2	5/8	3	7/8	Short	65222	M525-0500-0625-N0875-SQ			
							1-3/8	Long	65738	M525-0500-0625-N1375-SQ			
						4	7/8	Short	65231	M525-0500-0625-N0875-SQ-L4			
							2-1/4	Long	65747	M525-0500-0625-N2250-SQ-L4			
5	7/8	Short				65240	M525-0500-0625-N0875-SQ-L5						
	3-1/4	Long				65756	M525-0500-0625-N3250-SQ-L5						
6	7/8	Short				65249	M525-0500-0625-N0875-SQ-L6						
	4-1/4	Long				65765	M525-0500-0625-N4250-SQ-L6						
5/8	5/8	3/4				4	1	Short	65331	M525-0625-0750-N1000-SQ			
							2-1/8	Long	65774	M525-0625-0750-N2125-SQ			
						5	1	Short	65341	M525-0625-0750-N1000-SQ-L5			
							3-1/8	Long	65784	M525-0625-0750-N3125-SQ-L5			
			6	1	Short	65351	M525-0625-0750-N1000-SQ-L6						
				4-1/8	Long	65794	M525-0625-0750-N4125-SQ-L6						
3/4	3/4	1	4	1-1/4	Short	65431	M525-0750-1000-N1250-SQ						
				2	Long	65804	M525-0750-1000-N2000-SQ						
			5	1-1/4	Short	65441	M525-0750-1000-N1250-SQ-L5						
				2-7/8	Long	65814	M525-0750-1000-N2875-SQ-L5						
			6	1-1/4	Short	65451	M525-0750-1000-N1250-SQ-L6						
				3-7/8	Long	65824	M525-0750-1000-N3875-SQ-L6						
			7	1-1/4	Short	67051	M525-0750-1000-N1250-SQ-L7						
				4-7/8	Long	67061	M525-0750-1000-N4875-SQ-L7						
			1	1	1-1/4	4	1-1/2	Short	65511	M525-1000-1250-N1500-SQ			
							2-1/4	Long	65834	M525-1000-1250-N2250-SQ			
						5	1-1/2	Short	65522	M525-1000-1250-N1500-SQ-L5			
							2-5/8	Long	65845	M525-1000-1250-N2625-SQ-L5			
6	1-1/2	Short				65533	M525-1000-1250-N1500-SQ-L6						
	3-5/8	Long				65856	M525-1000-1250-N3625-SQ-L6						
7	1-1/2	Short				65544	M525-1000-1250-N1500-SQ-L7						
4-5/8	Long	65867	M525-1000-1250-N4625-SQ-L7										
1-1/4	1-1/4	1-1/2	4-1/2	1-3/4	Short	65610	M525-1250-1500-N1750-SQ						
				2-1/2	Long	65878	M525-1250-1500-N2500-SQ						
			6	1-3/4	Short	65621	M525-1250-1500-N1750-SQ-L6						
				3-5/8	Long	65889	M525-1250-1500-N3625-SQ-L6						
			8	1-3/4	Short	65632	M525-1250-1500-N1750-SQ-L8						
				5-5/8	Long	65900	M525-1250-1500-N5625-SQ-L8						

**Model Code: M525N**  
**5-Flute w/Square End and Neck Relief**



Cutter Dia	Shank Dia	Length of Cut	Overall Length	Reach/ LBS	Neck Style	Order Code	EZ-ID Number
d1	d2	l2	l1	l3			M525 - xxx - xxx - Nxxx - SQ - Lxxx d1 l2 l3 l1
6	6	8	63	14	Short	68407	M525-060-008-N014-SQ
				27	Long	66701	M525-060-008-N027-SQ
			75	14	Short	68408	M525-060-008-N014-SQ-L075
				39	Long	66706	M525-060-008-N039-SQ-L075
			100	14	Short	68409	M525-060-008-N014-SQ-L100
				64	Long	66711	M525-060-008-N064-SQ-L100
8	8	10	63	16	Short	68410	M525-080-010-N016-SQ
				27	Long	66716	M525-080-010-N027-SQ
			75	16	Short	68411	M525-080-010-N016-SQ-L075
				39	Long	66721	M525-080-010-N039-SQ-L075
			100	16	Short	68412	M525-080-010-N016-SQ-L100
				64	Long	66727	M525-080-010-N064-SQ-L100
10	10	12	72	18	Short	68413	M525-100-012-N018-SQ
				32	Long	66733	M525-100-012-N032-SQ
			100	18	Short	68414	M525-100-012-N018-SQ-L100
				60	Long	66740	M525-100-012-N060-SQ-L100
			150	18	Short	68415	M525-100-012-N018-SQ-L150
				110	Long	66747	M525-100-012-N110-SQ-L150
12	12	15	83	21	Short	68416	M525-120-015-N021-SQ
				38	Long	66754	M525-120-015-N038-SQ
			100	21	Short	68417	M525-120-015-N021-SQ-L100
				55	Long	66761	M525-120-015-N055-SQ-L100
			125	21	Short	68418	M525-120-015-N021-SQ-L125
				80	Long	66768	M525-120-015-N080-SQ-L125
150	21	Short	68419	M525-120-015-N021-SQ-L150			
	105	Long	66775	M525-120-015-N105-SQ-L150			
16	16	20	110	26	Short	68420	M525-160-020-N026-SQ
				62	Long	66782	M525-160-020-N062-SQ
			150	26	Short	68421	M525-160-020-N026-SQ-L150
				102	Long	66789	M525-160-020-N102-SQ-L150
20	20	25	100	31	Short	68422	M525-200-025-N031-SQ
				50	Long	66796	M525-200-025-N050-SQ
			125	31	Short	68423	M525-200-025-N031-SQ-L125
				75	Long	66803	M525-200-025-N075-SQ-L125
			150	31	Short	68424	M525-200-025-N031-SQ-L150
				100	Long	66811	M525-200-025-N100-SQ-L150
25	25	32	120	38	Short	68425	M525-250-032-N038-SQ
				64	Long	66819	M525-250-032-N064-SQ
			150	38	Short	68426	M525-250-032-N038-SQ-L150
				94	Long	66827	M525-250-032-N094-SQ-L150

## GOT LBS?

Getting the right flute and neck length is easy with IMCO's M525N end mills.

Use M525N with short neck relief to get the length of cut (LOC) and overall length (OAL) you need when long reach is critical, but a necked shank is not.

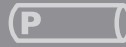
Use M525N with long neck relief to get the clearance to machine parts in deep cavities and a necked shank is critical.



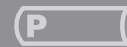


# Model Code: M525N

## 5-Flute w/Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Neck Style	Order Code by Corner Radius (R) (replace -xxx in EZ-ID number with mm size shown below)							EZ-ID Number				
						0,5 CR	1,0 CR	1,5 CR	2,0 CR	3,0 CR	4,0 CR	5,0 CR	d1	l2	l3	R	l1
6	6	8	63	14	Short	68427	68428	68429						M525-060-008-N014-xxx			
				27	Long	66835	66843	66851						M525-060-008-N027-xxx			
			75	14	Short	68430	68431	68432							M525-060-008-N014-xxx-L075		
				39	Long	66859	66867	66702							M525-060-008-N039-xxx-L075		
			100	14	Short	68433	68434	68435								M525-060-008-N014-xxx-L100	
				64	Long	66703	66704	66705								M525-060-008-N064-xxx-L100	
8	8	10	63	16	Short	68436	68437	68438						M525-080-010-N016-xxx			
				27	Long	66707	66708	66709							M525-080-010-N027-xxx		
			75	16	Short	68439	68440	68441							M525-080-010-N016-xxx-L075		
				39	Long	66710	66712	66713							M525-080-010-N039-xxx-L075		
			100	16	Short	68442	68443	68444								M525-080-010-N016-xxx-L100	
				64	Long	66714	66715	66717								M525-080-010-N064-xxx-L100	
10	10	12	72	18	Short	68445	68446	68447	68448					M525-100-012-N018-xxx			
				32	Long	66718	66719	66720	66722						M525-100-012-N032-xxx		
			100	18	Short	68449	68450	68451	68452							M525-100-012-N018-xxx-L100	
				60	Long	66723	66724	66725	66726							M525-100-012-N060-xxx-L100	
			150	18	Short	68453	68454	68455	68456							M525-100-012-N018-xxx-L150	
				110	Long	66728	66729	66730	66731							M525-100-012-N110-xxx-L150	
12	12	15	83	21	Short	68457	68458	68459	68460	68461				M525-120-015-N021-xxx			
				38	Long	66732	66734	66735	66736	66737					M525-120-015-N038-xxx		
			100	21	Short	68462	68463	68464	68465	68466					M525-120-015-N021-xxx-L100		
				55	Long	66738	66739	66741	66742	66743					M525-120-015-N055-xxx-L100		
			125	21	Short	68467	68468	68469	68470	68471						M525-120-015-N021-xxx-L125	
				80	Long	66744	66745	66746	66748	66749						M525-120-015-N080-xxx-L125	
150	21	Short	68472	68473	68474	68475	68476						M525-120-015-N021-xxx-L150				
	105	Long	66750	66751	66752	66753	66755						M525-120-015-N105-xxx-L150				
16	16	20	110	26	Short		68477	68478	68479	68480	68481			M525-160-020-N026-xxx			
				62	Long		66756	66757	66758	66759	66760				M525-160-020-N062-xxx		
			150	26	Short		68482	68483	68484	68485	68486				M525-160-020-N026-xxx-L150		
				102	Long		66762	66763	66764	66765	66766				M525-160-020-N102-xxx-L150		
20	20	25	100	31	Short		68487	68488	68489	68490	68491	68492		M525-200-025-N031-xxx			
				50	Long		66767	66769	66770	66771	66772	66773		M525-200-025-N050-xxx			
			125	31	Short		68493	68494	68495	68496	68497	68498			M525-200-025-N031-xxx-L125		
				75	Long		66774	66776	66777	66778	66779	66780			M525-200-025-N075-xxx-L125		
			150	31	Short		68499	68500	68501	68502	68503	68504				M525-200-025-N031-xxx-L150	
				100	Long		66781	66783	66784	66785	66786	66787				M525-200-025-N100-xxx-L150	
25	25	32	120	38	Short		68505	68506	68507	68508	68509	68510		M525-250-032-N038-xxx			
				64	Long		66788	66790	66791	66792	66793	66794			M525-250-032-N064-xxx		
			150	38	Short		68511	68512	68513	68514	68515	68516			M525-250-032-N038-xxx-L150		
				94	Long		66795	66797	66798	66799	66800	66801			M525-250-032-N094-xxx-L150		



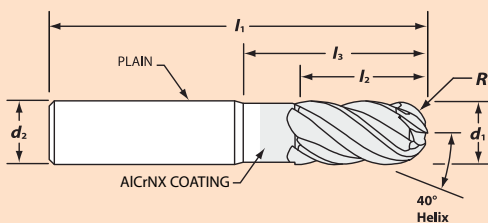
# M525NB

## Ball End with Neck Relief



### 5-FLUTE

M525N permits clearance in deeper cavities and easier machining against tight walls. Neck relief and short flute length mean increased end mill stability in the cut for more precise tolerances.

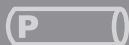


**in** d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
**mm** d1 +0,000 / -0,050 d2 -0,0025 / -0,0100

Minimizes tool deflection and increases productivity when contouring deep cavities.

Cutter Dia	Shank Dia	Length of Cut	Overall Length	Reach/LBS	Neck Style	Order Code	EZ-ID Number			
d1	d2	l2	l1	l3			M525 - xxxx - xxxx - Nxxxx - BN - Lxx d1 l2 l3 l1			
1/4	1/4	3/8	2-1/2	5/8	Short	65036	M525-0250-0375-N0625-BN			
				1-1/8	Long	65685	M525-0250-0375-N1125-BN			
			3	5/8	Short	65042	M525-0250-0375-N0625-BN-L3			
				1-3/8	Long	65691	M525-0250-0375-N1375-BN-L3			
			4	5/8	Short	65048	M525-0250-0375-N0625-BN-L4			
				2-3/8	Long	65697	M525-0250-0375-N2375-BN-L4			
3/8	3/8	1/2	3	3/4	Short	65108	M525-0375-0500-N0750-BN			
				1-3/8	Long	65713	M525-0375-0500-N1375-BN			
			4	3/4	Short	65116	M525-0375-0500-N0750-BN-L4			
				2-3/8	Long	65721	M525-0375-0500-N2375-BN-L4			
			5	3/4	Short	65124	M525-0375-0500-N0750-BN-L5			
				3-3/8	Long	65729	M525-0375-0500-N3375-BN-L5			
			6	3/4	Short	65132	M525-0375-0500-N0750-BN-L6			
				4-3/8	Long	65737	M525-0375-0500-N4375-BN-L6			
			1/2	1/2	5/8	3	7/8	Short	65230	M525-0500-0625-N0875-BN
							1-3/8	Long	65746	M525-0500-0625-N1375-BN
						4	7/8	Short	65239	M525-0500-0625-N0875-BN-L4
							2-1/4	Long	65755	M525-0500-0625-N2250-BN-L4
5	7/8	Short				65248	M525-0500-0625-N0875-BN-L5			
	3-1/4	Long				65764	M525-0500-0625-N3250-BN-L5			
6	7/8	Short				65257	M525-0500-0625-N0875-BN-L6			
	4-1/4	Long				65773	M525-0500-0625-N4250-BN-L6			
5/8	5/8	3/4				4	1	Short	65340	M525-0625-0750-N1000-BN
							2-1/8	Long	65783	M525-0625-0750-N2125-BN
						5	1	Short	65350	M525-0625-0750-N1000-BN-L5
							3-1/8	Long	65793	M525-0625-0750-N3125-BN-L5
			6	1	Short	65360	M525-0625-0750-N1000-BN-L6			
				4-1/8	Long	65803	M525-0625-0750-N4125-BN-L6			
3/4	3/4	1	4	1-1/4	Short	65440	M525-0750-1000-N1250-BN			
				2	Long	65813	M525-0750-1000-N2000-BN			
			5	1-1/4	Short	65450	M525-0750-1000-N1250-BN-L5			
				2-7/8	Long	65823	M525-0750-1000-N2875-BN-L5			
			6	1-1/4	Short	65460	M525-0750-1000-N1250-BN-L6			
				3-7/8	Long	65833	M525-0750-1000-N3875-BN-L6			
			7	1-1/4	Short	67060	M525-0750-1000-N1250-BN-L7			
				4-7/8	Long	67070	M525-0750-1000-N4875-BN-L7			
			1	1	1-1/4	4	1-1/2	Short	65521	M525-1000-1250-N1500-BN
							2-1/4	Long	65844	M525-1000-1250-N2250-BN
						5	1-1/2	Short	65532	M525-1000-1250-N1500-BN-L5
							2-5/8	Long	65855	M525-1000-1250-N2625-BN-L5
6	1-1/2	Short				65543	M525-1000-1250-N1500-BN-L6			
	3-5/8	Long				65866	M525-1000-1250-N3625-BN-L6			
7	1-1/2	Short				65554	M525-1000-1250-N1500-BN-L7			
	4-5/8	Long				65877	M525-1000-1250-N4625-BN-L7			
1-1/4	1-1/4	1-1/2				4-1/2	1-3/4	Short	65620	M525-1250-1500-N1750-BN
							2-1/2	Long	65888	M525-1250-1500-N2500-BN
						6	1-3/4	Short	65631	M525-1250-1500-N1750-BN-L6
							3-5/8	Long	65899	M525-1250-1500-N3625-BN-L6
			8	1-3/4	Short	65642	M525-1250-1500-N1750-BN-L8			
				5-5/8	Long	65910	M525-1250-1500-N5625-BN-L8			

**Model Code: M525NB**  
**5-Flute w/Ball End and Neck Relief**



Cutter Dia	Shank Dia	Length of Cut	Overall Length	Reach/ LBS	Neck Style	Order Code	EZ-ID Number
d1	d2	l2	l1	l3			M525 - xxx - xxx - Nxxx - BN - Lxxx d1 l2 l3 l1
6	6	8	63	14	Short	68517	M525-060-008-N014-BN
				27	Long	66802	M525-060-008-N027-BN
			75	14	Short	68518	M525-060-008-N014-BN-L075
				39	Long	66804	M525-060-008-N039-BN-L075
			100	14	Short	68519	M525-060-008-N014-BN-L100
				64	Long	66805	M525-060-008-N064-BN-L100
8	8	10	63	16	Short	68520	M525-080-010-N016-BN
				27	Long	66806	M525-080-010-N027-BN
			75	16	Short	68521	M525-080-010-N016-BN-L075
				39	Long	66807	M525-080-010-N039-BN-L075
			100	16	Short	68522	M525-080-010-N016-BN-L100
				64	Long	66808	M525-080-010-N064-BN-L100
10	10	12	72	18	Short	68523	M525-100-012-N018-BN
				32	Long	66809	M525-100-012-N032-BN
			100	18	Short	68524	M525-100-012-N018-BN-L100
				60	Long	66810	M525-100-012-N060-BN-L100
			150	18	Short	68525	M525-100-012-N018-BN-L150
				110	Long	66812	M525-100-012-N110-BN-L150
12	12	15	83	21	Short	68526	M525-120-015-N021-BN
				38	Long	66813	M525-120-015-N038-BN
			100	21	Short	68527	M525-120-015-N021-BN-L100
				55	Long	66814	M525-120-015-N055-BN-L100
			125	21	Short	68528	M525-120-015-N021-BN-L125
				80	Long	66815	M525-120-015-N080-BN-L125
150	21	Short	68529	M525-120-015-N021-BN-L150			
	105	Long	66816	M525-120-015-N105-BN-L150			
16	16	20	110	26	Short	68530	M525-160-020-N026-BN
				62	Long	66817	M525-160-020-N062-BN
			150	26	Short	68531	M525-160-020-N026-BN-L150
				102	Long	66818	M525-160-020-N102-BN-L150
20	20	25	100	31	Short	68532	M525-200-025-N031-BN
				50	Long	66820	M525-200-025-N050-BN
			125	31	Short	68533	M525-200-025-N031-BN-L125
				75	Long	66821	M525-200-025-N075-BN-L125
			150	31	Short	68534	M525-200-025-N031-BN-L150
				100	Long	66822	M525-200-025-N100-BN-L150
25	25	32	120	38	Short	68535	M525-250-032-N038-BN
				64	Long	66823	M525-250-032-N064-BN
			150	38	Short	68536	M525-250-032-N038-BN-L150
				94	Long	66824	M525-250-032-N094-BN-L150

# M525 Application Guide - Speed & Feed (inch)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	No. of Flutes	Speed (SFM)	Feed (Inches per Tooth)						
							1/8	1/4	3/8	1/2	5/8	3/4	1
<b>S</b>	Titanium Alloys 6Al-4V, 6-2-4	Slotting	.5 x D	1 x D	5	250	.0005	.0009	.0014	.0018	.0023	.0028	.0037
		Peripheral - Rough	1 x D	.3 x D	5	300	.0006	.0013	.0019	.0025	.0031	.0038	.0050
		Peripheral - HEM*	3 x D	.05 x D	5	330	.0018	.0036	.0055	.0073	.0091	.0109	.0146
		Finish	1.5 x D	.015 x D	5	300	.0006	.0013	.0019	.0026	.0032	.0038	.0051
	Difficult to machine titanium alloys 10-2-3	Slotting	.25 x D	1 x D	5	200	.0003	.0007	.0010	.0014	.0017	.0020	.0027
		Peripheral - Rough	1 x D	.25 x D	5	250	.0005	.0010	.0015	.0020	.0025	.0029	.0039
		Peripheral - HEM*	3 x D	.05 x D	5	275	.0015	.0030	.0045	.0059	.0074	.0089	.0119
		Finish	1.5 x D	.01 x D	5	250	.0006	.0012	.0017	.0023	.0029	.0035	.0046
<b>M</b>	Austenitic Stainless Steels, FeNi Alloys 303, 304, 316, Invar, Kovar	Slotting	.5 x D	1 x D	5	275	.0006	.0012	.0018	.0024	.0030	.0036	.0048
		Peripheral - Rough	1.25 x D	.3 x D	5	350	.0008	.0016	.0025	.0033	.0041	.0049	.0065
		Peripheral - HEM*	3 x D	.05 x D	5	390	.0025	.0049	.0074	.0099	.0123	.0148	.0198
		Finish	2 x D	.015 x D	5	350	.0008	.0017	.0025	.0033	.0042	.0050	.0067
	Precipitation Hardening Stainless Steels 17-4, 15-5, 13-8	Slotting	.5 x D	1 x D	5	250	.0005	.0010	.0015	.0020	.0025	.0030	.0040
		Peripheral - Rough	1.25 x D	.3 x D	5	325	.0007	.0014	.0020	.0027	.0034	.0041	.0055
		Peripheral - HEM*	3 x D	.05 x D	5	360	.0020	.0040	.0059	.0079	.0099	.0119	.0158
		Finish	1.5 x D	.015 x D	5	325	.0007	.0014	.0021	.0028	.0035	.0042	.0056
<b>P</b>	Low Carbon Steels <= 38 Rc 1018, 1020, 12L14, 5120, 8620	Slotting	.5 x D	1 x D	5	325	.0007	.0014	.0021	.0028	.0035	.0042	.0056
		Peripheral - Rough	1.25 x D	.3 x D	5	400	.0010	.0019	.0029	.0038	.0048	.0057	.0076
		Peripheral - HEM*	3 x D	.07 x D	5	450	.0028	.0056	.0084	.0012	.0140	.0168	.0224
		Finish	2 x	.015 x D	5	400	.0010	.0019	.0029	.0039	.0049	.0058	.0078
	Medium Carbon Steels <= 48 HRC 1045, 4140, 4340, 5140	Slotting	.5 x D	1 x D	5	300	.0006	.0013	.0019	.0026	.0032	.0038	.0051
		Peripheral - Rough	1.25 x D	.3 x D	5	375	.0009	.0017	.0026	.0035	.0044	.0052	.0070
		Peripheral - HEM*	3 x D	.05 x D	5	415	.0026	.0052	.0077	.0103	.0129	.0155	.0207
		Finish	2 x D	.015 x D	5	375	.0009	.0018	.0027	.0036	.0044	.0053	.0071
	Tool and Die Steels <= 48 Rc A2, D2, O1, S7, P20, H13	Slotting	.5 x D	1 x D	5	275	.0005	.0011	.0016	.0022	.0027	.0032	.0043
		Peripheral - Rough	1.25 x D	.3 x D	5	350	.0007	.0015	.0022	.0029	.0037	.0044	.0059
		Peripheral - HEM*	3 x D	.05 x D	5	390	.0022	.0043	.0065	.0087	.0108	.0130	.0173
		Finish	2 x D	.015 x D	5	350	.0007	.0015	.0022	.0030	.0037	.0045	.0060
	Martensitic & Ferritic Stainless Steels 410, 416, 440	Slotting	.5 x D	1 x D	5	300	.0006	.0013	.0019	.0026	.0032	.0038	.0051
		Peripheral - Rough	1.25 x D	.3 x D	5	375	.0009	.0017	.0026	.0035	.0044	.0052	.0070
		Peripheral - HEM*	3 x D	.05 x D	5	415	.0026	.0052	.0077	.0103	.0129	.0155	.0207
		Finish	2 x D	.015 x D	5	375	.0009	.0018	.0027	.0036	.0044	.0053	.0071
<b>K</b>	Cast Iron Gray	Slotting	.5 x D	1 x D	5	300	.0006	.0012	.0018	.0024	.0030	.0036	.0048
		Peripheral - Rough	1.25 x D	.3 x D	5	375	.0008	.0016	.0025	.0033	.0041	.0049	.0065
		Finish	2 x D	.015 x D	5	375	.0008	.0017	.0025	.0033	.0042	.0050	.0067
	Cast Iron Malleable	Slotting	.5 x D	1 x D	5	275	.0005	.0010	.0015	.0020	.0025	.0030	.0040
		Peripheral - Rough	1.25 x D	.3 x D	5	350	.0007	.0014	.0020	.0027	.0034	.0041	.0055
		Peripheral - HEM*	3 x D	.05 x D	5	390	.0020	.0040	.0060	.0081	.0101	.0121	.0161
		Finish	2 x D	.015 x D	5	350	.0007	.0014	.0021	.0028	.0035	.0042	.0056

D = Tool Diameter \*HEM= High-efficiency machining (chip thinning calculations have already been applied to HEM parameters shown)

## Common Machining Formulas

$$RPM = \frac{SFM \times 3.82}{D}$$

$$SFM = RPM \times D \times .262$$

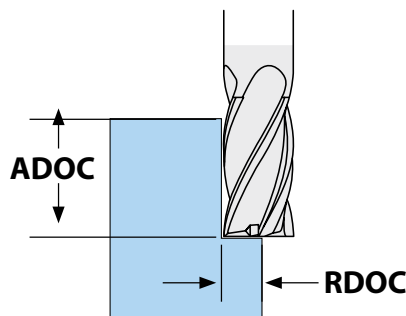
$$IPM = RPM \times IPT \times Z$$

$$MRR = RDOC \times ADOC \times IPM$$

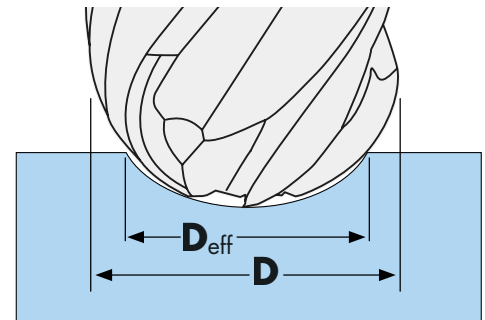
- D Tool Cutting Diameter
- R Tool Radius
- Z Number of Flutes
- RPM Revolutions per Minute
- SFM Surface Feet per Minute
- IPM Inches per Minute
- MRR Metal Removal Rate
- RDOC Radial Depth of Cut
- ADOC Axial Depth of Cut

Radial Chip Thinning Adjustment 
$$IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$$

Ball Nose "Effective Diameter" 
$$D_{eff} = 2R \sqrt{R^2 - (R - ADOC)^2}$$



Apply chip thinning adjustment when RDOC < D



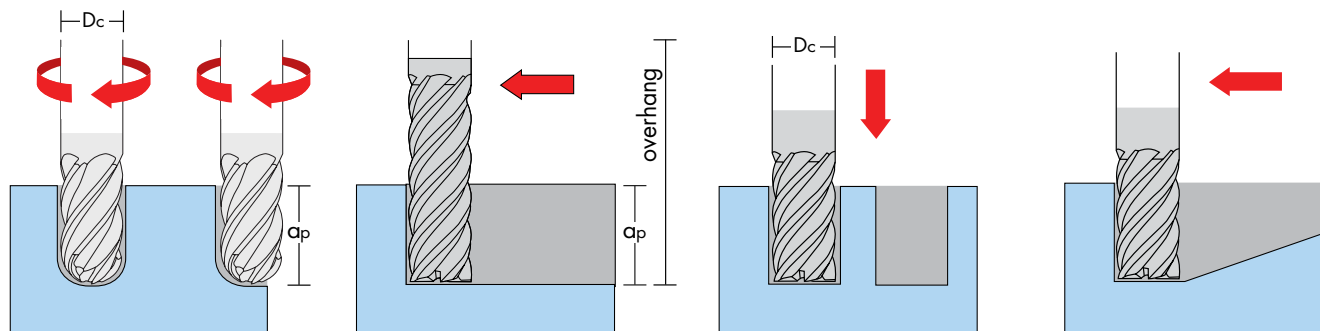
Use D\_eff when making shallow cuts with full radius

# M525 Application Guide - Speed & Feed (metric)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	No. of Flutes	Speed (M/min)	Feed (MM per Tooth)					
							6,0	10,0	12,0	16,0	20,0	25,0
S	Titanium Alloys 6Al-4V, 6-2-4	Slotting	.5 x D	1 x D	5	76	0.0234	0.0388	0.0467	0.0622	0.0776	0.0935
		Peripheral - Rough	1 x D	.3 x D	5	91	0.0319	0.0529	0.0637	0.0848	0.1058	0.1275
		Peripheral - HEM*	1.5 x D	.1 x D	5	130	0.0609	0.1010	0.1217	0.1619	0.2020	0.2434
		Finish	1.5 x D	.01 x D	5	91	0.0587	0.0975	0.1174	0.1562	0.1949	0.2349
	Difficult-to-Machine Titanium Alloys 10-2-3	Slotting	.25 x D	1 x D	5	61	0.0173	0.0287	0.0345	0.0459	0.0573	0.0691
		Peripheral - Rough	1 x D	.25 x D	5	76	0.0249	0.0414	0.0499	0.0663	0.0828	0.0997
		Peripheral - HEM*	1.5 x D	.1 x D	5	91	0.0450	0.0747	0.0900	0.1196	0.1493	0.1799
		Finish	1.5 x D	.01 x D	5	76	0.0434	0.0720	0.0868	0.1154	0.1441	0.1736
M	Austenitic Stainless Steels, FeNi Alloys 303, 304, 316, Invar, Kovar	Slotting	.5 x D	1 x D	5	84	0.0305	0.0506	0.0610	0.0811	0.1012	0.1219
		Peripheral - Rough	1.25 x D	.3 x D	5	107	0.0416	0.0690	0.0831	0.1106	0.1380	0.1663
		Peripheral - HEM*	2 x D	.1 x D	5	145	0.0794	0.1318	0.1588	0.2111	0.2635	0.3175
		Finish	2 x D	.01 x D	5	107	0.0766	0.1271	0.1532	0.2037	0.2543	0.3063
	Precipitation Hardening Stainless Steels 17-4, 15-5, 13-8	Slotting	.5 x D	1 x D	5	76	0.0254	0.0422	0.0508	0.0676	0.0843	0.1016
		Peripheral - Rough	1.25 x D	.3 x D	5	99	0.0346	0.0575	0.0693	0.0921	0.1150	0.1386
		Peripheral - HEM*	1.5 x D	.1 x D	5	137	0.0661	0.1098	0.1323	0.1759	0.2196	0.2646
		Finish	1.5 x D	.01 x D	5	99	0.0638	0.1059	0.1276	0.1698	0.2119	0.2553
P	Martensitic & Ferritic Stainless Steels 410, 416, 440	Slotting	.5 x D	1 x D	5	99	0.0356	0.0590	0.0711	0.0946	0.1181	0.1422
		Peripheral - Rough	1.25 x D	.3 x D	5	122	0.0485	0.0805	0.0970	0.1290	0.1610	0.1940
		Peripheral - HEM*	2 x D	.15 x D	5	160	0.0778	0.1292	0.1556	0.2070	0.2583	0.3112
		Finish	2 x D	.01 x D	5	122	0.0893	0.1483	0.1787	0.2377	0.2966	0.3574
	Low Carbon Steels 1018, 1020, 12L14, 5120, 8620	Slotting	.5 x D	1 x D	5	91	0.0325	0.0540	0.0650	0.0865	0.1079	0.1300
		Peripheral - Rough	1.25 x D	.3 x D	5	114	0.0443	0.0736	0.0887	0.1179	0.1472	0.1774
		Peripheral - HEM*	2 x	.15 x D	5	152	0.0711	0.1181	0.1423	0.1892	0.2362	0.2845
		Finish	2 x	.01 x D	5	114	0.0817	0.1356	0.1634	0.2173	0.2712	0.3268
	Medium Carbon Steels ≤ 48 HRC 1045, 4140, 4340, 5140	Slotting	.5 x D	1 x D	5	84	0.0274	0.0455	0.0549	0.0730	0.0911	0.1097
		Peripheral - Rough	1.25 x D	.3 x D	5	107	0.0374	0.0621	0.0748	0.0995	0.1242	0.1497
		Peripheral - HEM*	2 x D	.15 x D	5	145	0.0600	0.0996	0.1200	0.1597	0.1993	0.2401
		Finish	2 x D	.01 x D	5	107	0.0689	0.1144	0.1379	0.1833	0.2288	0.2757
	Tool and Die Steels ≤ 48 Rc A2, D2, O1, S7, P20, H13	Slotting	.5 x D	1 x D	5	91	0.0325	0.0540	0.0650	0.0865	0.1079	0.1300
		Peripheral - Rough	1.25 x D	.3 x D	5	114	0.0443	0.0736	0.0887	0.1179	0.1472	0.1774
		Peripheral - HEM*	2 x D	.15 x D	5	152	0.0711	0.1181	0.1423	0.1892	0.2362	0.2845
		Finish	2 x D	.01 x D	5	114	0.0817	0.1356	0.1634	0.2173	0.2712	0.3268
K	Cast Iron Gray	Slotting	.5 x D	1 x D	5	91	0.0305	0.0506	0.0610	0.0811	0.1012	0.1219
		Peripheral - Rough	1.25 x D	.3 x D	5	114	0.0416	0.0690	0.0831	0.1106	0.1380	0.1663
		Finish	2 x D	.01 x D	5	114	0.0766	0.1271	0.1532	0.2037	0.2543	0.3063
	Cast Iron Malleable	Slotting	.5 x D	1 x D	5	84	0.0254	0.0422	0.0508	0.0676	0.0843	0.1016
		Peripheral - Rough	1.25 x D	.3 x D	5	107	0.0346	0.0575	0.0693	0.0921	0.1150	0.1386
		Peripheral - HEM*	2 x D	.15 x D	5	145	0.0556	0.0923	0.1111	0.1478	0.1845	0.2223
		Finish	2 x D	.01 x D	5	107	0.0638	0.1059	0.1276	0.1698	0.2119	0.2553

D = Tool Diameter \*HEM = High-efficiency machining (chip thinning calculations have already been applied to HEM parameters shown)

## Adjustments - Apply these adjustments when programming the following applications.



### 1. Ball end mills

- Reduce chipload by 25% from roughing/slotting recommendation when axial DOC ( $a_p$ ) exceeds 75% of Dc

### 2. Long reach mills with large overhang

- Reduce speed rate and chipload by 10%

### 3. Plunge entry into work piece

- Reduce chipload by 80% of recommended slotting rate
- Peck mill if axial DOC ( $a_p$ ) exceeds 50% of Dc

### 4. Ramp entry into work piece

- Ramp at 1.5°–2.5° angle
- Reduce chipload by 20% of recommended slotting rate

# OMEGA-6<sup>®</sup>

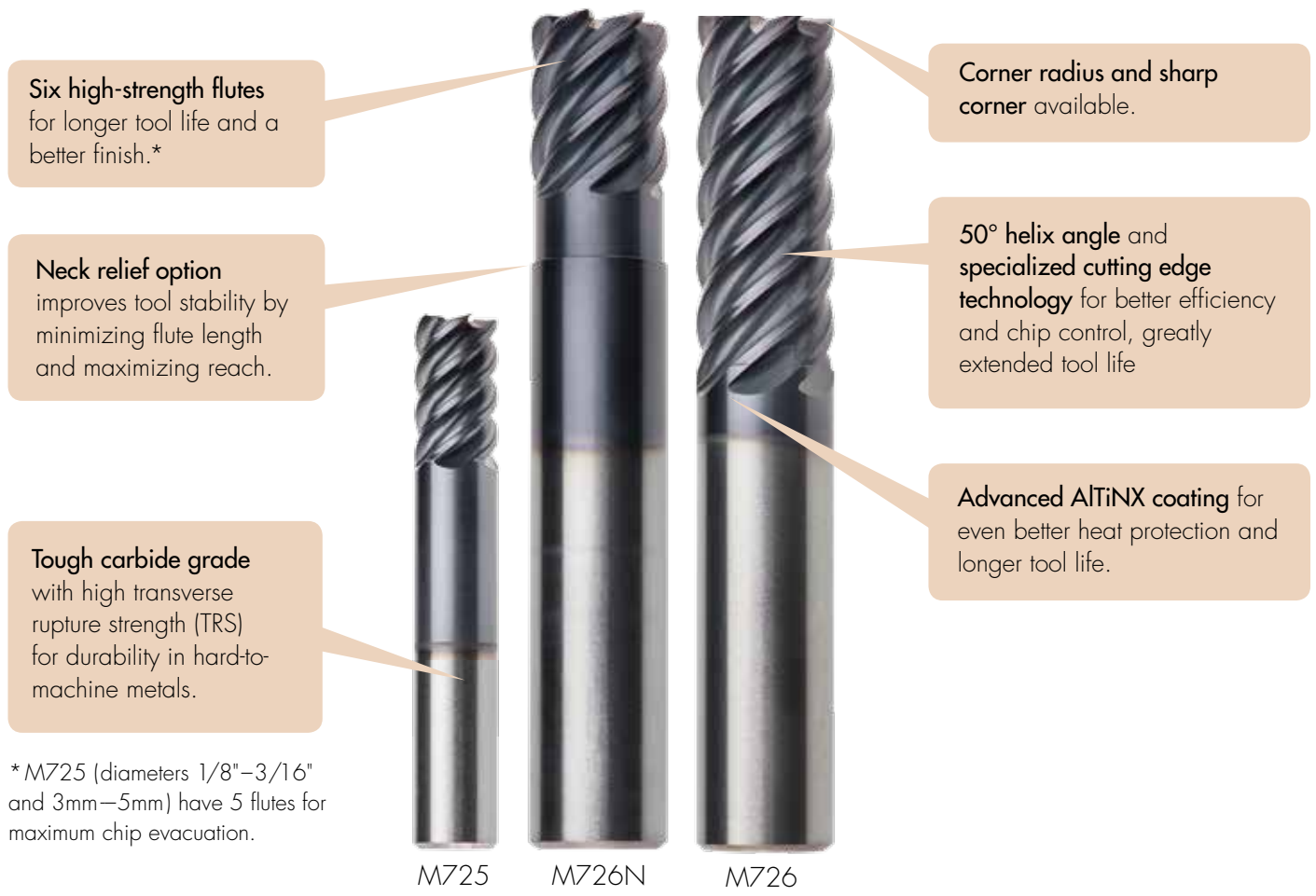
## M7 Series

### **M725/M726 for hardened steels.**

The new Omega-6 end mill demonstrates remarkably longer tool life in hardened steels, even up to 58-62 HRC, running wet or dry.\* This tool excels in hardened materials, and it provides superior finishes in a wide range of non-hardened materials – all proven repeatable and reliable in hundreds of tests in the machining lab.

\*Running without coolant requires the use of high-speed, high-efficiency machining techniques and continuous tool paths.

# Omega-6 M7 Features



\* M725 (diameters 1/8"–3/16" and 3mm–5mm) have 5 flutes for maximum chip evacuation.

M725      M726N      M726

## Options

### Corner radius

Helps prevent corner chipping.

### Square end

For routine machining, finishing.

### h6 tolerance shanks

Fit all collets and conform to shrink-fit requirements. Many styles, sizes offered with flats for Weldon-style holders.

## Choose the length for the job.

**Extra rigidity in deep pockets** – Choose short flute length with neck relief.

**Medium-to-deep cuts** – Order standard, long or extra-long flute length and reach.

**Finishing passes** – Order extra-long flute length.

**Neck relief** – Better clearance in deeper cavities, easier machining against tight walls.

## Higher engagement. Higher performance. Higher finish.

Your first choice of tooling in these materials:

**H Hardened materials**  
Carbon and tool steels and stainless steels over 50 HRC

The ideal choice for finishing in:

**M Stainless steels**  
Austenitic and precipitation hardening stainless steels

**P Carbon and tool steels**  
Martensitic and ferritic stainless steels, as well as carbon and tool steels

**K Cast iron**  
Malleable and gray cast irons

**S Hi-temp alloys**  
Inconel

# NEW TOOL

# M725/M726

## OMEGA-6 M725/M726:

# Break the Hardness Barrier.

Hundreds of tests in the machining lab prove that the M725/M726\* tools deliver 3x the tool life in hardened materials. IMCO's multi-flute monster is built to last when machining very hard materials and leaves superior finishes. They're the next wave in productivity-driven performance.

## Square End and Corner Radius

### 5/6-FLUTE

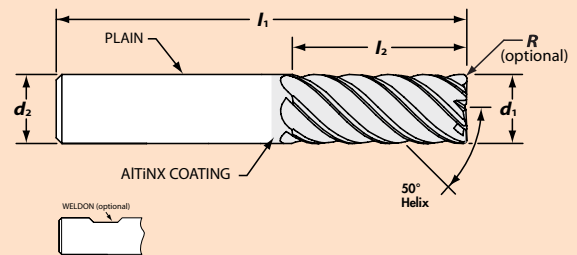
Use M725/M726 to achieve maximum tool performance when machining hardened materials (58–62 HRC). Unique corner rad design, cutting edge design, and advanced AlTiN coating yield great tool life.

\* M725 (diameters 1/8"–3/16" and 3mm–5mm) have 5 flutes for maximum chip evacuation.



M725

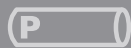
M726



<b>in</b>	d1 +0.000 / -0.002	d2 -0.0001 / -0.0004
<b>mm</b>	d1 +0,000 / -0,050	d2 -0,0025 / -0,0100

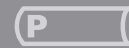


**Model Code: M725**  
**5-Flute w/Square End**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code	EZ-ID Number M725 - xxxx - xxxx - SQ d1 l2
1/8	1/8	1/4	1-1/2	Plain	69050	M725-0125-0250-SQ
		1/2	1-1/2	Plain	69052	M725-0125-0500-SQ
3/16	3/16	5/16	2	Plain	69054	M725-0187-0312-SQ
		9/16	2	Plain	69056	M725-0187-0562-SQ

**Model Code: M725**  
**5-Flute w/Square End**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code	EZ-ID Number M725 - xxx - xxx - SQ d1 l2
3	3	6	38	Plain	69138	M725-030-006-SQ
		8	38	Plain	69140	M725-030-008-SQ
4	4	7	50	Plain	69142	M725-040-007-SQ
		11	50	Plain	69144	M725-040-011-SQ
5	5	8	50	Plain	69146	M725-050-008-SQ
		13	50	Plain	69148	M725-050-013-SQ

**Model Code: M726**  
**6-Flute w/Square End**



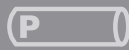
Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code	EZ-ID Number M726 - xxxx - xxxx - SQ d1 l2		
1/4	1/4	3/4	2-1/2	Plain	69058	M726-0250-0750-SQ		
		1-1/4	3	Plain	69061	M726-0250-1250-SQ		
3/8	3/8	7/8	2-1/2	Plain	69070	M726-0375-0875-SQ		
				Weldon	69220	M726-0375-0875-SQ-W		
		1-1/4	3	Plain	69073	M726-0375-1250-SQ		
				Weldon	69223	M726-0375-1250-SQ-W		
		2	4	Plain	69076	M726-0375-2000-SQ		
				Weldon	69226	M726-0375-2000-SQ-W		
1/2	1/2	1	3	Plain	69079	M726-0500-1000-SQ		
				Weldon	69229	M726-0500-1000-SQ-W		
		1-1/4	3	Plain	69083	M726-0500-1250-SQ		
				Weldon	69233	M726-0500-1250-SQ-W		
		1-5/8	3-1/2	Plain	69087	M726-0500-1625-SQ		
				Weldon	69237	M726-0500-1625-SQ-W		
		2-1/8	4	Plain	69091	M726-0500-2125-SQ		
				Weldon	69241	M726-0500-2125-SQ-W		
		2-5/8	5	Plain	69095	M726-0500-2625-SQ		
				Weldon	69245	M726-0500-2625-SQ-W		
		5/8	5/8	1-3/8	3-1/2	Plain	69099	M726-0625-1375-SQ
						Weldon	69249	M726-0625-1375-SQ-W
1-7/8	4			Plain	69103	M726-0625-1875-SQ		
				Weldon	69253	M726-0625-1875-SQ-W		
2-5/8	5			Plain	69107	M726-0625-2625-SQ		
				Weldon	69257	M726-0625-2625-SQ-W		
3/4	3/4	1-5/8	4	Plain	69111	M726-0750-1625-SQ		
				Weldon	69261	M726-0750-1625-SQ-W		
		2-5/8	5	Plain	69115	M726-0750-2625-SQ		
				Weldon	69265	M726-0750-2625-SQ-W		
		3-3/8	6	Plain	69119	M726-0750-3375-SQ		
				Weldon	69269	M726-0750-3375-SQ-W		

**Model Code: M726**  
**6-Flute w/Square End**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code	EZ-ID Number M726 - xxx - xxx - SQ d1 l2
6	6	13	57	Plain	69150	M726-060-013-SQ
				Weldon	69290	M726-060-013-SQ-W
		25	75	Plain	69152	M726-060-025-SQ
Weldon	69292			M726-060-025-SQ-W		
8	8	19	63	Plain	69154	M726-080-019-SQ
				Weldon	69294	M726-080-019-SQ-W
		32	75	Plain	69156	M726-080-032-SQ
				Weldon	69296	M726-080-032-SQ-W
10	10	22	72	Plain	69158	M726-100-022-SQ
				Weldon	69298	M726-100-022-SQ-W
		40	88	Plain	69161	M726-100-040-SQ
				Weldon	69301	M726-100-040-SQ-W
		46	100	Plain	69164	M726-100-046-SQ
				Weldon	69304	M726-100-046-SQ-W
12	12	26	83	Plain	69167	M726-120-026-SQ
				Weldon	69307	M726-120-026-SQ-W
		50	100	Plain	69171	M726-120-050-SQ
				Weldon	69311	M726-120-050-SQ-W
		65	125	Plain	69175	M726-120-065-SQ
				Weldon	69315	M726-120-065-SQ-W
16	16	32	92	Plain	69179	M726-160-032-SQ
				Weldon	69319	M726-160-032-SQ-W
		55	110	Plain	69183	M726-160-055-SQ
				Weldon	69323	M726-160-055-SQ-W
		65	125	Plain	69187	M726-160-065-SQ
				Weldon	69327	M726-160-065-SQ-W
20	20	38	104	Plain	69191	M726-200-038-SQ
				Weldon	69331	M726-200-038-SQ-W
		65	125	Plain	69195	M726-200-065-SQ
				Weldon	69335	M726-200-065-SQ-W
		85	150	Plain	69199	M726-200-085-SQ
				Weldon	69339	M726-200-085-SQ-W

## Model Code: M725 5-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code		EZ-ID Number	
					.015 CR		M725 - xxxx - xxxx - xxx	d1 l2 R
1/8	1/8	1/4	1-1/2	Plain	69051		M725-0125-0250-015	
		1/2	1-1/2	Plain	69053		M725-0125-0500-015	
3/16	3/16	5/16	2	Plain	69055		M725-0187-0312-015	
		9/16	2	Plain	69057		M725-0187-0562-015	

## Model Code: M726 6-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code by Corner Radius (R)			EZ-ID Number				
					.015 CR	.030 CR	.060 CR	M726 - xxxx - xxxx - xxx	d1 l2 R			
1/4	1/4	3/4	2-1/2	Plain	69059	69060		M726-0250-0750-xxx				
		1-1/4	3	Plain	69062	69063		M726-0250-1250-xxx				
3/8	3/8	7/8	2-1/2	Plain	69071	69072		M726-0375-0875-xxx				
				Weldon	69221	69222		M726-0375-0875-xxx-W				
		1-1/4	3	Plain	69074	69075		M726-0375-1250-xxx				
				Weldon	69224	69225		M726-0375-1250-xxx-W				
		2	4	Plain	69077	69078		M726-0375-2000-xxx				
				Weldon	69227	69228		M726-0375-2000-xxx-W				
1/2	1/2	1	3	Plain	69080	69081	69082	M726-0500-1000-xxx				
				Weldon	69230	69231	69232	M726-0500-1000-xxx-W				
		1-1/4	3	Plain	69084	69085	69086	M726-0500-1250-xxx				
				Weldon	69234	69235	69236	M726-0500-1250-xxx-W				
		1-5/8	3-1/2	Plain	69088	69089	69090	M726-0500-1625-xxx				
				Weldon	69238	69239	69240	M726-0500-1625-xxx-W				
		2-1/8	4	Plain	69092	69093	69094	M726-0500-2125-xxx				
				Weldon	69242	69243	69244	M726-0500-2125-xxx-W				
		2-5/8	5	Plain	69096	69097	69098	M726-0500-2625-xxx				
				Weldon	69246	69247	69248	M726-0500-2625-xxx-W				
		5/8	5/8	1-3/8	3-1/2	Plain		69101	69102	M726-0625-1375-xxx		
						Weldon		69251	69252	M726-0625-1375-xxx-W		
1-7/8	4			Plain		69105	69106	M726-0625-1875-xxx				
				Weldon		69255	69256	M726-0625-1875-xxx-W				
2-5/8	5			Plain		69109	69110	M726-0625-2625-xxx				
				Weldon		69259	69260	M726-0625-2625-xxx-W				
3/4	3/4	1-5/8	4	Plain		69113	69114	M726-0750-1625-xxx				
				Weldon		69263	69264	M726-0750-1625-xxx-W				
		2-5/8	5	Plain		69117	69118	M726-0750-2625-xxx				
				Weldon		69267	69268	M726-0750-2625-xxx-W				
		3-3/8	6	Plain		69121	69122	M726-0750-3375-xxx				
				Weldon		69271	69272	M726-0750-3375-xxx-W				



## TOOL TIP

### The Hot Corner.

Using an end mill with a corner radius greatly extends tool life in most applications, especially roughing cuts and those in materials with low machinability ratings. Corner chipping can lead to tool failure and poor finishes. Adding a corner radius reduces chipping and improves tool life by protecting the weakest part of the end mill.

## Model Code: M725 5-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code 0,3 CR	EZ-ID Number M725 - xxx - xxx - xxx d1 l2 R		
3	3	6	38	Plain	69139	M725-030-006-030		
		8	38	Plain	69141	M725-030-008-030		
4	4	7	50	Plain	69143	M725-040-007-030		
		11	50	Plain	69145	M725-040-011-030		
5	5	8	50	Plain	69147	M725-050-008-030		
		13	50	Plain	69149	M725-050-013-030		

## Model Code: M726 6-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code by Corner Radius (R)			EZ-ID Number M726 - xxx - xxx - xxx d1 l2 R				
					0,5 CR	1,0 CR	1,5 CR					
6	6	13	57	Plain	69151			M726-060-013-050				
				Weldon	69291			M726-060-013-050-W				
		25	75	Plain	69153			M726-060-025-050				
				Weldon	69293			M726-060-025-050-W				
8	8	19	63	Plain	69155			M726-080-019-050				
				Weldon	69295			M726-080-019-050-W				
		32	75	Plain	69157			M726-080-032-050				
				Weldon	69297			M726-080-032-050-W				
10	10	22	72	Plain	69159	69160		M726-100-022-xxx				
				Weldon	69299	69300		M726-100-022-xxx-W				
		40	88	Plain	69162	69163		M726-100-040-xxx				
				Weldon	69302	69303		M726-100-040-xxx-W				
		46	100	Plain	69165	69166		M726-100-046-xxx				
				Weldon	69305	69306		M726-100-046-xxx-W				
12	12	26	83	Plain	69168	69169	69170	M726-120-026-xxx				
				Weldon	69308	69309	69310	M726-120-026-xxx-W				
		50	100	Plain	69172	69173	69174	M726-120-050-xxx				
				Weldon	69312	69313	69314	M726-120-050-xxx-W				
		65	125	Plain	69176	69177	69178	M726-120-065-xxx				
				Weldon	69316	69317	69318	M726-120-065-xxx-W				
		16	16	32	92	Plain		69181	69182	M726-160-032-xxx		
						Weldon		69321	69322	M726-160-032-xxx-W		
55	110			Plain		69185	69186	M726-160-055-xxx				
				Weldon		69325	69326	M726-160-055-xxx-W				
65	125			Plain		69189	69190	M726-160-065-xxx				
				Weldon		69329	69330	M726-160-065-xxx-W				
20	20	38	104	Plain	69193	69194		M726-200-038-xxx				
				Weldon	69333	69334		M726-200-038-xxx-W				
		65	125	Plain	69197	69198		M726-200-065-xxx				
				Weldon	69337	69338		M726-200-065-xxx-W				
		85	150	Plain	69201	69202		M726-200-085-xxx				
				Weldon	69341	69342		M726-200-085-xxx-W				

## Model Code: M725N 5-Flute w/Square End and Neck Relief



# M725N/M726N

## Square End and Corner Radius w/Neck Relief



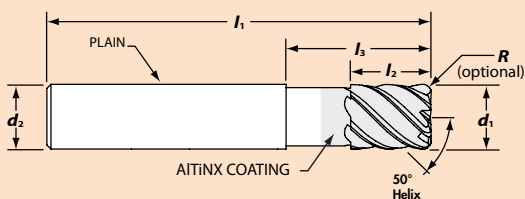
M725N

M726N

### 5/6-FLUTE

M725N/M726N permit clearance in deeper cavities and easier machining against tight walls. Neck relief and short flute length mean increased stability of the end mill in the cut for more precise tolerances.

\* M725 (diameters 1/8"-3/16" and 3mm-5mm) have 5 flutes for maximum chip evacuation.



<b>in</b>	d1 +0.000 / -0.002	d2 -0.0001 / -0.0004
<b>mm</b>	d1 +0.000 / -0.050	d2 -0.0025 / -0.0100

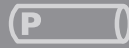
Cutter Dia d1	Shank Dia d2	Length of Cut L2	Overall Length L1	Reach/ LBS L3	Neck Style	Order Code	EZ-ID Number
							M725 - xxxx - xxxx - Nxxxx- SQ d1 L2 L3
1/8	1/8	1/4	1-1/2	1/2	Short	69350	M725-0125-0250-N0500-SQ
			2-1/2	1/2	Short	69352	M725-0125-0250-N0500-SQ
			1-1/8	Long	69490	M725-0125-0250-N1125-SQ	
3/16	3/16	5/16	2	9/16	Short	69354	M725-0187-0312-N0562-SQ
		3/8	3	5/8	Short	69356	M725-0187-0375-N0625-SQ
				1-3/8	Long	69492	M725-0187-0375-N1375-SQ

## Model Code: M726N 6-Flute w/Square End and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut L2	Overall Length L1	Reach/ LBS L3	Neck Style	Order Code	EZ-ID Number		
							M726 - xxxx - xxxx - Nxxxx- SQ-Lx d1 L2 L3 L1		
1/4	1/4	3/8	2-1/2	5/8	Short	69358	M726-0250-0375-N0625-SQ		
		5/8	3	7/8	Short	69361	M726-0250-0625-N0875-SQ		
				1-3/8	Long	69494	M726-0250-0625-N1375-SQ		
		5/8	4	7/8	Short	69364	M726-0250-0625-N0875-SQ-L4		
				2-3/8	Long	69497	M726-0250-0625-N2375-SQ-L4		
3/8	3/8	1/2	2-1/2	3/4	Short	69367	M726-0375-0500-N0750-SQ		
		7/8	3	1-1/8	Short	69370	M726-0375-0875-N1125-SQ		
				1-3/8	Long	69500	M726-0375-0875-N1375-SQ		
		7/8	4	1-1/8	Short	69373	M726-0375-0875-N1125-SQ-L4		
				2-3/8	Long	69503	M726-0375-0875-N2375-SQ-L4		
		1/2	1/2	5/8	3	7/8	Short	69376	M726-0500-0625-N0875-SQ
1-1/8	3-1/2			1-3/8	Long	69506	M726-0500-0625-N1375-SQ		
				1-3/4	Long	69380	M726-0500-1250-N1375-SQ		
1-1/8	4			1-3/8	Short	69384	M726-0500-1250-N1375-SQ-L4		
				2-1/4	Long	69514	M726-0500-1250-N2250-SQ-L4		
1-1/8	5			1-3/8	Short	69388	M726-0500-1250-N1375-SQ-L5		
				3-1/4	Long	69518	M726-0500-1250-N3250-SQ-L5		
5/8	5/8			3/4	3-1/2	1	Short	69392	M726-0625-0750-N1000-SQ
				1-1/8	4	1-5/8	Long	69522	M726-0625-0750-N1625-SQ
						1-3/8	Short	69396	M726-0625-1250-N1375-SQ
		1-3/8	5	2-1/8	Long	69526	M726-0625-1250-N2125-SQ		
				1-5/8	Short	69400	M726-0625-1375-N1625-SQ		
		3-1/8	Long	69530	M726-0625-1375-N3125-SQ				
3/4	3/4	1-1/8	4	1-3/8	Short	69404	M726-0750-1250-N1375-SQ		
		1-5/8	5	2	Long	69534	M726-0750-1250-N2000-SQ		
				1-7/8	Short	69408	M726-0750-1625-N1875-SQ		
		1-5/8	6	2-7/8	Long	69538	M726-0750-1625-N2875-SQ		
				1-7/8	Short	69412	M726-0750-1625-N1875-SQ-L6		
		3-7/8	Long	69542	M726-0750-1625-N3875-SQ-L6				

**Model Code: M726N**  
**6-Flute w/Square End and Neck Relief**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Neck Style	Order Code	EZ-ID Number
							M726 - xxx - xxx - Nxxx - SQ - Lxxx d1 l2 l3 l1
6	6	9	57	15	Short	69420	M726-060-009-N015-SQ
				21	Short	69422	M726-060-015-N021-SQ
		15	75	39	Long	69556	M726-060-015-N039-SQ
				21	Short	69424	M726-060-015-N021-SQ-L100
		15	100	64	Long	69558	M726-060-015-N064-SQ-L100
				11	Short	69426	M726-080-011-N017-SQ
8	8	19	75	25	Short	69428	M726-080-019-N025-SQ
				39	Long	69562	M726-080-019-N039-SQ
		19	100	25	Short	69430	M726-080-019-N025-SQ-L100
				64	Long	69564	M726-080-019-N064-SQ-L100
		13	72	19	Short	69432	M726-100-013-N019-SQ
				32	Long	69566	M726-100-013-N032-SQ
23	88	29	Short	69435	M726-100-023-N029-SQ		
		48	Long	69569	M726-100-023-N048-SQ		
23	100	29	Short	69438	M726-100-023-N029-SQ-L100		
		60	Long	69572	M726-100-023-N060-SQ-L100		
12	12	15	83	21	Short	69441	M726-120-015-N021-SQ
				38	Long	69575	M726-120-015-N038-SQ
		27	100	33	Short	69445	M726-120-027-N033-SQ
				55	Long	69579	M726-120-027-N055-SQ
		27	125	33	Short	69449	M726-120-027-N033-SQ-L125
				80	Long	69583	M726-120-027-N080-SQ-L125
16	16	20	92	26	Short	69453	M726-160-020-N026-SQ
				44	Long	69587	M726-160-020-N044-SQ
		35	110	41	Short	69457	M726-160-035-N041-SQ
				62	Long	69591	M726-160-035-N062-SQ
		35	126	41	Short	69461	M726-160-035-N041-SQ-L125
				77	Long	69595	M726-160-035-N077-SQ-L125
20	20	24	104	30	Short	69465	M726-200-024-N030-SQ
				54	Long	69599	M726-200-024-N054-SQ
		43	125	49	Short	69469	M726-200-043-N049-SQ
				75	Long	69603	M726-200-043-N075-SQ
		43	150	49	Short	69473	M726-200-043-N049-SQ-L150
				100	Long	69607	M726-200-043-N100-SQ-L150

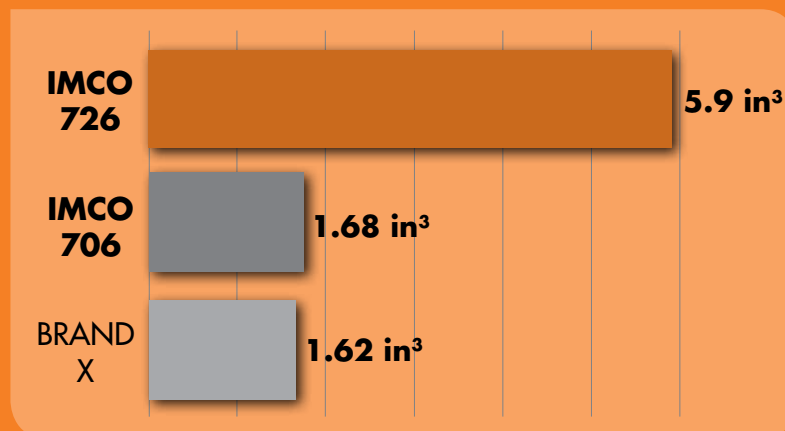
**M726: Performance by the Numbers.**



**MORE THAN 3X  
 THE TOOL LIFE  
 IN HARDENED  
 MATERIALS.**

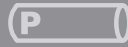
Test results in A2 steel at HRC 60 using 1/4" dia. end mill at 0.25" axial DOC and 0.015" radial DOC

**Metal Removal Rate (MRR)**



## Model Code: M725N

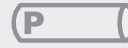
### 5-Flute with Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Neck Style	Order Code		EZ-ID Number				
						.015 CR		M725 -	xxxx -	xxxx -	Nxxxx -	xxx -
								d1	l2	l3	R	
1/8	1/8	1/4	1-1/2	1/2	Short	69351		M725-0125-0250-N0500-015				
			2-1/2	1/2	Short	69353		M725-0125-0250-N0500-015				
				1-1/8	Long	69491		M725-0125-0250-N1125-015				
3/16	3/16	5/16	2	9/16	Short	69355		M725-0187-0312-N0562-015				
				5/8	Short	69357		M725-0187-0375-N0625-015				
		3/8	3	1-3/8	Long	69493		M725-0187-0375-N1375-015				

## Model Code: M726N

### 6-Flute with Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Neck Style	Order Code by Corner Radius (R)			EZ-ID Number				
						.015 CR	.030 CR	.060 CR	M726 -	xxxx -	xxxx -	Nxxxx -	xxx -
									d1	l2	l3	R	l1
1/4	1/4	3/8	2-1/2	5/8	Short	69359	69360		M726-0250-0375-N0625-xxx				
				7/8	Short	69362	69363	M726-0250-0625-N0875-xxx					
					Long	69495	69496	M726-0250-0625-N1375-xxx					
		5/8	4	7/8	Short	69365	69366	M726-0250-0625-N0875-xxx-L4					
				2-3/8	Long	69498	69499	M726-0250-0625-N2375-xxx-L4					

# Model Code: M726N

## 6-Flute with Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Neck Style	Order Code by Corner Radius (R)			EZ-ID Number				
						0,5 CR	1,0 CR	1,5 CR	M726 - xxx - xxx - Nxxx - xxx - Lxxx	d1	l2	l3	R
6	6	9	57	15	Short	69421			M726-060-009-N015-050				
				21	Short	69423	M726-060-015-N021-050						
		15	75	39	Long	69557	M726-060-015-N039-050						
				21	Short	69425	M726-060-015-N021-050-L100						
		15	100	64	Long	69559	M726-060-015-N064-050-L100						
8	8	11	63	17	Short	69427			M726-080-011-N017-050				
				25	Short	69429	M726-080-019-N025-050						
		19	75	39	Long	69563	M726-080-019-N039-050						
				25	Short	69431	M726-080-019-N025-050-L100						
		19	100	64	Long	69565	M726-080-019-N064-050-L100						
10	10	13	72	19	Short	69433	69434		M726-100-013-N019-xxx				
				32	Long	69567	69568	M726-100-013-N032-xxx					
		23	88	29	Short	69436	69437	M726-100-023-N029-xxx					
				48	Long	69570	69571	M726-100-023-N048-xxx					
		23	100	29	Short	69439	69440	M726-100-023-N029-xxx-L100					
				60	Long	69573	69574	M726-100-023-N060-xxx-L100					
12	12	15	83	21	Short	69442	69443	69444	M726-120-015-N021-xxx				
				38	Long	69576	69577	69578	M726-012-015-N038-xxx				
		27	100	33	Short	69446	69447	69448	M726-120-027-N033-xxx				
				55	Long	69580	69581	69582	M726-120-027-N055-xxx				
		27	125	33	Short	69450	69451	69452	M726-120-027-N033-xxx-L125				
				80	Long	69584	69585	69586	M726-120-027-N080-xxx-L125				
16	16	20	92	26	Short		69455	69456	M726-160-020-N026-xxx				
				44	Long		69589	69590	M726-160-020-N044-xxx				
		35	110	41	Short		69459	69460	M726-160-035-N041-xxx				
				62	Long		69593	69594	M726-160-035-N062-xxx				
		35	125	41	Short		69463	69464	M726-160-035-N041-xxx-L125				
				77	Long		69597	69598	M726-160-035-N077-xxx-L125				
20	20	24	104	30	Short		69467	69468	M726-200-024-N030-xxx				
				54	Long		69601	69602	M726-200-024-N054-xxx				
		43	125	49	Short		69471	69472	M726-200-043-N049-xxx				
				75	Long		69605	69606	M726-200-043-N075-xxx				
		43	150	49	Short		69475	69476	M726-200-043-N049-xxx-L150				
				100	Long		69609	69610	M726-200-043-N100-xxx-L150				

# M7 Series Application Guide - Speed & Feed (inch and metric)

	No. of Flutes	Type of Cut	INCH							METRIC						
			Tool Dia	Axial Max	Radial Max	Speed (SFM)	RPM	IPT	IPM	Tool Dia	Axial Max	Radial Max	Speed (M/Min)	RPM	MMPT	MM/Min
<b>H</b> 51 HRC-63 HRC	5	Rough < 10,000 Finish	1/8	0.1250	0.0075	350	10,696	0.00035	18.7	3,0	3,0	0,18	106	113,247	0.0089	5039.5
				0.1250	0.0075	325	9,932	0.00035	17.4				94	9,973	0.0089	443.8
				0.2500	0.001	300	9,168	0.00030	13.7				91	9,701	0.0075	363.8
	5	Rough Finish	3/16	0.1875	0.0130	250	5,093	0.00070	17.8	4,0	4,0	0,275	64	5,093	0.0180	458.4
				0.3750	0.0015	300	6,112	0.00040	12.2				91	7,241	0.0097	351.2
	6	Rough Finish	1/4	0.2500	0.0150	400	6,112	0.00100	36.6	5,0	5,0	0,345	80	5,093	0.0200	509.3
				0.5000	0.0020	300	4,584	0.00050	13.8				91	5,793	0.0107	309.9
	6	Rough Finish	5/16	0.3125	0.0220	400	4,890	0.00125	36.6	6,0	6,0	0,380	122	6,472	0.0254	986.3
				0.6250	0.0020	300	3,667	0.00060	13.2				91	4,828	0.0127	367.9
	6	Rough Finish	3/8	0.3750	0.0300	400	4,074	0.00150	36.6	8,0	8,0	0,558	121	4,814	0.0330	953.2
0.7500				0.0030	300	3,056	0.00070	12.8	91				3,621	0.0152	330.2	
6	Rough Finish	1/2	0.5000	0.0400	400	3,056	0.00200	36.6	10,0	10,0	0,800	121	3,851	0.0400	924.3	
			1.000	0.0030	300	2,292	0.00100	13.7				91	2,897	0.0200	347.6	
6	Rough Finish	5/8	0.6250	0.0500	400	2,445	0.00250	36.6	12,0	12,0	0,960	121	3,210	0.0480	924.3	
			1.250	0.0050	300	1,833	0.00130	14.3				91	2,414	0.0240	347.6	
6	Rough Finish	3/4	0.750	0.0600	400	2,037	0.00300	36.6	16,0	16,0	1,270	121	2,407	0.0635	917.1	
			1.500	0.0050	300	1,528	0.00150	13.7				91	1,810	0.0330	358.4	
6	Rough Finish	1	1.000	0.0800	400	1,528	0.00400	36.6	20,0	20,0	1,524	121	1,926	0.0760	878.1	
			2.000	0.0080	300	1,146	0.00200	13.7				91	1,448	0.0380	330.2	
<b>H</b> 43 HRC-50 HRC	5	Rough < 10,000 Finish Finish < 10,000	1/8	0.1250	0.010	500	15,280	0.0006	45.8	3,0	3,0	0,254	152	16,127	0.0152	1225.7
				0.1250	0.010	325	9,932	0.0006	29.8				94	9,973	0.0152	758.0
				0.2500	0.001	400	12,224	0.0003	18.3				121	12,838	0.0076	487.8
				0.2500	0.001	325	9,932	0.0003	14.9				94	9,973	0.0076	379.0
	5	Rough < 10,000 Finish	3/16	0.1875	0.015	500	10,186	0.0009	45.8	4,0	4,0	0,320	152	12,095	0.0192	1161.2
				0.1875	0.015	480	9,780	0.0009	44.0				125	9,947	0.0192	954.9
				0.3750	0.0015	400	8,150	0.0005	20.4				121	9,629	0.0103	495.9
	6	Rough Finish	1/4	0.2500	0.020	500	7,640	0.0012	55.0	5,0	5,0	0,400	152	9,676	0.0239	1156.3
				0.5000	0.003	400	6,112	0.0007	25.7				121	7,703	0.0132	508.4
	6	Rough Finish	5/16	0.3125	0.025	500	6,112	0.0014	51.3	6,0	6,0	0,480	152	8,064	0.0305	1475.6
				0.6250	0.003	400	4,889	0.0007	20.5				121	6,419	0.0170	654.7
	6	Rough Finish	3/8	0.7500	0.030	500	5,093	0.0017	52.0	8,0	8,0	0,640	152	6,048	0.0355	1288.2
				0.7500	0.005	400	4,074	0.0010	24.4				121	4,814	0.0175	505.5
	6	Rough Finish	1/2	0.5000	0.040	500	3,820	0.0023	52.7	10,0	10,0	0,800	152	4,838	0.0453	1315.0
				1.0000	0.007	400	3,056	0.0014	25.6				121	3,851	0.0266	614.7
	6	Rough Finish	5/8	0.6250	0.050	500	3,056	0.0029	53.2	12,0	12,0	0,970	152	4,032	0.0552	1335.3
1.2500				0.008	400	2,445	0.0018	26.4	121				3,210	0.0336	647.0	
6	Rough Finish	3/4	0.7500	0.060	500	2,547	0.0034	52.0	16,0	16,0	1,280	152	3,024	0.0736	1335.3	
			1.5000	0.009	400	2,037	0.0020	24.4				121	2,407	0.0455	657.2	
6	Rough Finish	1	1.0000	0.080	500	1,910	0.0046	52.7	20,0	20,0	1,600	152	2,419	0.0863	1252.6	
			2.0000	0.010	400	1,528	0.0023	21.0				121	1,926	0.0508	587.0	
<b>P</b> <b>M</b> 36 HRC-42 HRC	5	Rough < 10,000 Finish Finish < 10,000	1/8	0.1250	0.0100	600	18,336	0.0010	91.7	3,0	3,0	0,240	182	19,310	0.0254	2452.4
				0.1250	0.0100	325	9,932	0.0010	49.6				94	9,973	0.0254	1266.6
				0.2500	0.0015	450	13,752	0.0005	34.4				137	14,536	0.0127	923.0
				0.2500	0.0015	325	9,932	0.0005	24.8				94	9,973	0.0127	633.3
	5	Rough < 10,000 Finish	3/16	0.1875	0.0150	600	12,224	0.0013	79.5	4,0	4,0	0,320	182	14,483	0.0280	2027.6
				0.1875	0.0150	475	9,677	0.0013	63.0				125	9,947	0.0280	1392.6
				0.3750	0.0020	450	9,168	0.0008	36.7				125	9,947	0.0170	845.5
	6	Rough Finish	1/4	0.2500	0.0250	600	9,168	0.0020	110.0	5,0	5,0	0,400	182	11,586	0.0345	1998.6
				-	-	-	-	-	-				157	9,995	0.0345	1724.1
	6	Rough Finish	5/16	0.3125	0.0310	600	7,334	0.0025	110.0	6,0	6,0	0,600	183	9,708	0.0510	2970.7
				0.6250	0.0030	500	6,112	0.0013	47.6				152	8,064	0.0254	1228.9
	6	Rough Finish	3/8	0.3750	0.0370	600	6,112	0.0030	110.0	8,0	8,0	0,800	183	7,281	0.0635	2774.1
				0.7500	0.0030	500	5,093	0.0015	45.8				152	6,048	0.0330	1197.4
	6	Rough Finish	1/2	0.5000	0.0500	600	4,584	0.0040	110.0	10,0	10,0	1,000	183	5,825	0.0800	2795.9
				1.0000	0.0050	500	3,820	0.0020	45.8				152	4,838	0.0400	1161.2
	6	Rough Finish	5/8	0.6250	0.0625	600	3,667	0.0050	110.0	12,0	12,0	1,200	183	4,854	0.0960	2795.9
1.2500				0.0050	500	3,056	0.0025	45.8	152				4,032	0.0480	1161.2	
6	Rough Finish	3/4	0.7500	0.0750	600	3,056	0.0060	110.0	16,0	16,0	1,600	183	3,641	0.1270	2774.1	
			1.5000	0.0050	500	2,546	0.0030	45.8				152	3,024	0.0635	1152.1	
6	Rough Finish	1	1.0000	0.1000	600	2,292	0.0080	110.0	20,0	20,0	2,000	183	2,912	0.1524	2663.1	
			2.0000	0.0070	500	1,910	0.0040	45.8				152	2,419	0.0762	1106.0	



# TOOL TIP



## Run Wet or Dry? Run Both!

Tests show that M725/M726 end mills provide the same extended tool life when machining under coolant or dry with an air blast – even in very hard materials.

### Common Machining Formulas

**Radial Chip Thinning Adjustment** 
$$IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$$

$$RPM = \frac{SFM \times 3.82}{D}$$

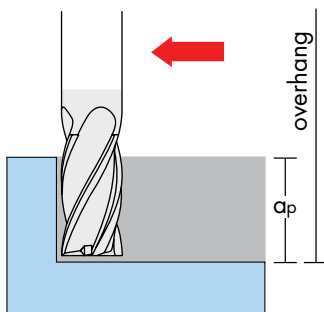
$$SFM = RPM \times D \times .262$$

$$IPM = RPM \times IPT \times Z$$

$$MRR = RDOC \times ADOC \times IPM$$

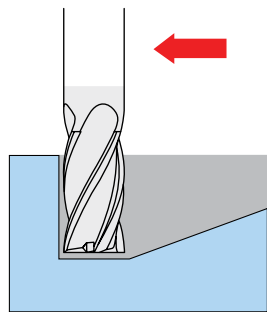
<b>D</b> Tool Cutting Diameter	<b>IPM</b> Inches per Minute
<b>R</b> Tool Radius	<b>MRR</b> Metal Removal Rate
<b>Z</b> Number of Flutes	<b>RDOC</b> Radial Depth of Cut
<b>RPM</b> Revolutions per Minute	<b>ADOC</b> Axial Depth of Cut
<b>SFM</b> Surface Feet per Minute	

**Adjustments** – Apply these adjustments when programming the following applications.



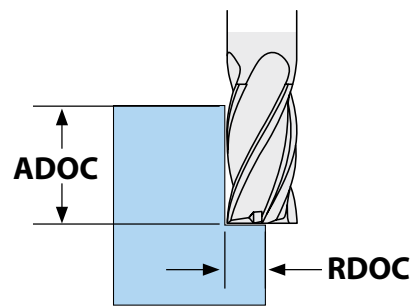
**1. Long reach mills with large overhang**

- Reduce speed rate and chip load by 20% each when total reach to tool diameter ratio is 5:1 or greater



**2. Ramp entry into work piece**

- Ramp at 1.5°–2.5° angle
- Reduce chip load by 20% of recommended slotting rate



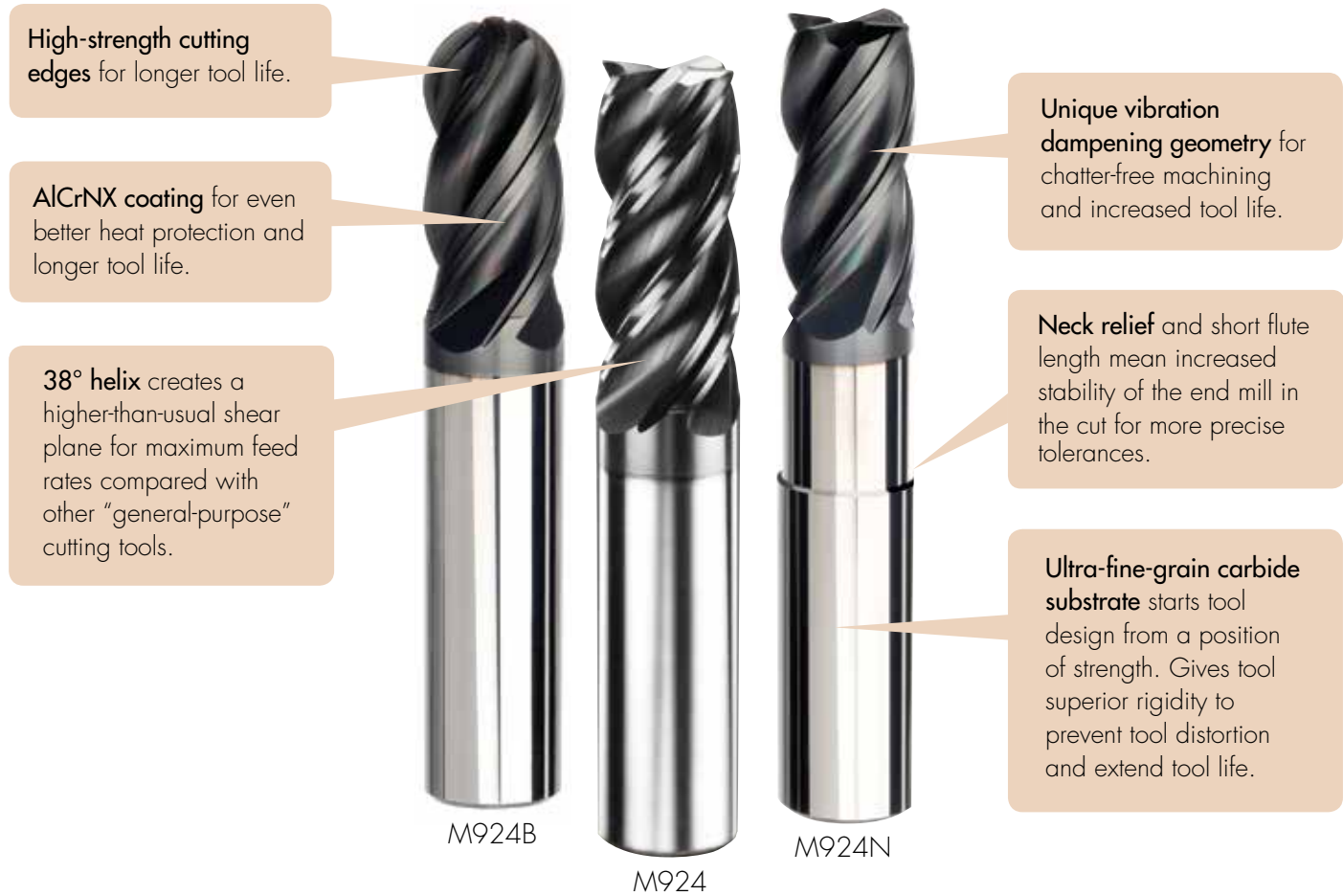
**3. Apply chip thinning adjustment when RDOC < D**

# POW·R·FEED® M9 Series

## **M924: The new powerhouse.**

New features make it incredibly durable, extending tool life in many applications. Reinforced cutting edges give you even longer tool life in more demanding applications, with maximum feeds and speeds you never thought possible.

# POW•R•FEED M9 Series Features



## Options

### Corner radii

A wide variety available to meet your part's specific requirements. Helps prevent corner chipping.

### Square end

For general machining and finishing.

### Ball end

For precision contouring.

### H6 tolerance shanks

Fits all collets and conform to shrink-fit requirements. Some styles offered with flats for Weldon-style holders.

## Choose the length for the job.

**Extra rigidity** – Choose stub length.

**Medium-to-deep cuts** – Order standard, long or extra-long flute length and reach.

**Neck relief** – Better clearance in deep cavities, easier machining against tight walls.

## Choose the right tool for your shop.

M9 Series end mills make fast work of most machining work in these materials:



### Carbon and tool steels

Martensitic and ferritic stainless steels as well as carbon and tool steels



### Cast iron

Malleable and gray cast irons



### Stainless steels

Austenitic and precipitation hardening stainless steels



### Heat-resistant super alloys

Titanium and heat-resistant alloys

## Square End

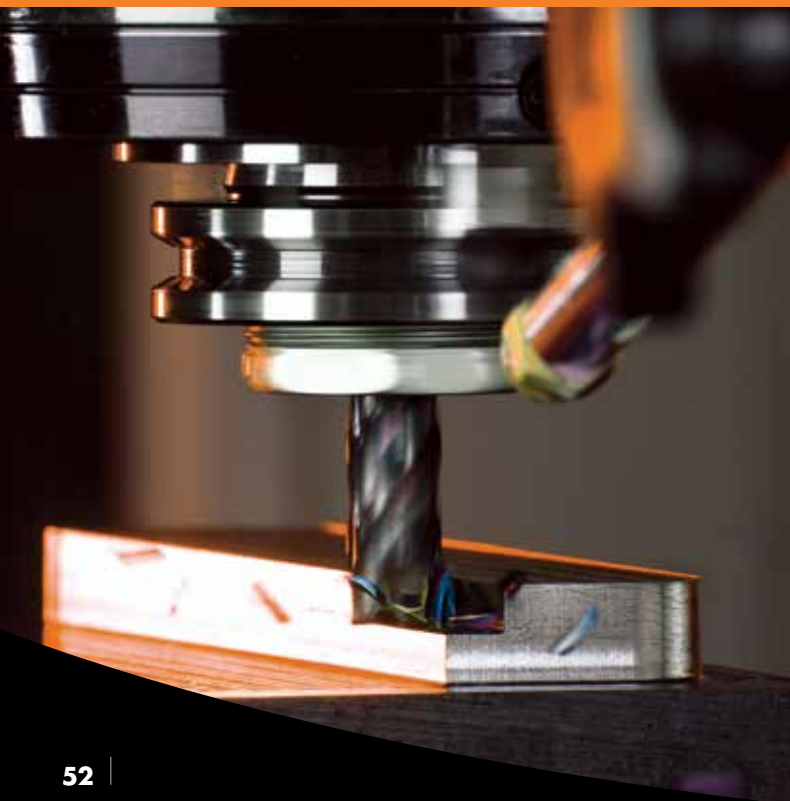
### POW•R•FEED® M924: The M9 Series Powerhouse

IMCO's new M924 is the second generation of the POW•R•FEED M9 Series, designed for production environments. Reinforced cutting edges give you even longer tool life in more demanding applications.

- Better performance, longer tool life with optimized rake and relief angles.
- New AlCrNX engineered coating shown to improve tool life exponentially.

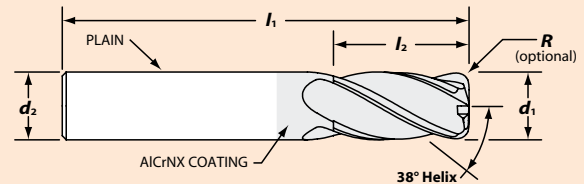
These performance benefits make the new M924 end mills an excellent choice when:

- Speed and cycle time are critical.
- High-volume part runs make it easy to measure tool life.



### 4 - FLUTE

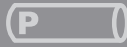
For high-performance milling in a wide range of materials and applications. Designed to be free cutting with superior edge strength. Recommended for high-volume production runs and difficult-to-machine materials. Use square corner for general finishing operations, and corner radius for roughing and semi-finishing operations.



<b>in</b>	d1 +0.000 / -0.002	d2 -0.0001 / -0.0004
<b>mm</b>	d1 +0,000 / -0,050	d2 -0,0025 / -0,0100

Use M924 plain shank with milling chuck, collet or shrink-fit tool holders to minimize TIR when performing high-efficiency machining or finishing operations.

**Model Code: M924**  
**4-Flute w/Square End**



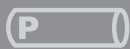
Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number M924-xxxx-xxxx-SQ d1 l2
1/8	1/8	1/4	1-1/2	67494	M924-0125-0250-SQ
		1/2	1-1/2	67498	M924-0125-0500-SQ
		3/4	2-1/4	67502	M924-0125-0750-SQ
5/32	3/16	5/16	2	67536	M924-0156-0312-SQ
		9/16	2	67537	M924-0156-0562-SQ
3/16	3/16	5/16	2	67506	M924-0187-0312-SQ
		9/16	2	67510	M924-0187-0562-SQ
		3/4	2-1/2	67514	M924-0187-0750-SQ
7/32	1/4	3/8	2	67541	M924-0218-0375-SQ
		3/4	2-1/2	67542	M924-0218-0750-SQ
1/4	1/4	3/8	2	67518	M924-0250-0375-SQ
		3/4	2-1/2	67524	M924-0250-0750-SQ
		1-1/4	3	67530	M924-0250-1250-SQ
9/32	5/16	1-3/4	4	67546	M924-0250-1750-SQ
		3/4	2-1/2	67549	M924-0281-0750-SQ
		7/16	2	67092	M924-0312-0437-SQ
5/16	5/16	13/16	2-1/2	67098	M924-0312-0812-SQ
		1-1/4	3	67104	M924-0312-1250-SQ
		2-1/8	4	67110	M924-0312-2125-SQ
11/32	3/8	7/8	2-1/2	67552	M924-0343-0875-SQ
3/8	3/8	1/2	2	67116	M924-0375-0500-SQ
		7/8	2-1/2	67124	M924-0375-0875-SQ
		1-1/4	3	67132	M924-0375-1250-SQ
		1-5/8	4	67148	M924-0375-1625-SQ
		2	4	67164	M924-0375-2000-SQ
13/32	7/16	2-1/2	5	67554	M924-0375-2500-SQ
		1	2-3/4	67557	M924-0406-1000-SQ
		5/8	2-1/2	67180	M924-0437-0625-SQ
7/16	7/16	1	2-3/4	67188	M924-0437-1000-SQ
		2	4	67196	M924-0437-2000-SQ
1/2	1/2	5/8	2-1/2	67204	M924-0500-0625-SQ
		1	3	67213	M924-0500-1000-SQ
		1-1/4	3	67222	M924-0500-1250-SQ
		1-5/8	4	67231	M924-0500-1625-SQ
		2-1/8	4	67249	M924-0500-2125-SQ
		2-5/8	5	67258	M924-0500-2625-SQ
9/16	9/16	3-1/4	6	67267	M924-0500-3250-SQ
		1-1/4	3-1/2	67559	M924-0562-1250-SQ
		3/4	3	67276	M924-0625-0750-SQ
5/8	5/8	1-3/8	3-1/2	67286	M924-0625-1375-SQ
		2-1/8	4	67296	M924-0625-2125-SQ
		2-5/8	5	67316	M924-0625-2625-SQ
		3-1/4	6	67326	M924-0625-3250-SQ
3/4	3/4	1	3	67346	M924-0750-1000-SQ
		1-5/8	4	67356	M924-0750-1625-SQ
		2-3/8	5	67366	M924-0750-2375-SQ
		3-1/4	6	67386	M924-0750-3250-SQ
		4-1/8	7	67396	M924-0750-4125-SQ
1	1	1-3/4	4	67406	M924-1000-1750-SQ
		2-1/4	5	67417	M924-1000-2250-SQ
		3-1/4	6	67439	M924-1000-3250-SQ
		4-1/4	7	67450	M924-1000-4250-SQ
1-1/4	1-1/4	2	4-1/2	67461	M924-1250-2000-SQ
		3-1/4	6	67472	M924-1250-3250-SQ
		5	8	67483	M924-1250-5000-SQ

**Model Code: M924**  
**4-Flute w/Square End**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number M924-xxxx-xxxx-SQ-W d1 l2
3/8	3/8	7/8	2-1/2	68195	M924-0375-0875-SQ-W
		1-1/4	3	68196	M924-0375-1250-SQ-W
		1-5/8	4	68197	M924-0375-1625-SQ-W
5/32	3/16	2	4	68198	M924-0375-2000-SQ-W
		2-1/2	5	68221	M924-0375-2500-SQ-W
3/16	3/16	1	2-3/4	68199	M924-0437-1000-SQ-W
		2	4	68200	M924-0437-2000-SQ-W
7/32	1/4	1	3	68710	M924-0500-1000-SQ-W
		1-1/4	3	68201	M924-0500-1250-SQ-W
		1-5/8	4	68202	M924-0500-1625-SQ-W
1/4	1/4	2-1/8	4	68203	M924-0500-2125-SQ-W
		2-5/8	5	68204	M924-0500-2625-SQ-W
		3-1/4	6	68205	M924-0500-3250-SQ-W
9/32	5/16	1-3/8	3-1/2	68206	M924-0625-1375-SQ-W
		2-1/8	4	68207	M924-0625-2125-SQ-W
		2-5/8	5	68208	M924-0625-2625-SQ-W
5/16	5/16	3-1/4	6	68209	M924-0625-3250-SQ-W
		1-5/8	4	68210	M924-0750-1625-SQ-W
		2-3/8	5	68211	M924-0750-2375-SQ-W
11/32	3/8	3-1/4	6	68212	M924-0750-3250-SQ-W
		4-1/8	7	68213	M924-0750-4125-SQ-W
3/8	3/8	1-3/4	4	68214	M924-1000-1750-SQ-W
		2-1/4	5	68215	M924-1000-2250-SQ-W
		3-1/4	6	68216	M924-1000-3250-SQ-W
13/32	7/16	4-1/4	7	68217	M924-1000-4250-SQ-W
		2	4-1/2	68218	M924-1250-2000-SQ-W
7/16	7/16	3-1/4	6	68219	M924-1250-3250-SQ-W
		5	8	68220	M924-1250-5000-SQ-W

**Model Code: M924**  
**4-Flute w/Square End**



**Model Code: M924**  
**4-Flute w/Square End**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number M924-xxx-xxx-SQ d1 l2
3	3	9	38	67900	M924-030-009-SQ
		12	38	67902	M924-030-012-SQ
		25	75	67904	M924-030-025-SQ
3	6	9	50	67906	M924-030-009-SQ
		12	57	67909	M924-030-012-SQ
4	6	12	54	67912	M924-040-012-SQ
		16	63	67915	M924-040-016-SQ
5	6	15	54	67918	M924-050-015-SQ
		20	63	67921	M924-050-020-SQ
6	6	13	57	67924	M924-060-013-SQ
		19	63	67928	M924-060-019-SQ
		25	75	67932	M924-060-025-SQ
7	8	19	63	67936	M924-070-019-SQ
8	8	19	63	67939	M924-080-019-SQ
		32	75	67942	M924-080-032-SQ
9	10	22	72	67945	M924-090-022-SQ
10	10	22	72	67948	M924-100-022-SQ
		40	88	67953	M924-100-040-SQ
		19	73	67956	M924-120-019-SQ
12	12	26	83	67959	M924-120-026-SQ
		50	100	67964	M924-120-050-SQ
		75	150	67967	M924-120-075-SQ
14	14	32	83	67970	M924-140-032-SQ
		34	92	67975	M924-160-034-SQ
16	16	55	110	67980	M924-160-055-SQ
		75	150	67983	M924-160-075-SQ
		38	104	67986	M924-200-038-SQ
20	20	42	100	67991	M924-200-042-SQ
		65	125	67996	M924-200-065-SQ
		85	150	67999	M924-200-085-SQ
25	25	52	120	68002	M924-250-052-SQ
		85	150	68007	M924-250-085-SQ

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number M924-xxx-xxx-SQ-W d1 l2
6	6	13	57	68222	M924-060-013-SQ-W
		19	63	68223	M924-060-019-SQ-W
		25	75	68224	M924-060-025-SQ-W
8	8	19	63	68225	M924-080-019-SQ-W
		32	75	68226	M924-080-032-SQ-W
10	10	22	72	68227	M924-100-022-SQ-W
		40	88	68228	M924-100-040-SQ-W
12	12	26	83	68229	M924-120-026-SQ-W
		50	100	68230	M924-120-050-SQ-W
		75	150	68231	M924-120-075-SQ-W
16	16	34	92	68232	M924-160-034-SQ-W
		55	110	68233	M924-160-055-SQ-W
		75	150	68234	M924-160-075-SQ-W
20	20	38	104	68235	M924-200-038-SQ-W
		42	100	68236	M924-200-042-SQ-W
		65	125	68237	M924-200-065-SQ-W
25	25	85	150	68238	M924-200-085-SQ-W
		52	120	68239	M924-250-052-SQ-W
		85	150	68240	M924-250-085-SQ-W



## CASE STUDY

# Putting the "POW" into Pow·R·Feed!

The new features on the M924 make it an incredibly durable tool – extending the tool life in many applications. One IMCO customer was using the original M904 mill and a leading competitor's mill in a tough chrome application. By changing to the M924 the customer cut five times the parts per tool – without lowering the metal removal rate. That's a double savings – more parts per tool and fewer tool changes. Combine the great tool life with the aggressive feed rates and the M924 is a very Pow-R-Full tool.

**Model Code: M924**  
**4-Flute w/Corner Radius**



# M924

## Corner Radius



### 4 - FLUTE

Using an end mill with a corner radius greatly extends tool life in most applications, especially roughing cuts and those in materials with low machinability ratings. Corner chipping can lead to tool failure and poor finishes. Adding a corner radius reduces chipping and improves tool life by protecting the weakest part of the end mill.

*Refer to the line drawing on Page 52.*

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R)				EZ-ID Number M924-xxxx-xxxx-xxx d1 l2 R		
				(replace .015 CR	.030 CR	.060 CR	.090 CR		.120 CR	
1/8	1/8	1/4	1-1/2	67495					M924-0125-0250-015	
		1/2	1-1/2	67499					M924-0125-0500-015	
		3/4	2-1/4	67503					M924-0125-0750-015	
5/32	3/16	5/16	2	67538					M924-0156-0312-015	
		9/16	2	67539					M924-0156-0562-015	
3/16	3/16	5/16	2	67507	67508				M924-0187-0312-xxx	
		9/16	2	67511	67512				M924-0187-0562-xxx	
		3/4	2-1/2	67515	67516				M924-0187-0750-xxx	
7/32	1/4	3/8	2	67543					M924-0218-0375-015	
		3/4	2-1/2	67544					M924-0218-0750-015	
1/4	1/4	3/8	2	67519	67520				M924-0250-0375-xxx	
		3/4	2-1/2	67525	67526	67527			M924-0250-0750-xxx	
		1-1/4	3	67531	67532				M924-0250-1250-xxx	
		1-3/4	4	67547	67548				M924-0250-1750-xxx	
9/32	5/16	3/4	2-1/2	67550	67551				M924-0281-0750-xxx	
5/16	5/16	7/16	2	67093	67094				M924-0312-0437-xxx	
		13/16	2-1/2	67099	67100	67101			M924-0312-0812-xxx	
		1-1/4	3	67105	67106				M924-0312-1250-xxx	
		2-1/8	4	67111	67112				M924-0312-2125-xxx	
11/32	3/8	7/8	2-1/2		67553				M924-0343-0875-030	
3/8	3/8	1/2	2	67117	67118				M924-0375-0500-xxx	
		7/8	2-1/2	67125	67126	67127	67128		M924-0375-0875-xxx	
		1-1/4	3	67133	67134	67135			M924-0375-1250-xxx	
		1-5/8	4	67149	67150	67151			M924-0375-1625-xxx	
		2	4	67165	67166	67167			M924-0375-2000-xxx	
		2-1/2	5	67555	67556				M924-0375-2500-xxx	
13/32	7/16	1	2-3/4		67558				M924-0406-1000-030	
7/16	7/16	5/8	2-1/2		67182					M924-0437-0625-030
		1	2-3/4		67190					M924-0437-1000-030
		2	4		67198					M924-0437-2000-030
1/2	1/2	5/8	2-1/2		67206	67207				M924-0500-0625-xxx
		1	3	67214	67215	67216	67217	67218		M924-0500-1000-xxx
		1-1/4	3	67223	67224	67225	67226	67227		M924-0500-1250-xxx
		1-5/8	4		67233	67234	67235	67236		M924-0500-1625-xxx
		2-1/8	4		67251	67252	67253	67254		M924-0500-2125-xxx
		2-5/8	5		67260	67261				M924-0500-2625-xxx
3-1/4	6		67269	67270				M924-0500-3250-xxx		
9/16	9/16	1-1/4	3-1/2		67560				M924-0562-1250-030	
5/8	5/8	3/4	3		67278	67279				M924-0625-0750-xxx
		1-3/8	3-1/2		67288	67289	67290	67291		M924-0625-1375-xxx
		2-1/8	4		67298	67299	67300	67301		M924-0625-2125-xxx
		2-5/8	5		67318	67319				M924-0625-2625-xxx
		3-1/4	6		67328	67329				M924-0625-3250-xxx
3/4	3/4	1	3		67348	67349				M924-0750-1000-xxx
		1-5/8	4		67358	67359	67360	67361		M924-0750-1625-xxx
		2-3/8	5		67368	67369	67370	67371		M924-0750-2375-xxx
		3-1/4	6		67388	67389				M924-0750-3250-xxx
		4-1/8	7		67398	67399				M924-0750-4125-xxx
1	1	1-3/4	4		67408	67409	67410	67411		M924-1000-1750-xxx
		2-1/4	5		67419	67420		67422		M924-1000-2250-xxx
		3-1/4	6		67441	67442				M924-1000-3250-xxx
		4-1/4	7		67452	67453				M924-1000-4250-xxx
1-1/4	1-1/4	2	4-1/2		67463	67464		67466		M924-1250-2000-xxx
		3-1/4	6		67474	67475		67477		M924-1250-3250-xxx
		5	8		67485	67486		67488		M924-1250-5000-xxx

**Model Code: M924**  
**4-Flute w/Corner Radius**



Cutter Dia d1	Shank Dia d2	Length of Cut L2	Overall Length L1	Order Code by Corner Radius (R)				EZ-ID Number		
				.015 CR	.030 CR	.060 CR	.120 CR	M924-xxxx-xxxx-xxx-W d1 L2 R		
3/8	3/8	7/8	2-1/2	68116	68117	68118		M924-0375-0875-xxx-W		
		1-1/4	3	68119	68120	68121		M924-0375-1250-xxx-W		
		1-5/8	4	68122	68123	68124		M924-0375-1625-xxx-W		
		2	4	68125	68126	68127		M924-0375-2000-xxx-W		
1/2	1/2	1	3	68711	68712	68713	68714	M924-0500-1000-xxx-W		
		1-1/4	3	68131	68132	68133	68134	M924-0500-1250-xxx-W		
		1-5/8	4		68136	68137		M924-0500-1625-xxx-W		
		2-1/8	4		68139	68140		M924-0500-2125-xxx-W		
		2-5/8	5		68142	68143		M924-0500-2625-xxx-W		
		3-1/4	6		68145	68146		M924-0500-3250-xxx-W		
		1-3/8	3-1/2		68147	68148		M924-0625-1375-xxx-W		
5/8	5/8	2-1/8	4		68149	68150		M924-0625-2125-xxx-W		
		2-5/8	5		68151	68152		M924-0625-2625-xxx-W		
		3-1/4	6		68153	68154		M924-0625-3250-xxx-W		
		1-5/8	4		68155	68156	68157	M924-0750-1625-xxx-W		
3/4	3/4	2-3/8	5		68158	68159	68160	M924-0750-2375-xxx-W		
		3-1/4	6		68161	68162		M924-0750-3250-xxx-W		
		4-1/8	7		68164	68165		M924-0750-4125-xxx-W		
		1-3/4	4		68167	68168	68169	M924-1000-1750-xxx-W		
1	1	2-1/4	5		68171	68172	68173	M924-1000-2250-xxx-W		
		3-1/4	6		68175	68176		M924-1000-3250-xxx-W		
		4-1/4	7		68179	68180		M924-1000-4250-xxx-W		
		2	4-1/2		68183	68184	68185	M924-1250-2000-xxx-W		
1-1/4	1-1/4	3-1/4	6		68187	68188	68189	M924-1250-3250-xxx-W		
		5	8		68191	68192	68193	M924-1250-5000-xxx-W		



## CASE STUDY

# More Parts Per Tool

Never underestimate the power of the coating. Tested in 6AL-4V titanium against a tool with a different coating, the POW•R•FEED M9 tool lasted 60% longer, simply due to the advanced AlCrNX coating. That translates into a 60% parts-per-tool increase and takes a big bite out of the customer's ongoing tool costs.



## Model Code: M924 4-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R) (replace -xxx in EZ-ID number with mm size below)			EZ-ID Number M924-xxx-xxx-xxx-Lxxx				
				0,3 CR	0,5 CR	1,0 CR	d1	l2	R	l1	
3	3	9	38	67901			M924-030-009-030				
		12	38	67903			M924-030-012-030				
		25	75	67905			M924-030-025-030				
3	6	9	50	67907			M924-030-009-030				
		12	57	67910			M924-030-012-030-L57				
4	6	12	54	67913			M924-040-012-030				
		16	63	67916			M924-040-016-030				
5	6	15	54	67919			M924-050-015-030				
		20	63	67922			M924-050-020-030				
6	6	13	57	67925	67926		M924-060-013-xxx				
		19	63	67929	67930		M924-060-019-xxx				
		25	75	67933	67934		M924-060-025-xxx				
7	8	19	63		67937		M924-070-019-050				
8	8	19	63		67940		M924-080-019-050				
		32	75		67943		M924-080-032-050				
9	10	22	72		67946		M924-090-022-050				
10	10	22	72		67949	67950	M924-100-022-xxx				
		40	88		67954		M924-100-040-050				
12	12	19	73		67957	67958	M924-120-019-xxx				
		26	83		67960	67961	M924-120-026-xxx				
		50	100		67965		M924-120-050-050				
		75	150		67968		M924-120-075-050				
14	14	32	83		67971	67972	M924-140-032-xxx				
		34	92		67976	67977	M924-160-034-xxx				
16	16	55	110		67981		M924-160-055-050				
		75	150		67984		M924-160-075-050				
		38	104		67987	67988	M924-200-038-xxx				
20	20	42	100		67992	67993	M924-200-042-xxx				
		65	125		67997		M924-200-065-050				
		85	150		68000		M924-200-085-050				
25	25	52	120		68003	68004	M924-250-052-xxx				
		85	150		68008		M924-250-085-050				

## Model Code: M924 4-Flute w/Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R)		EZ-ID Number M924-xxx-xxx-xxx-Lxxx				
				0,5 CR	1,0 CR	d1	l2	R	l1	
6	6	13	57	67927		M924-060-013-050-W				
		19	63	67931		M924-060-019-050-W				
		25	75	67935		M924-060-025-050-W				
8	8	19	63	67941		M924-080-019-050-W				
		32	75	67944		M924-080-032-050-W				
10	10	22	72	67951	67952	M924-100-022-xxx-W				
		40	88	67955		M924-100-040-050-W				
12	12	26	83	67962	67963	M924-120-026-xxx-W				
		50	100	67966		M924-120-050-050-W				
		75	150	67969		M924-120-075-050-W				
16	16	34	92	67978	67979	M924-160-034-xxx-W				
		55	110	67982		M924-160-055-050-W				
		75	150	67985		M924-160-075-050-W				
20	20	38	104	67989	67990	M924-200-038-xxx-W				
		42	100	67994	67995	M924-200-042-xxx-W				
		65	125	67998		M924-200-065-050-W				
		85	150	68001		M924-200-085-050-W				
25	25	52	120	68005	68006	M924-250-052-xxx-W				
		85	150	68009		M924-250-085-050-W				

## Corner Radius w/Neck Relief

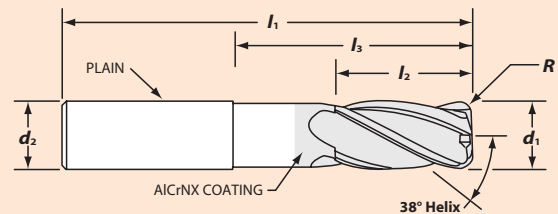
# Twice the Power: M924 w/2xD Flute Length

Put your metal removal rate into high gear with IMCO's 2xD flute length. Most tools made for cavity work use a 1:1 diameter-to-flute ratio for flute length. In addition to the 1xD ratio, IMCO offers the 2xD ratio which gives you twice the cutting depth in cavity work – without the loss of tool strength, balance and rigidity. How does IMCO do this? It's our solid carbide core and advanced geometries that keep the tool working and the chips flying.



### 4 - FLUTE

M924N permits clearance in deeper cavities and easier machining against tight walls. Neck relief and short flute length mean increased stability of the end mill in the cut for more precise tolerances.



<b>in</b>	d1 +0.000 / -0.002	d2 -0.0001 / -0.0004
<b>mm</b>	d1 +0,000 / -0,050	d2 -0,0025 / -0,0100

# GOT LBS?

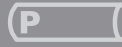
Getting the right flute and neck length is easy with IMCO's M924N end mills.

Use either the M924N 1xD or 2xD with short neck relief to get the LOF and OAL that you require when you need a long reach but a necked shank isn't critical.

Use either the M924N 1xD or 2xD with long neck relief to get the clearance necessary to machine your part when working in deep cavities and a necked shank is necessary.

# Model Code: M924N

## 4-Flute 2xD w/Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut L2	Overall Length L1	Reach LBS L3	Neck Style	Order Code by Corner Radius (R)				EZ-ID Number M924-xxx-xxx-xxx-Lxxx d1 L2 R L1
						.015 CR	.030 CR	.060 CR	.120 CR	
1/8	1/8	1/4	2-1/2	3/8	Short	67562				M924-0125-0250-N0375-015
				1-1/8	Long	67731				M924-0125-0250-N1125-015
3/16	3/16	3/8	3	1/2	Short	67564	67565			M924-0187-0375-N0250-xxx
				1-3/8	Long	67733	67734			M924-0187-0375-N1375-xxx
1/4	1/4	1/2	3	5/8	Short	67571	67572	67573		M924-0250-0500-N0625-xxx
				1-3/8	Long	67740	67741	67742		M924-0250-0500-N1375-xxx
			4	5/8	Short	67575	67576	67577		M924-0250-0500-N0625-xxx-L4
				2-3/8	Long	67744	67745	67746		M924-0250-0500-N2375-xxx-L4
3/8	3/8	3/4	4	1	Short	68698	68699	68700		M924-0375-0750-N1000-xxx
				2-3/8	Long	68324	68325	68326		M924-0375-0750-N2375-xxx
			5	1	Short	68701	68702	68703		M924-0375-0750-N1000-xxx-L5
				3-3/8	Long	68327	68328	68329		M924-0375-0750-N3375-xxx-L5
			6	1	Short	68704	68705	68706		M924-0375-0750-N1000-xxx-L6
				4-3/8	Long	68330	68331	68332		M924-0375-0750-N4375-xxx-L6
1/2	1/2	1	4	1-1/4	Short		67689	67690	67691	M924-0500-1000-N1250-xxx
				2-1/4	Long		67858	67859	67860	M924-0500-1000-N2250-xxx
			5	1-1/4	Short		67692	67693	67694	M924-0500-1000-N1250-xxx-L5
				3-1/4	Long		67861	67862	67863	M924-0500-1000-N3250-xxx-L5
			6	1-1/4	Short		67695	67696	67697	M924-0500-1000-N1250-xxx-L6
				4-1/4	Long		67864	67865	67866	M924-0500-1000-N4250-xxx-L6
5/8	5/8	1-1/4	4	1-1/2	Short		67698	67699	67700	M924-0625-1250-N1500-xxx
				2-1/8	Long		67867	67868	67869	M924-0625-1250-N2125-xxx
			5	1-1/2	Short		67701	67702	67703	M924-0625-1250-N1500-xxx-L5
				3-1/8	Long		67870	67871	67872	M924-0625-1250-N3125-xxx-L5
			6	1-1/2	Short		67704	67705	67706	M924-0625-1250-N1500-xxx-L6
				4-1/8	Long		67873	67874	67875	M924-0625-1250-N4125-xxx-L6
3/4	3/4	1-1/2	5	1-3/4	Short		67707	67708	67709	M924-0750-1500-N1750-xxx
				2-7/8	Long		67876	67877	67878	M924-0750-1500-N2875-xxx
			6	1-3/4	Short		67710	67711	67712	M924-0750-1500-N1750-xxx-L6
				3-7/8	Long		67879	67880	67881	M924-0750-1500-N3875-xxx-L6
			7	1-3/4	Short		67713	67714	67715	M924-0750-1500-N1750-xxx-L7
				4-7/8	Long		67882	67883	67884	M924-0750-1500-N4875-xxx-L7
1	1	2	5	2-1/4	Short		67716	67717	67718	M924-1000-2000-N2250-xxx
				2-5/8	Long		67885	67886	67887	M924-1000-2000-N2625-xxx
			6	2-1/4	Short		67719	67720	67721	M924-1000-2000-N2250-xxx-L6
				3-5/8	Long		67888	67889	67890	M924-1000-2000-N3625-xxx-L6
			7	2-1/4	Short		67722	67723	67724	M924-1000-2000-N2250-xxx-L7
				4-5/8	Long		67891	67892	67893	M924-1000-2000-N4625-xxx-L7
1-1/4	1-1/4	2-1/2	6	2-3/4	Short		67725	67726	67727	M924-1250-2500-N2750-xxx
				3-5/8	Long		67894	67895	67896	M924-1250-2500-N3625-xxx
			8	2-3/4	Short		67728	67729	67730	M924-1250-2500-N2750-xxx-L8
				5-5/8	Long		67897	67898	67899	M924-1250-2500-N5625-xxx-L8

# Model Code: M924N

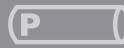
## 4-Flute 2xD w/Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach LBS l3	Neck Style	Order Code by Corner Radius (R)		EZ-ID Number M924-xxx-xxx-xxx-Lxxx d1 l2 R l1
						0,5 CR	1,0 CR	
6	6	12	75	18	Short	68537		M924-060-012-N018-050
				39	Long	68020		M924-060-012-N039-050
			100	18	Short	68538		M924-060-012-N018-050-L100
				64	Long	68021		M924-060-012-N064-050-L100
8	8	16	75	22	Short	68539		M924-080-016-N022-050
				39	Long	68023		M924-080-016-N039-050
			100	22	Short	68540		M924-080-016-N022-050-L100
				64	Long	68024		M924-080-016-N064-050-L100
10	10	20	72	26	Short	68580	68581	M924-100-020-N026-xxx
				32	Long	68070	68071	M924-100-020-N032-xxx
			100	26	Short	68582	68583	M924-100-020-N026-xxx-L100
				60	Long	68072	68073	M924-100-020-N060-xxx-L100
			150	26	Short	68584	68585	M924-100-020-N026-xxx-L150
				110	Long	68074	68075	M924-100-020-N110-xxx-L150
12	12	24	83	30	Short	68586	68587	M924-120-024-N030-xxx
				38	Long	68076	68077	M924-120-024-N038-xxx
			100	30	Short	68588	68589	M924-120-024-N030-xxx-L100
				55	Long	68078	68079	M924-120-024-N055-xxx-L100
			125	30	Short	68590	68591	M924-120-024-N030-xxx-L125
				80	Long	68080	68081	M924-120-024-N080-xxx-L125
			150	30	Short	68592	68593	M924-120-024-N030-xxx-L150
				105	Long	68082	68083	M924-120-024-N105-xxx-L150
16	16	32	110	38	Short	68594	68595	M924-160-032-N038-xxx
				62	Long	68084	68085	M924-160-032-N062-xxx
			150	38	Short	68596	68597	M924-160-032-N038-xxx-L150
				102	Long	68086	68087	M924-160-032-N102-xxx-L150
20	20	40	125	46	Short	68598	68599	M924-200-040-N046-xxx
				75	Long	68088	68089	M924-200-040-N075-xxx
			150	46	Short	68600	68601	M924-200-040-N046-xxx-L150
				100	Long	68090	68091	M924-200-040-N100-xxx-L150
25	25	50	120	56	Short	68602	68603	M924-250-050-N056-xxx
				64	Long	68092	68093	M924-250-050-N064-xxx
			150	56	Short	68604	68605	M924-250-050-N056-xxx-L150
				94	Long	68094	68095	M924-250-050-N094-xxx-L150

# Model Code: M924N

## 4-Flute 1xD w/Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach LBS l3	Neck Style	Order Code by Corner Radius (R)					EZ-ID Number						
						.015 CR	.030 CR	.060 CR	.090 CR	.120 CR	M924-xxx-xxx-xxx-Lxxx	d1	l2	R	l1		
3/8	3/8	1/2	3	3/4	Short	67579	67580	67581	67582		M924-0375-0500-N0750-xxx						
				1-3/8	Long	67748	67749	67750	67751		M924-0375-0500-N1375-xxx						
			4	3/4	Short	67584	67585	67586	67587		M924-0375-0500-N0750-xxx-L4						
				2-3/8	Long	67753	67754	67755	67756		M924-0375-0500-N2375-xxx-L4						
			5	3/4	Short	67589	67590	67591	67592		M924-0375-0500-N0750-xxx-L5						
				3-3/8	Long	67758	67759	67760	67761		M924-0375-0500-N3375-xxx-L5						
			6	3/4	Short	67594	67595	67596	67597		M924-0375-0500-N0750-xxx-L6						
				4-3/8	Long	67763	67764	67765	67766		M924-0375-0500-N4375-xxx-L6						
			1/2	1/2	5/8	3	7/8	Short		67599	67600	67601	67602	M924-0500-0625-N0875-xxx			
							1-3/8	Long		67768	67769	67770	67771	M924-0500-0625-N1375-xxx			
						4	7/8	Short		67604	67605	67606	67607	M924-0500-0625-N0875-xxx-L4			
							2-1/4	Long		67773	67774	67775	67776	M924-0500-0625-N2250-xxx-L4			
5	7/8	Short					67609	67610	67611	67612	M924-0500-0625-N0875-xxx-L5						
	3-1/4	Long					67778	67779	67780	67781	M924-0500-0625-N3250-xxx-L5						
6	7/8	Short					67614	67615	67616	67617	M924-0500-0625-N0875-xxx-L6						
	4-1/4	Long					67783	67784	67785	67786	M924-0500-0625-N4250-xxx-L6						
5/8	5/8	3/4				4	1	Short		67619	67620	67621	67622	M924-0625-0750-N1000-xxx			
							2-1/8	Long		67788	67789	67790	67791	M924-0625-0750-N2125-xxx			
						5	1	Short		67624	67625	67626	67627	M924-0625-0750-N1000-xxx-L5			
							3-1/8	Long		67793	67794	67795	67796	M924-0625-0750-N3125-xxx-L5			
			6	1	Short		67629	67630	67631	67632	M924-0625-0750-N1000-xxx-L6						
				4-1/8	Long		67798	67799	67800	67801	M924-0625-0750-N4125-xxx-L6						
3/4	3/4	1	4	1-1/4	Short		67634	67635	67636	67637	M924-0750-1000-N1250-xxx						
				2	Long		67803	67804	67805	67806	M924-0750-1000-N2000-xxx						
			5	1-1/4	Short		67639	67640	67641	67642	M924-0750-1000-N1250-xxx-L5						
				2-7/8	Long		67808	67809	67810	67811	M924-0750-1000-N2875-xxx-L5						
			6	1-1/4	Short		67644	67645	67646	67647	M924-0750-1000-N1250-xxx-L6						
				3-7/8	Long		67813	67814	67815	67816	M924-0750-1000-N3875-xxx-L6						
			7	1-1/4	Short		67649	67650	67651	67652	M924-0750-1000-N1250-xxx-L7						
				4-7/8	Long		67818	67819	67820	67821	M924-0750-1000-N4875-xxx-L7						
			1	1	1-1/4	4	1-1/2	Short		67654	67655	67656	67657	M924-1000-1250-N1500-xxx			
							2-1/4	Long		67823	67824	67825	67826	M924-1000-1250-N2250-xxx			
						5	1-1/2	Short		67659	67660	67661	67662	M924-1000-1250-N1500-xxx-L5			
							2-5/8	Long		67828	67829	67830	67831	M924-1000-1250-N2625-xxx-L5			
6	1-1/2	Short					67664	67665	67666	67667	M924-1000-1250-N1500-xxx-L6						
	3-5/8	Long					67833	67834	67835	67836	M924-1000-1250-N3625-xxx-L6						
7	1-1/2	Short					67669	67670	67671	67672	M924-1000-1250-N1500-xxx-L7						
	4-5/8	Long					67838	67839	67840	67841	M924-1000-1250-N4625-xxx-L7						
1-1/4	1-1/4	1-1/2				4-1/2	1-3/4	Short		67674	67675	67676	67677	M924-1250-1500-N1750-xxx			
							2-1/2	Long		67843	67844	67845	67846	M924-1250-1500-N2250-xxx			
						6	1-3/4	Short		67679	67680	67681	67682	M924-1250-1500-N1750-xxx-L6			
							3-5/8	Long		67848	67849	67850	67851	M924-1250-1500-N3625-xxx-L6			
			8	1-3/4	Short		67684	67685	67686	67687	M924-1250-1500-N1750-xxx-L8						
				5-5/8	Long		67853	67854	67855	67856	M924-1250-1500-N5625-xxx-L8						

# Model Code: M924N

## 4-Flute 1xD w/Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut L2	Overall Length L1	Reach L3	Neck Dia d3	Order Code by Corner Radius (R)			EZ-ID Number M924-xxx-xxx-xxx-Lxxx d1 L2 R L1			
						0,5 CR	1,0 CR	1,5 CR				
10	10	12	72	18	Short	68541	68542		M924-100-012-N018-xxx			
				32	Long	68025	68026		M924-100-012-N032-xxx			
			100	18	Short	68543	68544		M924-100-012-N018-xxx-L100			
				60	Long	68027	68028		M924-100-012-N060-xxx-L100			
			150	18	Short	68545	68546		M924-100-012-N018-xxx-L150			
				110	Long	68029	68030		M924-100-012-N110-xxx-L150			
12	12	15	83	21	Short	68547	68548	68549	M924-120-015-N021-xxx			
				38	Long	68031	68032	68033	M924-120-015-N038-xxx			
			100	21	Short	68550	68551	68552	M924-120-015-N021-xxx-L100			
				55	Long	68034	68035	68036	M924-120-015-N055-xxx-L100			
			125	21	Short	68553	68554	68555	M924-120-015-N021-xxx-L125			
				80	Long	68037	68038	68039	M924-120-015-N080-xxx-L125			
			150	21	Short	68556	68557	68558	M924-120-015-N021-xxx-L150			
				105	Long	68040	68041	68042	M924-120-015-N105-xxx-L150			
			16	16	20	110	26	Short	68559	68560	68561	M924-160-016-N026-xxx
							62	Long	68043	68044	68045	M924-160-016-N062-xxx
150	26	Short				68562	68563	68564	M924-160-016-N026-xxx-L150			
	102	Long				68046	68047	68048	M924-160-016-N102-xxx-L150			
20	20	25				100	31	Short	68565	68566	68567	M924-200-025-N031-xxx
							50	Long	68049	68050	68051	M924-200-025-N050-xxx
			125	31	Short	68568	68569	68570	M924-200-025-N031-xxx-L125			
				75	Long	68052	68053	68054	M924-200-025-N075-xxx-L125			
150	31	Short	68571	68572	68573	M924-200-025-N031-xxx-L150						
	100	Long	68055	68056	68057	M924-200-025-N100-xxx-L150						
25	25	32	120	38	Short	68574	68575	68576	M924-250-032-N038-xxx			
				64	Long	68058	68059	68060	M924-250-032-N064-xxx			
			150	38	Short	68577	68578	68579	M924-250-032-N038-xxx-L150			
				94	Long	68061	68062	68063	M924-250-032-N094-xxx-L150			

# TOOL TIP

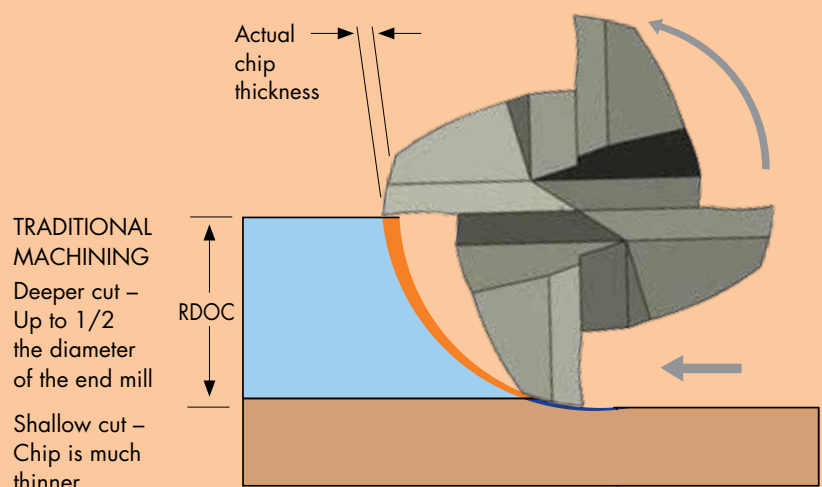
## Chip Thinning & Light Cuts.

When using a light radial stepover, the chip that is created is thinner than what is entered into the program. This thinning occurs when the radial stepover is less than 50% of the tool diameter.

When the chips are too thin, the cutting edges tend to “rub” the part and begin to wear too quickly. To avoid this problem, use the radial chip-thinning formula at right to calculate an adjusted feed per tooth necessary to maintain optimal chip thickness.

$$IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$$

**IPT** = Inch per tooth  
**D** = Tool cutting diameter  
**RDOC** = Radial depth of cut



Apply formula when taking shallow cuts to reach optimum chipload

# M924B

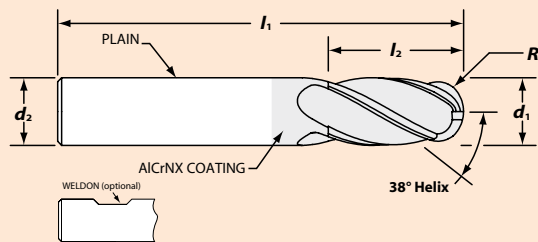
## Ball End



### 4 - FLUTE

The M924B ball end is excellent for contouring applications in a variety of materials. Based on the same high-performance design as the M924 series, but with a full end radius.

As a general rule, when using the M924B ball end mill, reduce feed rates by 25% when the axial DOC exceeds 75% of the mill diameter. Refer to speed and feed information for more detail.



**in** d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
**mm** d1 +0,000 / -0,050 d2 -0,0025 / -0,0100

## Model Code: M924B 4-Flute w/Ball End



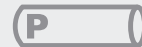
Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number M924-xxxx-xxxx-BN d1 l2
1/8	1/8	1/2	1-1/2	67501	M924-0125-0500-BN
5/32	3/16	9/16	2	67540	M924-0156-0562-BN
3/16	3/16	9/16	2	67513	M924-0187-0562-BN
7/32	1/4	3/4	2-1/2	67545	M924-0218-0750-BN
1/4	1/4	3/4	2-1/2	67529	M924-0250-0750-BN
5/16	5/16	13/16	2-1/2	67103	M924-0312-0812-BN
3/8	3/8	7/8	2-1/2	67131	M924-0375-0875-BN
7/16	7/16	1	2-3/4	67195	M924-0437-1000-BN
1/2	1/2	1	3	67221	M924-0500-1000-BN
		1-1/4	3	67230	M924-0500-1250-BN
5/8	5/8	1-3/8	3-1/2	67295	M924-0625-1375-BN
3/4	3/4	1-5/8	4	67365	M924-0750-1625-BN

## Model Code: M924B 4-Flute w/Ball End



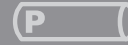
Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number M924-xxxx-xxxx-BN-W d1 l2
3/8	3/8	7/8	2-1/2	68715	M924-0375-0875-BN-W
1/2	1/2	1	3	68717	M924-0500-1000-BN-W
		1-1/4	3	68718	M924-0500-1250-BN-W
5/8	5/8	1-3/8	3-1/2	68720	M924-0625-1375-BN-W
3/4	3/4	1-5/8	4	68721	M924-0750-1625-BN-W

## Model Code: M924B 4-Flute w/Ball End



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code	EZ-ID Number M924-xxx-xxx-BN-Lxxx d1 l2 l1
3	6	9	50	68010	M924-030-009-BN
4	6	12	54	68011	M924-040-012-BN
5	6	15	54	68012	M924-050-015-BN
6	6	13	57	68013	M924-060-013-BN
8	8	19	63	68014	M924-080-019-BN
10	10	22	72	68015	M924-100-022-BN
12	12	26	83	68016	M924-120-026-BN
16	16	34	92	68017	M924-160-034-BN
20	20	38	104	68018	M924-200-038-BN

**Model Code: M924NB**  
**4-Flute w/Ball End and Neck Relief**



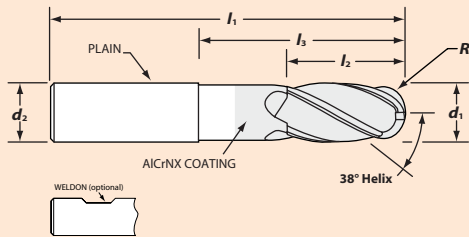
# M924NB

## Ball End w/Neck Relief



### 4-FLUTE

The same high-performance design but with a full end radius and neck relief for additional clearance in cavities and when machining tightly against part walls.

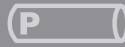


**in** d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
**mm** d1 +0,000 / -0,050 d2 -0,0025 / -0,0100

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach LBS l3	Neck Style	Order Code	EZ-ID Number M924-xxx-xxx-xxx-Lxxx d1 l2 R l1
1/8	1/8	1/4	2-1/2	3/8	Short	67563	M924-0125-0250-N0375-BN
				1-1/8	Long	67732	M924-0125-0250-N1125-BN
3/16	3/16	3/8	3	1/2	Short	67566	M924-0187-0375-N0500-BN
				1-3/8	Long	67735	M924-0187-0375-N1375-BN
1/4	1/4	1/2	3	5/8	Short	67574	M924-0250-0500-N0625-BN
				1-3/8	Long	67743	M924-0250-0500-N1375-BN
			4	5/8	Short	67578	M924-0250-0500-N0625-BN-L4
				2-3/8	Long	67747	M924-0250-0500-N2375-BN-L4
3/8	3/8	1/2	3	3/4	Short	67583	M924-0375-0500-N0750-BN
				1-3/8	Long	67752	M924-0375-0500-N1375-BN
			4	3/4	Short	67588	M924-0375-0500-N0750-BN-L4
				2-3/8	Long	67757	M924-0375-0500-N2375-BN-L4
			5	3/4	Short	67593	M924-0375-0500-N0750-BN-L5
				3-3/8	Long	67762	M924-0375-0500-N3375-BN-L5
			6	3/4	Short	67598	M924-0375-0500-N0750-BN-L6
				4-3/8	Long	67767	M924-0375-0500-N4375-BN-L6
1/2	1/2	5/8	3	7/8	Short	67603	M924-0500-0625-N0875-BN
				1-3/8	Long	67772	M924-0500-0625-N1375-BN
			4	7/8	Short	67608	M924-0500-0625-N0875-BN-L4
				2-1/4	Long	67777	M924-0500-0625-N2250-BN-L4
			5	7/8	Short	67613	M924-0500-0625-N0875-BN-L5
				3-1/4	Long	67782	M924-0500-0625-N3250-BN-L5
			6	7/8	Short	67618	M924-0500-0625-N0875-BN-L6
				4-1/4	Long	67787	M924-0500-0625-N4250-BN-L6
5/8	5/8	3/4	4	1	Short	67623	M924-0625-0750-N1000-BN
				2-1/8	Long	67792	M924-0625-0750-N2125-BN
			5	1	Short	67628	M924-0625-0750-N1000-BN-L5
				3-1/8	Long	67797	M924-0625-0750-N3125-BN-L5
			6	1	Short	67633	M924-0625-0750-N1000-BN-L6
				4-1/8	Long	67802	M924-0625-0750-N4125-BN-L6
3/4	3/4	1	4	1-1/4	Short	67638	M924-0750-1000-N1250-BN
				2	Long	67807	M924-0750-1000-N2000-BN
			5	1-1/4	Short	67643	M924-0750-1000-N1250-BN-L5
				2-7/8	Long	67812	M924-0750-1000-N2875-BN-L5
			6	1-1/4	Short	67648	M924-0750-1000-N1250-BN-L6
				3-7/8	Long	67817	M924-0750-1000-N3875-BN-L6
			7	1-1/4	Short	67653	M924-0750-1000-N1250-BN-L7
				4-7/8	Long	67822	M924-0750-1000-N4875-BN-L7
1	1	1-1/4	4	1-1/2	Short	67658	M924-1000-1250-N1500-BN
				2-1/4	Long	67827	M924-1000-1250-N2250-BN
			5	1-1/2	Short	67663	M924-1000-1250-N1500-BN-L5
				2-5/8	Long	67832	M924-1000-1250-N2625-BN-L5
			6	1-1/2	Short	67668	M924-1000-1250-N1500-BN-L6
				3-5/8	Long	67837	M924-1000-1250-N3625-BN-L6
			7	1-1/2	Short	67673	M924-1000-1250-N1500-BN-L7
				4-5/8	Long	67842	M924-1000-1250-N4625-BN-L7
1-1/4	1-1/4	1-1/2	4-1/2	1-3/4	Short	67678	M924-1250-1500-N1750-BN
				2-1/2	Long	67847	M924-1250-1500-N2500-BN
			6	1-3/4	Short	67683	M924-1250-1500-N1750-BN-L6
				3-5/8	Long	67852	M924-1250-1500-N3625-BN-L6
			8	1-3/4	Short	67688	M924-1250-1500-N1750-BN-L8
				5-5/8	Long	67857	M924-1250-1500-N5625-BN-L8



**Model Code: M924NB**  
**4-Flute w/Ball End and Neck Relief**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach LBS l3	Neck Style	Order Code	EZ-ID Number M924-xxx-xxx-xxx-Lxxx d1 l2 R l1
6	6	12	75	18	Short	68606	M924-060-012-N018-BN
				39	Long	68097	M924-060-012-N039-BN
			100	18	Short	68607	M924-060-012-N018-BN-L100
				64	Long	68098	M924-060-012-N064-BN-L100
8	8	16	75	22	Short	68608	M924-080-016-N022-BN
				39	Long	68100	M924-080-016-N039-BN
			100	22	Short	68609	M924-080-016-N022-BN-L100
				64	Long	68101	M924-080-016-N064-BN-L100
10	10	12	72	18	Short	68610	M924-100-012-N018-BN
				32	Long	68102	M924-100-012-N032-BN
			100	18	Short	68611	M924-100-012-N018-BN-L100
				60	Long	68103	M924-100-012-N060-BN-L100
			150	18	Short	68612	M924-100-012-N018-BN-L150
				110	Long	68104	M924-100-012-N110-BN-L150
12	12	15	83	21	Short	68613	M924-120-015-N021-BN
				38	Long	68105	M924-120-015-N038-BN
			100	21	Short	68614	M924-120-015-N021-BN-L100
				55	Long	68106	M924-120-015-N055-BN-L100
			125	21	Short	68615	M924-120-015-N021-BN-L125
				80	Long	68107	M924-120-015-N080-BN-L125
			150	21	Short	68616	M924-120-015-N021-BN-L150
				105	Long	68108	M924-120-015-N105-BN-L150
16	16	20	110	26	Short	68617	M924-160-020-N026-BN
				62	Long	68109	M924-160-020-N062-BN
			150	26	Short	68618	M924-160-020-N026-BN-L150
				102	Long	68110	M924-160-020-N102-BN-L150
20	20	25	100	31	Short	68619	M924-200-025-N031-BN
				50	Long	68111	M924-200-025-N050-BN
			125	31	Short	68620	M924-200-025-N031-BN-L125
				75	Long	68112	M924-200-025-N075-BN-L125
			150	31	Short	68621	M924-200-025-N031-BN-L150
				100	Long	68113	M924-200-025-N100-BN-L150
25	25	32	120	38	Short	68622	M924-250-032-N038-BN
				64	Long	68114	M924-250-032-N064-BN
			150	38	Short	68623	M924-250-032-N038-BN-L150
				94	Long	68115	M924-250-032-N094-BN-L150

# M9 Series Application Guide - Speed & Feed (inch)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (SFM)	Feed (Inches per Tooth)						
							1/8	1/4	3/8	1/2	5/8	3/4	1
<b>P</b>	Low Carbon Steel 1018, 12L14, 8620	Slotting	1 x D	1 x D	4	350	.0006	.0013	.0019	.0026	.0032	.0038	.0051
		Peripheral - Rough	1.25 x D	.5 x D	4	425	.0008	.0016	.0024	.0032	.0040	.0048	.0064
		Peripheral - HEM	2 x D	.15 x D	4	525	.0015	.0031	.0046	.0061	.0077	.0092	.0123
		Finish	1.5 x D	.015 x D	4	500	.0009	.0018	.0027	.0036	.0044	.0053	.0071
	Medium Carbon Steels 4140, 4340	Slotting	1 x D	1 x D	4	300	.0006	.0012	.0018	.0024	.0030	.0036	.0048
		Peripheral - Rough	1.25 x D	.5 x D	4	375	.0008	.0015	.0023	.0030	.0038	.0045	.0060
		Peripheral - HEM	2 x D	.15 x D	4	475	.0014	.0028	.0042	.0056	.0070	.0084	.0112
		Finish	1.5 x D	.015 x D	4	450	.0008	.0017	.0025	.0033	.0042	.0050	.0067
	Martensitic Stainless Steel 416, 410, 440C	Slotting	.75 x D	1 x D	4	300	.0006	.0012	.0018	.0024	.0029	.0035	.0047
		Peripheral - Rough	1.25 x D	.3 x D	4	375	.0007	.0015	.0022	.0029	.0037	.0044	.0059
		Peripheral - HEM	2 x D	.15 x D	4	475	.0014	.0028	.0042	.0056	.0070	.0084	.0112
		Finish	1.5 x D	.015 x D	4	450	.0007	.0015	.0022	.0030	.0037	.0045	.0060
<b>K</b>	Cast Iron Gray	Slotting	1 x D	1 x D	4	325	.0006	.0012	.0018	.0024	.0030	.0036	.0048
		Peripheral - Rough	1.25 x D	.5 x D	4	400	.0008	.0015	.0023	.0030	.0038	.0045	.0060
		Peripheral - HEM	2 x D	.15 x D	4	500	.0013	.0026	.0039	.0053	.0066	.0079	.0105
		Finish	1.5 x D	.015 x D	4	475	.0008	.0017	.0025	.0033	.0042	.0050	.0067
	Cast Iron Ductile	Slotting	1 x D	1 x D	4	300	.0005	.0011	.0016	.0022	.0027	.0032	.0043
		Peripheral - Rough	1.25 x D	.5 x D	4	375	.0007	.0014	.0020	.0027	.0034	.0041	.0054
		Peripheral - HEM	2 x D	.15 x D	4	475	.0011	.0022	.0033	.0044	.0055	.0066	.0088
		Finish	1.5 x D	.015 x D	4	450	.0007	.0015	.0022	.0030	.0037	.0045	.0060
	Cast Iron Malleable	Slotting	.75 x D	1 x D	4	250	.0005	.0011	.0016	.0022	.0027	.0032	.0043
		Peripheral - Rough	1.25 x D	.5 x D	4	325	.0007	.0014	.0020	.0027	.0034	.0041	.0054
		Peripheral - HEM	2 x D	.15 x D	4	425	.0011	.0022	.0033	.0044	.0055	.0066	.0088
		Finish	1.5 x D	.015 x D	4	400	.0007	.0015	.0022	.0030	.0037	.0045	.0060
<b>M</b>	Austenitic Stainless Steels 303, 304, 316	Slotting	.75 x D	1 x D	4	275	.0007	.0013	.0020	.0026	.0033	.0039	.0052
		Peripheral - Rough	1.25 x D	.3 x D	4	325	.0008	.0016	.0025	.0033	.0041	.0049	.0065
		Peripheral - HEM	2 x D	.1 x D	4	425	.0016	.0031	.0047	.0063	.0078	.0094	.0125
		Finish	1.5 x D	.015 x D	4	400	.0008	.0017	.0025	.0033	.0042	.0050	.0067
	Precipitation Hardening Stainless Steels 17-4 PH, 15-5 PH, 13-8 PH	Slotting	.5 x D	1 x D	4	250	.0005	.0010	.0015	.0020	.0025	.0030	.0040
		Peripheral - Rough	1.25 x D	.3 x D	4	300	.0006	.0013	.0019	.0025	.0031	.0038	.0050
		Peripheral - HEM	1.5 x D	.1 x D	4	400	.0013	.0026	.0039	.0052	.0065	.0078	.0104
		Finish	1.5 x D	.015 x D	4	375	.0006	.0013	.0019	.0026	.0032	.0038	.0051
<b>H</b>	Tool & Die Steels < 48 Rc A2, D2, H13, P20	Slotting	.75 x D	1 x D	4	300	.0006	.0012	.0018	.0024	.0029	.0035	.0047
		Peripheral - Rough	1.25 x D	.3 x D	4	375	.0007	.0015	.0022	.0029	.0037	.0044	.0059
		Peripheral - HEM	2 x D	.15 x D	4	475	.0012	.0024	.0035	.0047	.0059	.0071	.0095
		Finish	1.5 x D	.015 x D	4	450	.0007	.0015	.0022	.0030	.0037	.0045	.0060
<b>S</b>	Titanium Alloys	Slotting	.5 x D	1 x D	4	250	.0005	.0010	.0015	.0020	.0025	.0030	.0040
		Peripheral - Rough	1.25 x D	.3 x D	4	300	.0006	.0013	.0019	.0025	.0031	.0038	.0050
		Peripheral - HEM	1.5 x D	.1 x D	4	400	.0012	.0024	.0036	.0048	.0060	.0072	.0096
		Finish	1.5 x D	.015 x D	4	375	.0006	.0013	.0019	.0026	.0032	.0038	.0051
	High Temperature Alloys Inconel, Haynes, Stellite, Hastalloy	Slotting	.25 x D	1 x D	4	60	.0005	.0011	.0016	.0021	.0027	.0032	.0042
		Peripheral - Rough	1.25 x D	.25 x D	4	90	.0007	.0013	.0020	.0027	.0033	.0040	.0053
		Peripheral - HEM	1.5 x D	.1 x D	4	225	.0009	.0018	.0027	.0035	.0044	.0053	.0071
		Finish	1.5 x D	.01 x D	4	125	.0008	.0016	.0023	.0031	.0039	.0047	.0062

D = Tool diameter

## Common Machining Formulas

$$RPM = \frac{SFM \times 3.82}{D}$$

$$SFM = RPM \times D \times .262$$

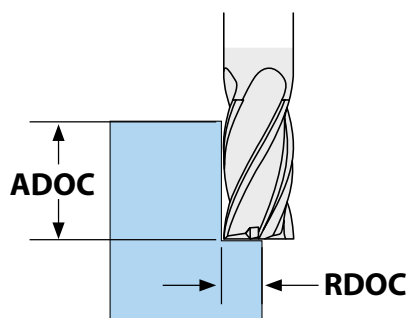
$$IPM = RPM \times IPT \times Z$$

$$MRR = RDOC \times ADOC \times IPM$$

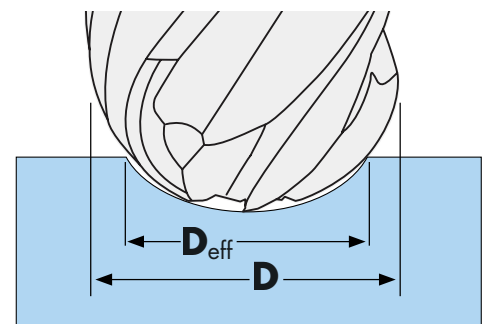
- D** Tool Cutting Diameter
- R** Tool Radius
- Z** Number of Flutes
- RPM** Revolutions per Minute
- SFM** Surface Feet per Minute
- IPM** Inches per Minute
- MRR** Metal Removal Rate
- RDOC** Radial Depth of Cut
- ADOC** Axial Depth of Cut

**Radial Chip Thinning Adjustment** 
$$IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$$

**Ball Nose "Effective Diameter"** 
$$D_{eff} = 2 \times \sqrt{R^2 - (R - ADOC)^2}$$



Apply chip thinning adjustment when RDOC < D



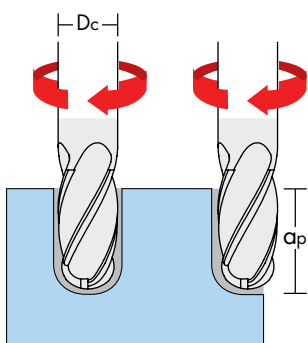
Use  $D_{eff}$  when making shallow cuts with full radius

# M9 Series Application Guide - Speed & Feed (metric)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (M/Min)	Feed (MM per Tooth)					
							6,0	10,0	12,0	16,0	20,0	25,0
<b>P</b>	Low Carbon Steel 1018, 12L14, 8620	Slotting	1 x D	1 x D	4	91	0.0152	0.0305	0.0506	0.061	0.0811	0.1012
		Peripheral - Rough	1.25 x D	.5 x D	4	114	0.0191	0.0381	0.0632	0.0762	0.1013	0.1265
			1.5 x D	.015 x D	4	137	0.0258	0.0517	0.0858	0.1034	0.1375	0.1716
	Medium Carbon Steels 4140, 4340	Slotting	1 x D	1 x D	4	91	0.015	0.0299	0.0497	0.0599	0.0796	0.0994
		Peripheral - Rough	1.25 x D	.5 x D	4	114	0.0187	0.0374	0.0621	0.0748	0.0995	0.1242
			1.5 x D	.015 x D	4	137	0.0233	0.0465	0.0772	0.093	0.1238	0.1545
	Martensitic Stainless Steel 416, 410, 440C	Slotting	.75 x D	1 x D	4	91	0.015	0.0299	0.0497	0.0599	0.0796	0.0994
		Peripheral - Rough	1.25 x D	.3 x D	4	114	0.0187	0.0374	0.0621	0.0748	0.0995	0.1242
			1.5 x D	.015 x D	4	137	0.0233	0.0465	0.0772	0.093	0.1238	0.1545
<b>K</b>	Cast Iron Gray	Slotting	1 x D	1 x D	4	107	0.0152	0.0305	0.0506	0.061	0.0811	0.1012
		Peripheral - Rough	1.25 x D	.5 x D	4	137	0.0191	0.0381	0.0632	0.0762	0.1013	0.1265
			1.5 x D	.015 x D	4	168	0.0258	0.0517	0.0858	0.1034	0.1375	0.1716
	Cast Iron Ductile	Slotting	1 x D	1 x D	4	99	0.0137	0.0274	0.0455	0.0549	0.073	0.0911
		Peripheral - Rough	1.25 x D	.5 x D	4	130	0.0171	0.0343	0.0569	0.0686	0.0912	0.1138
			1.5 x D	.015 x D	4	160	0.0233	0.0465	0.0772	0.093	0.1238	0.1545
	Cast Iron Malleable	Slotting	.75 x D	1 x D	4	91	0.0137	0.0274	0.0455	0.0549	0.073	0.0911
		Peripheral - Rough	1.25 x D	.5 x D	4	114	0.0171	0.0343	0.0569	0.0686	0.0912	0.1138
			1.5 x D	.015 x D	4	137	0.0233	0.0465	0.0772	0.093	0.1238	0.1545
<b>M</b>	Austenitic Stainless Steels 303, 304, 316	Slotting	.75 x D	1 x D	4	84	0.0166	0.0333	0.0552	0.0665	0.0885	0.1104
		Peripheral - Rough	1.25 x D	.3 x D	4	99	0.0208	0.0416	0.069	0.0831	0.1106	0.138
			1.5 x D	.015 x D	4	122	0.0258	0.0517	0.0858	0.1034	0.1375	0.1716
	Precipitation Hardening Stainless Steels 17-4 PH, 15-5 PH, 13-8 PH	Slotting	.5 x D	1 x D	4	76	0.0127	0.0255	0.0423	0.051	0.0678	0.0846
		Peripheral - Rough	1.25 x D	.3 x D	4	91	0.0159	0.0319	0.0529	0.0637	0.0848	0.1058
			1.5 x D	.015 x D	4	114	0.0198	0.0396	0.0658	0.0793	0.1054	0.1316
<b>H</b>	Tool & Die Steels < 48 Rc A2, D2, H13, P20	Slotting	.75 x D	1 x D	4	99	0.0152	0.0330	0.0508	0.0686	0.0864	0.1016
		Peripheral - Rough	1.25 x D	.3 x D	4	114	0.0203	0.0432	0.0660	0.0889	0.1118	0.1346
			1.5 x D	.015 x D	4	130	0.0178	0.0381	0.0557	0.0762	0.0935	0.1143
<b>S</b>	Titanium Alloys	Slotting	.5 x D	1 x D	4	76	0.0127	0.0255	0.0423	0.051	0.0678	0.0846
		Peripheral - Rough	1.25 x D	.3 x D	4	91	0.0159	0.0319	0.0529	0.0637	0.0848	0.1058
			1.5 x D	.015 x D	4	114	0.0198	0.0396	0.0658	0.0793	0.1054	0.1316
	High Temperature Alloys Inconel, Haynes, Stellite, Hastalloy	Slotting	.25 x D	1 x D	4	18	0.0135	0.027	0.0448	0.054	0.0718	0.0896
		Peripheral - Rough	1.25 x D	.25 x D	4	27	0.0169	0.0337	0.056	0.0675	0.0897	0.112
			1.5 x D	.01 x D	4	38	0.0198	0.0396	0.0658	0.0793	0.1054	0.1316

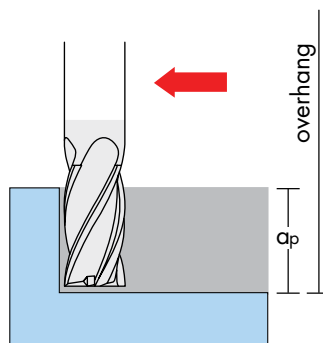
D = Tool diameter

**Adjustments** - Apply these adjustments when programming the following applications.



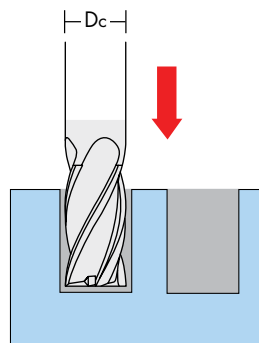
### 1. Ball nose end mills

- Reduce chip load by 25% from roughing/slotting recommendation when axial DOC ( $a_p$ ) exceeds 75% of  $D_c$



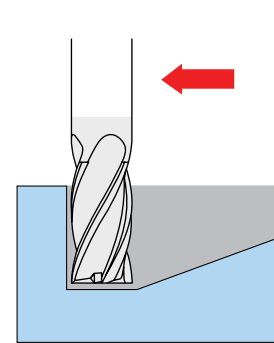
### 2. Long reach mills with large overhang

- Reduce speed rate and chip load by 20% each when total reach to tool diameter ratio is 5:1 or greater



### 3. Plunge entry into work piece

- Reduce chip load by 80% of recommended slotting rate
- Peck mill if axial DOC ( $a_p$ ) exceeds 50% of  $D_c$



### 4. Ramp entry into work piece

- Ramp at 1.5°–2.5° angle
- Reduce chip load by 20% of recommended slotting rate

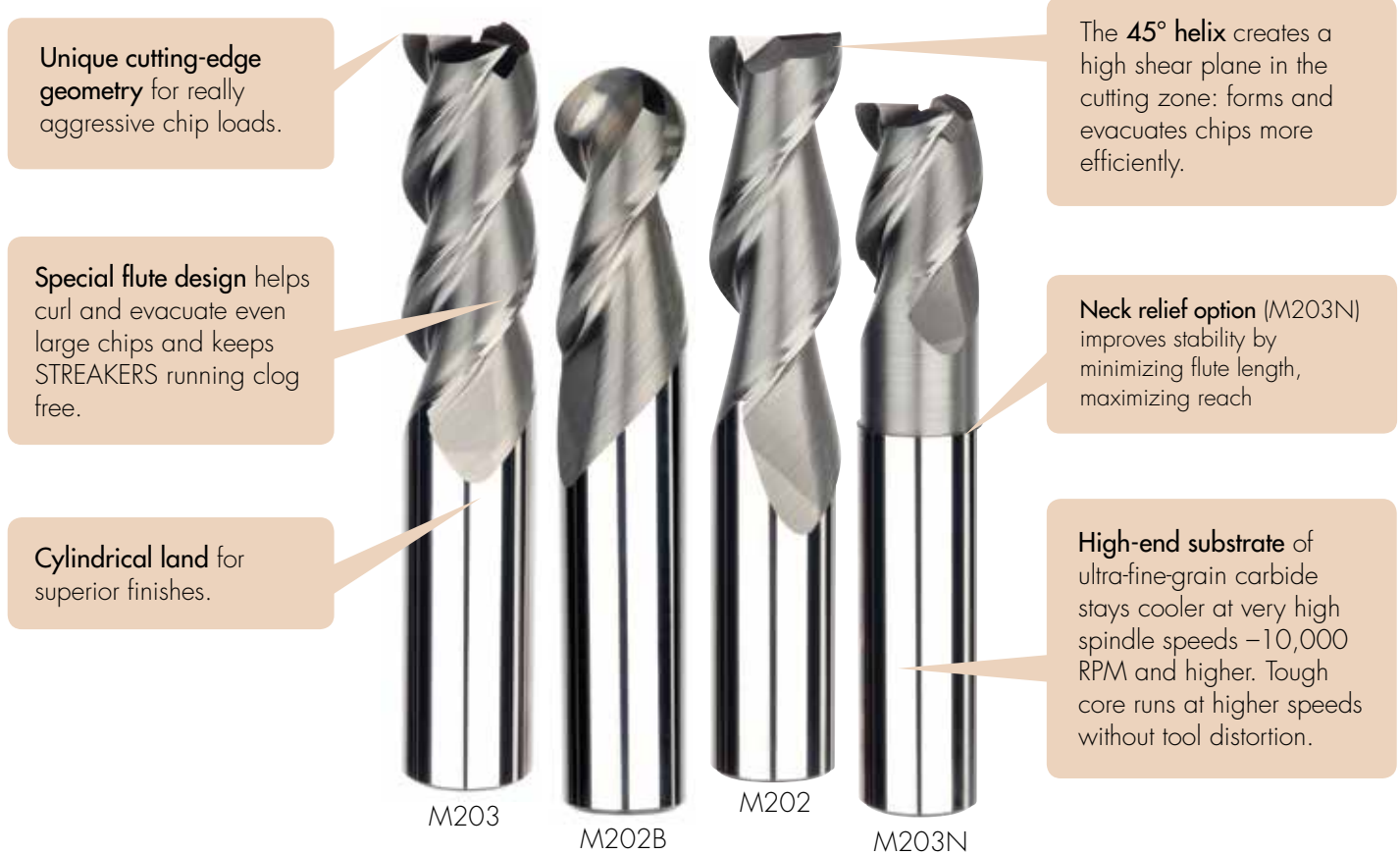
# STREAKERS® M2 Series

## Shear it and clear it.

IMCO's unique design makes STREAKERS end mills first-rate roughers and excellent finishers. Get high-volume metal removal without maxing horsepower, and powerful performance at speeds as low as 3,000 RPM and well above 10,000 RPM.



# STREAKERS M2 Series Features



## Options

### Corner radii

Ideal for aerospace and other industrial uses. Helps prevent cutting-end chipping.

### Square end

For general machining and finishing.

### Ball end

For precision contouring.

### H6 tolerance shanks

Fits all collets and conform to shrink-fit requirements. Some styles offered with flats for Weldon-style holders.

## Choose the length for the job.

**Extra rigidity** – Choose stub length.

**Medium-to-deep cuts** – Order standard, long or extra-long flute length and reach.

**Finishing passes** – Order extra-long flute length.

**Neck relief** - Better clearance in deep cavities, easier machining against tight walls.

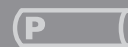
## Excellent performance in aluminum and non-ferrous metals.



The one-tool choice for roughing and finishing in these materials:

- Aluminum alloys
- Magnesium and copper alloys
- High silicon, die cast and extruded aluminum parts
- Composites

# Model Code: M203 3-Flute with Square End



# M203

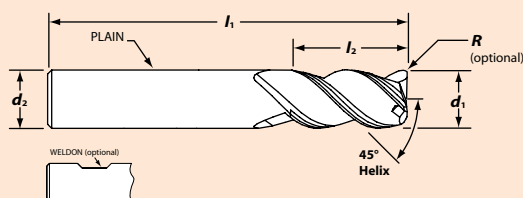
## Square End and Corner Radius



### 3-FLUTE

For high-performance milling in all types of aluminum and non-ferrous metals. Superior roughing tool and finisher, even on lower horsepower machinery.

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code	EZ-ID Number M203 - xxxx - xxxx - SQ d1 l2
1/8	1/8	1/4	1-1/2	Plain	32520	M203-0125-0250-SQ
		3/8	1-1/2	Plain	33246	M203-0125-0375-SQ
3/16	3/16	5/16	2	Plain	32521	M203-0187-0312-SQ
		9/16	2	Plain	33248	M203-0187-0562-SQ
1/4	1/4	3/8	2-1/2	Plain	32986	M203-0250-0375-SQ
		3/4	2-1/2	Plain	32992	M203-0250-0750-SQ
		3/4	2-1/2	Weldon	32634	M203-0250-0750-SQ-W
		1-1/4	3	Plain	33009	M203-0250-1250-SQ
5/16	5/16	1-1/4	3	Weldon	33011	M203-0250-1250-SQ-W
		7/16	2-1/2	Plain	32987	M203-0312-0437-SQ
		13/16	2-1/2	Plain	33250	M203-0312-0812-SQ
		13/16	2-1/2	Weldon	32736	M203-0312-0812-SQ-W
3/8	3/8	1-3/8	3	Plain	34454	M203-0312-1375-SQ
		1-3/8	3	Weldon	34455	M203-0312-1375-SQ-W
		1/2	2-1/2	Plain	32988	M203-0375-0500-SQ
		7/8	2-1/2	Weldon	32635	M203-0375-0875-SQ-W
1/2	1/2	1	2-1/2	Plain	32993	M203-0375-1000-SQ
		1-1/2	3-1/4	Plain	32998	M203-0375-1500-SQ
		1-1/2	3-1/4	Weldon	32702	M203-0375-1500-SQ-W
		2	4	Plain	33003	M203-0375-2000-SQ
		2	4	Weldon	32716	M203-0375-2000-SQ-W
		5/8	3	Plain	32989	M203-0500-0625-SQ
5/8	5/8	1-1/4	3	Plain	32994	M203-0500-1250-SQ
		1-1/4	3-1/4	Weldon	32637	M203-0500-1250-SQ-W
		2	4	Plain	32999	M203-0500-2000-SQ
		2	4	Weldon	32703	M203-0500-2000-SQ-W
		2-1/2	5	Plain	33004	M203-0500-2500-SQ
		2-1/2	5	Weldon	32718	M203-0500-2500-SQ-W
3/4	3/4	3-1/8	6	Plain	33013	M203-0500-3125-SQ
		3-1/8	6	Weldon	32830	M203-0500-3125-SQ-W
		3/4	3-1/2	Plain	32990	M203-0625-0750-SQ
		1-1/4	3-1/2	Weldon	32638	M203-0625-1250-SQ-W
		1-5/8	3-1/2	Plain	32995	M203-0625-1625-SQ
		2-1/2	5	Plain	33006	M203-0625-2500-SQ
1	1	2-1/2	5	Weldon	32720	M203-0625-2500-SQ-W
		3-3/4	6	Plain	33015	M203-0625-3750-SQ
		3-3/4	6	Weldon	32835	M203-0625-3750-SQ-W
		1	4	Plain	32991	M203-0750-1000-SQ
		1-5/8	4	Plain	32996	M203-0750-1625-SQ
		1-5/8	4	Weldon	32639	M203-0750-1625-SQ-W
3/4	3/4	2-1/2	5	Plain	33001	M203-0750-2500-SQ
		2-1/2	5	Weldon	32704	M203-0750-2500-SQ-W
		3-1/4	6	Plain	33007	M203-0750-3250-SQ
		3-1/4	6	Weldon	32724	M203-0750-3250-SQ-W
		4	6-1/2	Plain	33010	M203-0750-4000-SQ
		4	6-1/2	Weldon	32728	M203-0750-4000-SQ-W
1	1	1-1/4	4	Plain	33137	M203-1000-1250-SQ
		2	4	Plain	32997	M203-1000-2000-SQ
		2	4-1/2	Weldon	32701	M203-1000-2000-SQ-W
		2-5/8	5	Plain	33002	M203-1000-2625-SQ
		2-5/8	5	Weldon	32714	M203-1000-2625-SQ-W
		3-1/4	6	Plain	33008	M203-1000-3250-SQ
		3-1/4	6	Weldon	32726	M203-1000-3250-SQ-W
		4-1/8	7	Plain	33012	M203-1000-4125-SQ
4-1/8	7	Weldon	32735	M203-1000-4125-SQ-W		



Optional coatings for aluminum machining (Zn, TiCN, TiB2, DLC) are available by special order

**Coatings:**  
None (MG)

**in** d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
**mm** d1 +0,000 / -0,050 d2 -0,0025 / -0,0100

**Model Code: M203**  
**3-Flute with Square End**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code	EZ-ID Number M203 - xxx - xxx - SQ d1 l2
3	3	5	38	Plain	32522	M203-030-005-SQ
		6	50	Plain	32524	M203-040-006-SQ
4	4	11	50	Plain	33167	M203-040-011-SQ
		6	50	Plain	32525	M203-050-006-SQ
5	5	13	50	Plain	33169	M203-050-013-SQ
		7	54	Plain	32526	M203-060-007-SQ
6	6	16	57	Plain	33170	M203-060-016-SQ
		29	75	Plain	34302	M203-060-029-SQ
		9	58	Plain	32527	M203-080-009-SQ
8	8	19	63	Plain	33172	M203-080-019-SQ
		29	75	Plain	34303	M203-080-029-SQ
		11	66	Plain	32528	M203-100-011-SQ
10	10	22	72	Plain	33174	M203-100-022-SQ
		40	88	Plain	34311	M203-100-040-SQ
		12	73	Plain	32529	M203-120-012-SQ
12	12	26	83	Plain	33175	M203-120-026-SQ
		50	100	Plain	34305	M203-120-050-SQ
		14	83	Plain	33176	M203-140-026-SQ
14	14	16	82	Plain	32530	M203-160-016-SQ
		32	92	Plain	33177	M203-160-032-SQ
		57	125	Plain	34306	M203-160-057-SQ
16	16	20	92	Plain	32502	M203-200-020-SQ
		38	104	Plain	33179	M203-200-038-SQ
		57	125	Plain	34307	M203-200-057-SQ

## CASE STUDY

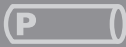
# Improved Productivity and Surface Finish.

Cycle time was a critical problem for a customer machining aluminum using a competitor's 3-flute end mill at 1,300 SFM and 60 IPM with an axial and radial cut of .125". Switching to a STREAKERS end mill allowed running at 90 IPM and increasing the axial and radial depths of cut to .265". That cut cycle time by 15 minutes – a 50% feed rate increase.



# Model Code: M203

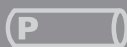
## 3-Flute with Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code by Corner Radius (R)								EZ-ID Number		
					.015 CR	.030 CR	.060 CR	.090 CR	.125 CR	.156 CR	.190 CR	.250 CR	M203 - xxxx - xxxx - xxx d1 l2 R		
1/8	1/8	3/8	1-1/2	Plain	34384									M203-0125-0375-015	
3/16	3/16	9/16	2	Plain	34385									M203-0187-0562-015	
1/4	1/4	3/8	2-1/2	Plain	33601	33602								M203-0250-0375-xxx	
		3/4	2-1/2	Plain	34386	34388								M203-0250-0750-xxx	
		3/4	2-1/2	Weldon	34387	34389								M203-0250-0750-xxx-W	
		1-1/4	3	Plain	34435	34438								M203-0250-1250-xxx	
		1-1/4	3	Weldon	34437	34447								M203-0250-1250-xxx-W	
		13/16	2-1/2	Plain	34450	34452	38258								M203-0312-0812-xxx
5/16	5/16	13/16	2-1/2	Weldon	34451	34453	38318							M203-0312-0812-xxx-W	
		1-3/8	3	Plain		38031	38260							M203-0312-1375-xxx	
		1-3/8	3	Weldon		38319	38056							M203-0312-1375-xxxW	
		1/2	2-1/2	Plain	33603	33604	33605							M203-0375-0500-xxx	
3/8	3/8	7/8	2-1/2	Weldon	34459	34461	38320							M203-0375-0875-xxx-W	
		1	2-1/2	Plain	34458	34460	38261							M203-0375-1000-xxx	
		1-1/2	3-1/4	Plain	34462	34480	38262							M203-0375-1500-xxx	
		1-1/2	3-1/4	Weldon	34463	34482	38321							M203-0375-1500-xxx-W	
		2	4	Plain	34484	34488	38263								M203-0375-2000-xxx
		2	4	Weldon	34486	34490	38322								M203-0375-2000-xxx-W
1/2	1/2	5/8	3	Plain	33606	33607	33608	33609	33610					M203-0500-0625-xxx	
		1-1/4	3	Plain	34492	34522	34526	38022	38025					M203-0500-1250-xxx	
		1-1/4	3-1/4	Weldon	34494	34523	34527	38050	38051					M203-0500-1250-xxx-W	
		2	4	Plain	34531	34534	34537	38032	38033					M203-0500-2000-xxx	
		2	4	Weldon	34533	34535	34538	38057	38058					M203-0500-2000-xxx-W	
		2-1/2	5	Plain		34539	38038	38039	38040						M203-0500-2500-xxx
		2-1/2	5	Weldon		34541	38063	38064	38065						M203-0500-2500-xxx-W
		3-1/8	6	Plain		34543	38045	38046	38047						M203-0500-3125-xxx
5/8	5/8	3-1/8	6	Weldon		34544	38070	38071	38072					M203-0500-3125-xxx-W	
		1-1/4	3-1/2	Weldon		34546	38323	38324	38325					M203-0625-1250-xxx-W	
		1-5/8	3-1/2	Plain		34545	38264	38265	38266					M203-0625-1625-xxx	
		2-1/2	5	Plain		34549	38267	38268	38269					M203-0625-2500-xxx	
		2-1/2	5	Weldon		34550	38328	38329	38330					M203-0625-2500-xxx-W	
		3-3/4	6	Plain		34551	38270	38271	38272						M203-0625-3750-xxx
3/4	3/4	3-3/4	6	Weldon		34552	38332	38333	38335					M203-0625-3750-xxx-W	
		1	4	Plain		33611	33612	33613	33614	33615	33616			M203-0750-1000-xxx	
		1-5/8	4	Plain		34553	34555	38027	38028	38273	38274			M203-0750-1625-xxx	
		1-5/8	4	Weldon		34554	34557	38052	38053	38336	38337			M203-0750-1625-xxx-W	
		2-1/2	5	Plain		34558	38034	38035	38036	38275	38276			M203-0750-2500-xxx	
		2-1/2	5	Weldon		34559	38059	38060	38061	38338	38340			M203-0750-2500-xxx-W	
1	1	3-1/4	6	Plain		34560	38041	38042	38043	38277	38278			M203-0750-3250-xxx	
		3-1/4	6	Weldon		34561	38066	38067	38068	38341	38345			M203-0750-3250-xxx-W	
		2	4	Plain		34562	34563	38029	38030	38279	38280	38281		M203-1000-2000-xxx	
		2	4-1/2	Weldon		38054	38055	38376	38377	38378	38379	38380		M203-1000-2000-xxx-W	
		2-5/8	5	Plain		34568	38037	38282	38283	38284	38285	38286		M203-1000-2625-xxx	
		2-5/8	5	Weldon		34569	38062	38346	38347	38348	38349	38350		M203-1000-2625-xxx-W	
		3-1/4	6	Plain		34584	38044	38287	38288	38289	38290	38291		M203-1000-3250-xxx	
		3-1/4	6	Weldon		34586	38069	38351	38352	38353	38354	38355		M203-1000-3250-xxx-W	
1	1	4-1/8	7	Plain		38048	38049	38292	38293	38294	38295	38296		M203-1000-4125-xxx	
		4-1/8	7	Weldon		38073	38074	38356	38357	38358	38359	38360		M203-1000-4125-xxx-W	



**Model Code: M203**  
**3-Flute with Corner Radius**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code by Corner Radius (R)				EZ-ID Number M203 - xxx - xxx - xxx d1 l2 R
					0,3 CR	0,5 CR	0,75 CR	1,0 CR	
3	3	5	38	Plain	34857				M203-030-005-030
4	4	11	50	Plain	34858				M203-040-011-030
5	5	13	50	Plain	34859				M203-050-013-030
6	6	16	57	Plain	34860	34862			M203-060-016-xxx
		29	75	Plain	34864	34866			M203-060-029-xxx
8	8	19	63	Plain	34868	34870			M203-080-019-xxx
		29	75	Plain		34872			M203-080-029-050
10	10	22	72	Plain	34874	34876			M203-100-022-xxx
		40	88	Plain	34878	34880			M203-100-040-xxx
12	12	26	83	Plain		34882	34884	34886	M203-120-026-xxx
		50	100	Plain		34888		34890	M203-120-050-xxx
16	16	32	92	Plain			34892	34894	M203-160-032-xxx
		57	125	Plain				34896	M203-160-057-100
20	20	38	104	Plain			34898	34900	M203-200-038-xxx
		57	125	Plain				36583	M203-200-057-100

## TOOL TIP

### 3-FLUTE STREAKERS:

# 3's a Charm.

There are several reasons to use the 3-flute version of STREAKERS end mills: more stability in the cut, less power draw through the spindle and a great finish. The center-cutting design allows the 3-flute STREAKERS to ramp and plunge into parts, and it works great in many non-ferrous materials.



# M203N

## Square End and Corner Radius w/Neck Relief



### 3-FLUTE

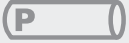
M203N permits clearance in deeper cavities and easier machining against tight walls. Neck relief and short flute length combine to increase end mill stability in the cut for more precise tolerances.

## Model Code: M203N 3-Flute with Square End and Neck Relief

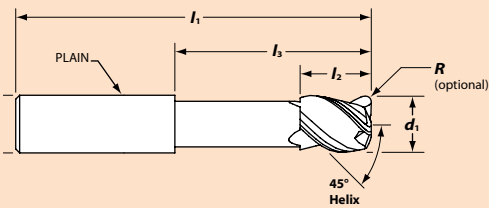


Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Order Code	EZ-ID Number
						M203 - xxxx - xxxx - Nxxxx - SQ d1 l2 l3
1/4	1/4	3/8	2-1/2	1-1/8	33034	M203-0250-0375-N1125-SQ
			3	1-5/8	33121	M203-0250-0375-N1625-SQ
			4	2-1/4	33110	M203-0250-0375-N2250-SQ
3/8	3/8	1/2	2-1/2	1-1/8	33035	M203-0375-0500-N1125-SQ
			3	1-3/4	33122	M203-0375-0500-N1750-SQ
			4	2-1/4	33112	M203-0375-0500-N2250-SQ
1/2	1/2	5/8	3	1-3/8	33036	M203-0500-0625-N1375-SQ
			4	2-1/4	33123	M203-0500-0625-N2250-SQ
			5	2-3/8	33114	M203-0500-0625-N2375-SQ
			6	3-3/8	33048	M203-0500-0625-N3375-SQ
5/8	5/8	3/4	3-1/2	1-1/2	33038	M203-0625-0750-N1500-SQ
			5	2-1/4	33124	M203-0625-0750-N2250-SQ
			6	3-3/8	33116	M203-0625-0750-N3375-SQ
3/4	3/4	1	4	1-3/4	33039	M203-0750-1000-N1750-SQ
			5	2-1/4	33125	M203-0750-1000-N2250-SQ
			6	3-3/8	33118	M203-0750-1000-N3375-SQ
1	1	1-1/8	4	1-7/8	33040	M203-1000-1125-N1875-SQ
			5	2-1/4	33126	M203-1000-1250-N2250-SQ
		1-1/4	6	3-3/8	33120	M203-1000-1250-N3375-SQ
			7	4-3/8	33049	M203-1000-1250-N4375-SQ

## Model Code: M203N 3-Flute with Square End and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Order Code	EZ-ID Number
						M203 - xxx - xxx - Nxxx - SQ d1 l2 l3
6	6	8	57	20	33041	M203-060-008-N020-SQ
			75	40	37262	M203-060-008-N040-SQ
8	8	10	63	26	33042	M203-080-010-N026-SQ
			72	31	33043	M203-100-012-N031-SQ
10	10	12	100	50	33128	M203-100-012-N050-SQ
			83	37	33044	M203-120-014-N037-SQ
12	12	14	125	70	33129	M203-120-014-N070-SQ
			92	41	33045	M203-160-018-N041-SQ
16	16	18	150	90	33131	M203-160-018-N090-SQ
			104	47	33046	M203-200-024-N047-SQ
20	20	24	150	90	37302	M203-200-024-N090-SQ

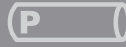


Optional coatings for aluminum machining (ZrN, TiCN, TiB2, DLC) are available by special order

Coatings:  
None (MG)

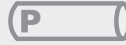
in d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
mm d1 +0,000 / -0,050 d2 -0,0025 / -0,0100

## Model Code: M203N 3-Flute with Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Order Code by Corner Radius (R)								EZ-ID Number			
					.015 CR	.030 CR	.060 CR	.090 CR	.125 CR	.156 CR	.190 CR	.250 CR	M203 - xxxx - xxxx - Nxxxx - xxx d1 l2 l3 R			
1/4	1/4	3/8	2-1/2	1-1/8	34782	34784									M203-0250-0375-N1125-xxx	
			3	1-5/8	34786	34788									M203-0250-0375-N1625-xxx	
			4	2-1/4	34790	34792										M203-0250-0375-N2250-xxx
3/8	3/8	1/2	2-1/2	1-1/8	34794	34796	38111								M203-0375-0500-N1125-xxx	
			3	1-3/4	34797	34798	38112								M203-0375-0500-N1750-xxx	
			4	2-1/4	34799	34800	38113								M203-0375-0500-N2250-xxx	
1/2	1/2	5/8	3	1-3/8	34801	34802	38114	38115	38116						M203-0500-0625-N1375-xxx	
			4	2-1/4	34803	34804	38117	38118	38119						M203-0500-0625-N2250-xxx	
			5	2-3/8	34805	34806	38120	38121	38122						M203-0500-0625-N2375-xxx	
			6	3-3/8	34826	34827	38123	38124	38125						M203-0500-0625-N3375-xxx	
5/8	5/8	3/4	3-1/2	1-1/2		34828	38126	38127	38128						M203-0625-0750-N1500-xxx	
			5	2-1/4		34829	38129	38130	38131						M203-0625-0750-N2250-xxx	
			6	3-3/8		34830	38132	38133	38134						M203-0625-0750-N3375-xxx	
3/4	3/4	1	4	1-3/4		34837	38135	38136	38137	38138	38139				M203-0750-1000-N1750-xxx	
			5	2-1/4		34838	38140	38141	38142	38143	38144				M203-0750-1000-N2250-xxx	
			6	3-3/8		34839	38145	38146	38147	38148	38149				M203-0750-1000-N3375-xxx	
1	1	1-1/8	4	1-7/8		34840	38150	38151	38152	38153	38154	38155			M203-1000-1125-N1875-xxx	
			5	2-1/4		34847	38156	38157	38158	38159	38160	38161			M203-1000-1250-N2250-xxx	
		1-1/4	6	3-3/8		34848	38162	38163	38164	38165	38166	38167			M203-1000-1250-N3375-xxx	
			7	4-3/8		34849	38168	38169	38170	38171	38172	38173			M203-1000-1250-N4375-xxx	

## Model Code: M203N 3-Flute with Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Order Code by Corner Radius (R)			EZ-ID Number				
					0,3 CR	0,5 CR	1,0 CR	M203 - xxx - xxx - Nxxx - xxx d1 l2 R l1				
6	6	8	57	20	37261							M203-060-008-N020-030
			75	40	37264							M203-060-008-N040-030
8	8	10	63	26		37266						M203-080-010-N026-050
10	10	12	72	31		37268						M203-100-012-N031-050
			100	50		37274						
12	12	14	83	37			37276					M203-120-014-N037-100
			125	70			37278					
16	16	18	92	41			37280					M203-160-018-N041-100
			150	90			37281					
20	20	24	104	47			37301					M203-200-024-N047-100
			150	90			37328					



# M202

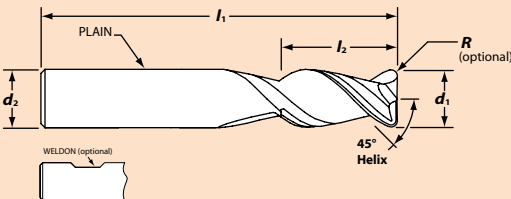
## Square End and Corner Radius



### 2-FLUTE

For high-performance milling in all types of aluminum including high silicon, die cast and extruded aluminum parts.

The 2-flute design allows maximum flute-to-flute spacing for greater stock removal and effective chip evacuation – ideal when you're going deep into the metal to remove material incrementally.



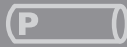
Optional coatings for aluminum machining (ZrN, TiCN, TiB2, DLC) are available by special order

**Coatings:**  
None (MG)

**in** d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
**mm** d1 +0,000 / -0,050 d2 -0,0025 / -0,0100

Cutter Dia d1	Shank Dia d2	Length of Cut L2	Overall Length L1	Shank Style	Order Code	EZ-ID Number M202 - xxxx - xxxx - SQ d1 L2		
1/8	1/8	1/4	1-1/2	Plain	32941	M202-0125-0250-SQ		
		3/8	1-1/2	Plain	32949	M202-0125-0375-SQ		
3/16	3/16	5/16	2	Plain	32942	M202-0187-0312-SQ		
		9/16	2	Plain	32950	M202-0187-0562-SQ		
1/4	1/4	3/8	2-1/2	Plain	32943	M202-0250-0375-SQ		
		3/4	2-1/2	Plain	32951	M202-0250-0750-SQ		
				Weldon	32430	M202-0250-0750-SQ-W		
		1-1/4	3	Plain	32957	M202-0250-1250-SQ		
5/16	5/16	7/16	2-1/2	Plain	32944	M202-0312-0437-SQ		
		13/16	2-1/2	Plain	32952	M202-0312-0812-SQ		
				Weldon	32431	M202-0312-0812-SQ-W		
		1-3/8	3	Plain	32958	M202-0312-1375-SQ		
				Weldon	32445	M202-0312-1375-SQ-W		
				3/8	3/8	1/2	2-1/2	Plain
1	2-1/2	Plain	32953			M202-0375-1000-SQ		
7/8	2-1/2	Weldon	32432			M202-0375-0875-SQ-W		
				1-1/2	3-1/4	Plain	32959	M202-0375-1500-SQ
						Weldon	32446	M202-0375-1500-SQ-W
				2	4	Plain	32964	M202-0375-2000-SQ
						Weldon	32510	M202-0375-2000-SQ-W
1/2	1/2	5/8	3	Plain	32946	M202-0500-0625-SQ		
				Weldon	32434	M202-0500-1000-SQ-W		
		1-1/4	3	Plain	90358	M202-0500-1250-SQ		
				Weldon	32606	M202-0500-1250-SQ-W		
		2	4	Plain	32960	M202-0500-2000-SQ		
				Weldon	32447	M202-0500-2000-SQ-W		
		2-1/2	5	Plain	32965	M202-0500-2500-SQ		
				Weldon	32512	M202-0500-2500-SQ-W		
		3-1/8	6	Plain	38390	M202-0500-3125-SQ		
				Weldon	38391	M202-0500-3125-SQ-W		
5/8	5/8	3/4	3-1/2	Plain	32947	M202-0625-0750-SQ		
		1-1/4	3-1/2	Weldon	32436	M202-0625-1250-SQ-W		
		1-5/8	3-1/2	Plain	32954	M202-0625-1625-SQ		
		2-1/2	5	Plain	32966	M202-0625-2500-SQ		
Weldon	32514			M202-0625-2500-SQ-W				
				3-3/4	6	Plain	38504	M202-0625-3750-SQ
						Weldon	38505	M202-0625-3750-SQ-W
				1	4	Plain	32948	M202-0750-1000-SQ
						Weldon	32955	M202-0750-1625-SQ
				1-5/8	4	Plain	32504	M202-0750-1625-SQ-W
						Weldon	32962	M202-0750-2500-SQ
3/4	3/4	2-1/2	5	Plain	32506	M202-0750-2500-SQ-W		
				Weldon	32968	M202-0750-3250-SQ		
		3-1/4	6	Plain	32516	M202-0750-3250-SQ-W		
				Weldon	33143	M202-1000-1250-SQ		
1	1	1-1/4	4	Plain	32956	M202-1000-2000-SQ		
				Weldon	32450	M202-1000-2000-SQ-W		
		2	4-1/2	Plain	32963	M202-1000-2625-SQ		
				Weldon	32508	M202-1000-2625-SQ-W		
2-5/8	5	Plain	32969	M202-1000-3250-SQ				
		Weldon	32518	M202-1000-3250-SQ-W				

**Model Code: M202**  
**2-Flute with Square End**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code	EZ-ID Number M202 - xxx - xxx - SQ d1 l2
3	3	5	38	Plain	32971	M202-030-005-SQ
4	4	6	50	Plain	32972	M202-040-006-SQ
		11	50	Plain	36974	M202-040-011-SQ
5	5	6	50	Plain	32973	M202-050-006-SQ
		13	50	Plain	36976	M202-050-013-SQ
6	6	7	54	Plain	32974	M202-060-007-SQ
		16	57	Plain	62402	M202-060-016-SQ
8	8	9	58	Plain	32975	M202-080-009-SQ
		19	63	Plain	62403	M202-080-019-SQ
10	10	11	66	Plain	32976	M202-100-011-SQ
		22	72	Plain	62404	M202-100-022-SQ
12	12	12	73	Plain	32977	M202-120-012-SQ
		26	83	Plain	62406	M202-120-026-SQ
14	14	26	83	Plain	62407	M202-140-026-SQ
16	16	16	82	Plain	32978	M202-160-016-SQ
		32	92	Plain	62408	M202-160-032-SQ
20	20	20	92	Plain	32979	M202-200-020-SQ
		38	104	Plain	62410	M202-200-038-SQ

## TECH TALK

### Precision Processes for Precision Tools.

IMCO's toolmakers work diligently to maintain consistency and repeatability in every tool we make, so that you get the same consistency and repeatability in your production operation. We support these efforts with the latest CNC measuring technology and process controls to ensure the highest possible quality in every tool.

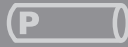
We make every cutting tool to exacting specifications under tightly controlled conditions, using CNC high-precision grinders and the latest in industrial diamond grinding technology. Precise process controls adhere to design tolerances, maintaining reliable consistency across the board.

The result: premium performance in every respect, from maximum metal removal to exceptional surface finish and unsurpassed tool life.



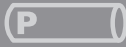
# Model Code: M202

## 2-Flute with Corner Radius



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code by Corner Radius (R)								EZ-ID Number M202 - xxxx - xxxx - xxx d1 l2 R				
					.015 CR	.030 CR	.060 CR	.090 CR	.125 CR	.156 CR	.190 CR	.250 CR					
1/8	1/8	3/8	1-1/2	Plain	33526										M202-0125-0375-015		
3/16	3/16	9/16	2	Plain	33542										M202-0187-0562-015		
1/4	1/4	3/4	2-1/2	Plain	33544	33548									M202-0250-0750-xxx		
				Weldon	33546	33550									M202-0250-0750-xxx-W		
		1-1/4	3	Plain	33552	34382										M202-0250-1250-xxx	
				Weldon	33566	34383											M202-0250-1250-xxx-W
5/16	5/16	13/16	2-1/2	Plain	33629	34362	38381								M202-0312-0812-xxx		
				Weldon	33630	34363	38382										M202-0312-0812-xxx-W
		1-3/8	3	Plain		38079	38383									M202-0312-1375-xxx	
				Weldon		38098	38384										M202-0312-1375-xxx-W
3/8	3/8	7/8	2-1/2	Weldon	33649	33691	33692								M202-0375-0875-xxx-W		
				Plain	33648	33689	38385										M202-0375-1000-xxx
		1-1/2	3-1/4	Plain	33693	33886	38386									M202-0375-1500-xxx	
				Weldon	33694	33887	38387										M202-0375-1500-xxx-W
		2	4	Plain	34100	34144	38388										M202-0375-2000-xxx
				Weldon	34101	34145	38389										
1/2	1/2	1	3	Weldon			34359								M202-0500-1000-030-W		
				Plain	34146	34161	34196	38075	38076								M202-0500-1250-xxx
		1-1/4	3-1/4	Weldon	34147	34162	34197	38092									M202-0500-1250-xxx-W
				Plain	34198	34204	34206	38080	38081								M202-0500-2000-xxx
		2	4	Weldon	34199	34205	34207	38099	38100								M202-0500-2000-xxx-W
				Plain		34235	38085	38086	38087								M202-0500-2500-xxx
		2-1/2	5	Weldon		34236	38104	38105	38106								M202-0500-2500-xxx-W
				Plain		38392	38394	38397	38399								M202-0500-3125-xxx
3-1/8	6	Weldon		38393	38395	38398	38400								M202-0500-3125-xxx-W		
		Plain		34238	38485	38487	38489								M202-0625-1250-xxx-W		
5/8	5/8	1-1/4	3-1/2	Weldon											M202-0625-1625-xxx		
				Plain	34237	38490	38492	38494								M202-0625-2500-xxx	
		2-1/2	5	Plain	34243	38496	38500	38502								M202-0625-2500-xxx-W	
				Weldon	34244	38498	38501	38503								M202-0625-2500-xxx-W	
		3-3/4	6	Plain		38506	38508	38510	38512								M202-0625-3750-xxx
				Weldon		38507	38509	38511	38513								M202-0625-3750-xxx-W
3/4	3/4	1-5/8	4	Plain	34245	34262	38077	38078	38514	38516					M202-0750-1625-xxx		
				Weldon	34246	34263	38094	38095	38515	38517							M202-0750-1625-xxx-W
		2-1/2	5	Plain	34343	38082	38083	38084	38518	38520						M202-0750-2500-xxx	
				Weldon	34344	38101	38102	38103	38519	38521							M202-0750-2500-xxx-W
		3-1/4	6	Plain	34345	38088	38089	38090	38522	38524							M202-0750-3250-xxx
				Weldon	34346	38107	38108	38109	38523	38525							
1	1	2	4	Plain	34351	34353	38526	38528	38530	38532	38534				M202-1000-2000-xxx		
				Weldon	38096	38097	38527	38529	38531	38533	38535						M202-1000-2000-xxx-W
		2-5/8	5	Plain	34352	34355	38536	38538	38540	38542	38544					M202-1000-2625-xxx	
				Weldon	34354	34356	38537	38539	38541	38543	38545						M202-1000-2625-xxx-W
		3-1/4	6	Plain	34357	38091	38546	38548	38550	38552	38554						M202-1000-3250-xxx
				Weldon	34358	38110	38547	38549	38551	38553	38555						

**Model Code: M202**  
**2-Flute with Corner Radius**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code by Corner Radius (R)				EZ-ID Number
					0,3 CR	0,5 CR	0,75 CR	1,0 CR	M202 - xxx - xxx - xxx d1 l2 R
3	3	5	38	Plain	36973				M202-030-005-030
4	4	11	50	Plain	36975				M202-040-011-030
5	5	13	50	Plain	36977				M202-050-013-030
6	6	16	57	Plain	36978	36980			M202-060-016-xxx
8	8	19	63	Plain	36982	36984			M202-080-019-xxx
10	10	22	72	Plain	37043	37047			M202-100-022-xxx
12	12	26	83	Plain		37049	37052	37084	M202-120-026-xxx
16	16	32	92	Plain			37101	37161	M202-160-032-xxx
20	20	38	104	Plain			37170	37180	M202-200-038-xxx

## TOOL TIP

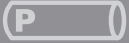
# Choosing the Right Tool Holder

IMCO's tools are designed and tested in all types of holders to meet the needs of our customers' shops. The h6 shank tolerances meet the requirements for press-fit and shrink-fit systems and eliminate run-out issues when using milling chucks and collets. Most IMCO tools are also offered with precision-ground flats to improve performance when the tool is used in an end mill holder with a side-locking set screw.

Whatever your choice in holders, it is important to always take the time to indicate a new tool in the spindle to ensure the total indicator run-out (TIR) is minimized, so you get maximum performance from our tools.



**Model Code: M202N**  
**2-Flute with Square End and Neck Relief**



# M202N

## Square End and Corner Radius w/Neck Relief

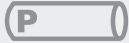


### 2-FLUTE

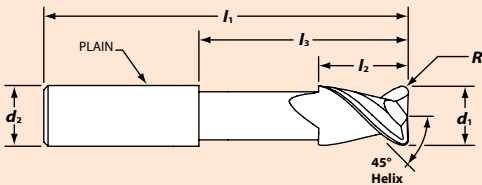
M202N permits clearance in deeper cavities and easier machining against tight walls. Neck relief and short flute length combine to increase end mill stability in the cut for more precise tolerances.

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach LBS l3	Order Code	EZ-ID Number				
						M202	- xxxx -	xxxx -	Nxxxx - SQ	
						d1	l2	l3		
1/4	1/4	3/8	2-1/2	1-1/8	32935	M202	-0250	-0375	-N1125	-SQ
					33016	M202	-0250	-0375	-N1625	-SQ
					33023	M202	-0250	-0375	-N2250	-SQ
3/8	3/8	1/2	2-1/2	1-1/8	32936	M202	-0375	-0500	-N1125	-SQ
					33018	M202	-0375	-0500	-N1750	-SQ
					33024	M202	-0375	-0500	-N2250	-SQ
1/2	1/2	5/8	3-1/2	1-1/2	32937	M202	-0500	-0625	-N1375	-SQ
					33019	M202	-0500	-0625	-N2250	-SQ
					33025	M202	-0500	-0625	-N2375	-SQ
					33032	M202	-0500	-0625	-N3375	-SQ
5/8	5/8	3/4	3-1/2	1-1/2	32938	M202	-0625	-0750	-N1500	-SQ
					33020	M202	-0625	-0750	-N2250	-SQ
					33026	M202	-0625	-0750	-N3375	-SQ
3/4	3/4	1	4	1-3/4	32939	M202	-0750	-1000	-N1750	-SQ
					33021	M202	-0750	-1000	-N2250	-SQ
					33027	M202	-0750	-1000	-N3375	-SQ
1	1	1-1/8	4	1-7/8	32940	M202	-1000	-1125	-N1875	-SQ
					33022	M202	-1000	-1250	-N2250	-SQ
		1-1/4			33028	M202	-1000	-1250	-N3375	-SQ
					33033	M202	-1000	-1250	-N4375	-SQ

**Model Code: M202N**  
**2-Flute with Square End and Neck Relief**



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Order Code	EZ-ID Number				
						M202	- xxx -	xxx -	Nxxx - SQ	
						d1	l2	l3		
6	6	8	57	20	32402	M202	-060	-008	-N020	-SQ
					37201	M202	-060	-008	-N040	-SQ
8	8	10	63	26	32404	M202	-080	-010	-N026	-SQ
					32406	M202	-100	-012	-N031	-SQ
10	10	12	72	31	33029	M202	-100	-012	-N050	-SQ
					32408	M202	-120	-014	-N037	-SQ
12	12	14	83	37	33030	M202	-120	-014	-N070	-SQ
					32410	M202	-160	-018	-N041	-SQ
16	16	18	92	41	33031	M202	-160	-018	-N090	-SQ
					32412	M202	-200	-024	-N047	-SQ
20	20	24	104	47	37228	M202	-200	-024	-N090	-SQ



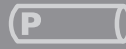
Optional coatings for aluminum machining (ZrN, TiCN, TiB2, DLC) are available by special order

**Coatings:**  
None (MG)

**in** d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
**mm** d1 +0,000 / -0,050 d2 -0,0025 / -0,0100

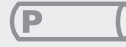


## Model Code: M202N 2-Flute with Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Order Code by Corner Radius (R)								EZ-ID Number			
					.015 CR	.030 CR	.060 CR	.090 CR	.125 CR	.156 CR	.190 CR	.250 CR	M202 - xxx - xxx - Nxxx - xxx	d1	l2	l3
1/4	1/4	3/8	2-1/2	1-1/8	34622	34623								M202-0250-0375-N1125-xxx		
			3	1-5/8	34626	34627								M202-0250-0375-N1625-xxx		
			4	2-1/4	34631	34633									M202-0250-0375-N2250-xxx	
3/8	3/8	1/2	2-1/2	1-1/8	34634	34635	38194							M202-0375-0500-N1125-xxx		
			3	1-3/4	34637	34638	38195								M202-0375-0500-N1750-xxx	
			4	2-1/4	34639	34643	38196								M202-0375-0500-N2250-xxx	
1/2	1/2	5/8	3	1-3/8	34644	34645	38197	38198	38199					M202-0500-0625-N1375-xxx		
			4	2-1/4	34646	34647	38200	38201	38202						M202-0500-0625-N2250-xxx	
			5	2-3/8	34649	34650	38203	38204	38205						M202-0500-0625-N2375-xxx	
			6	3-3/8	34651	34652	38206	38207	38208						M202-0500-0625-N3375-xxx	
5/8	5/8	3/4	3-1/2	1-1/2		34653	38209	38210	38211					M202-0625-0750-N1500-xxx		
			5	2-1/4		34654	38212	38213	38214						M202-0625-0750-N2250-xxx	
			6	3-3/8		34655	38215	38216	38217						M202-0625-0750-N3375-xxx	
3/4	3/4	1	4	1-3/4		34657	38218	38219	38220	38221	38222			M202-0750-1000-N1750-xxx		
			5	2-1/4		34658	38223	38224	38225	38226	38227				M202-0750-1000-N2250-xxx	
			6	3-3/8		34659	38228	38229	38230	38231	38232				M202-0750-1000-N3375-xxx	
1	1	1-1/8	4	1-7/8		34660	38233	38234	38235	38236	38237	38238		M202-1000-1125-N1875-xxx		
			5	2-1/4		34661	38239	38240	38241	38242	38243	38245		M202-1000-1250-N2250-xxx		
		1-1/4	6	3-3/8		34662	38246	38247	38248	38249	38250	38251		M202-1000-1250-N3375-xxx		
			7	4-3/8		34663	38252	38253	38254	38255	38256	38257		M202-1000-1250-N4375-xxx		

## Model Code: M202N 2-Flute with Corner Radius and Neck Relief



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Reach/ LBS l3	Order Code by Corner Radius (R)			EZ-ID Number					
					0,3 CR	0,5 CR	1,0 CR	M202 - xxx - xxx - Nxxx - xxx	d1	l2	l3	R	
6	6	8	57	20	37200								M202-060-008-N020-030
			75	40	37202								
8	8	10	63	26		37212							M202-080-010-N026-050
			72	31		37214							
10	10	12	100	50		37216							M202-100-012-N050-050
			83	37			37218						
12	12	14	125	70			37220						M202-120-014-N070-100
			92	41			37222						
16	16	18	150	90			37224						M202-160-018-N090-100
			104	47			37226						
20	20	24	150	90			37230						M202-200-024-N090-100

# M202B

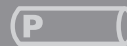
## Ball End



### 2-FLUTE

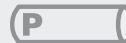
The M202B ball end is excellent for contouring applications in a variety of materials. Based on the same high-performance design as the M202 series, but with a full end radius.

## Model Code: M202B 2-Flute with Ball End

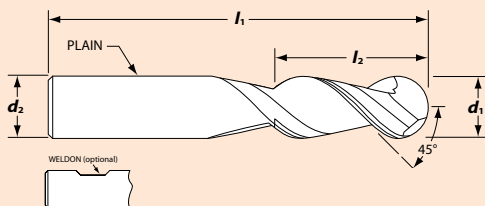


Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code	EZ-ID Number
						M202 - xxxx - xxxx - BN d1 l2
1/8	1/8	3/8	1-1/2	Plain	33446	M202-0125-0375-BN
3/16	3/16	9/16	2	Plain	33448	M202-0187-0562-BN
				Weldon	32980	M202-0250-0750-BN
1/4	1/4	3/4	2-1/2	Plain	32981	M202-0312-0812-BN
				Weldon	32595	M202-0250-0750-BN-W
5/16	5/16	13/16	2-1/2	Plain	32981	M202-0312-0812-BN
				Weldon	32596	M202-0312-0812-BN-W
3/8	3/8	7/8	2-1/2	Weldon	32597	M202-0375-0875-BN-W
		1	2-1/2	Plain	32982	M202-0375-1000-BN
1/2	1/2	1-1/4	3	Plain	32983	M202-0500-1250-BN
			3-1/4	Weldon	32598	M202-0500-1250-BN-W
5/8	5/8	1-1/4	3-1/2	Weldon	32599	M202-0625-1250-BN-W
		1-5/8	3-1/2	Plain	32984	M202-0625-1625-BN
3/4	3/4	1-5/8	4	Plain	32985	M202-0750-1625-BN
				Weldon	32608	M202-0750-1625-BN-W

## Model Code: M202B 2-Flute with Ball End



Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Shank Style	Order Code	EZ-ID Number
						M202 - xxx - xxx - BN d1 l2
6	6	16	57	Plain	62412	M202-060-016-BN
8	8	19	63	Plain	62413	M202-080-019-BN
10	10	22	72	Plain	62414	M202-100-022-BN
12	12	26	83	Plain	62416	M202-120-026-BN
16	16	32	92	Plain	62418	M202-160-032-BN
20	20	38	104	Plain	62420	M202-200-038-BN



Optional coatings for aluminum machining (ZrN, TiCN, TiB2, DLC) are available by special order

Coatings:  
None (MG)

**in** d1 +0.000 / -0.002 d2 -0.0001 / -0.0004  
**mm** d1 +0,000 / -0,050 d2 -0,0025 / -0,0100

## Hardrocker Racing Team

Every year, the South Dakota School of Mines & Technology Hardrocker Racing Team designs and builds a Formula SAE racecar from scratch. Making over 2,000 parts – at least 500 of them major components – in just three months, they needed cutting tools they could count on. IMCO stepped up with everything they needed.

Team leader Jordan Krell said, “It was awesome. It was like Christmas.” IMCO sent STREAKERS® M2, POW•R•FEED® M904 and enDURO® M525 end mills, along with IMCO FR10 routers and prototype tools for cutting carbon fiber.

“They all worked great,” said Evan Hogland, the only team member with machining experience. Aside from body panels, the parts are mostly aluminum; each wheel is hogged from a 22 lb. work piece to just 1.2 lbs. finished. “We’re still using that first STREAKERS tool. It’s still in great shape.”

**“Power. Precision. Performance. That’s what we do. This project is an excellent example of the application of all three.”**

– Matt Osburn, IMCO Vice President/Technical Director



Most components, like this wheel, are aluminum, all cut with a single STREAKERS M2 end mill.



## The results

The Hardrocker Racing Team’s work was impressive. Their student-built car took 11th place in design, 5th in autocross and 4th in skidpad, out of 120 teams.

IMCO’s Matt Osburn (second from right), Application Support Team Leader Steve Avers (back, second from left) and the Hardrocker Racing Team surround the Formula SAE racecar built using IMCO tools.

# M2 Series Application Guide - Speed & Feed (inch)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (SFM)	Feed (Inch per Tooth)						
							1/8	1/4	3/8	1/2	5/8	3/4	1
<b>N</b>	Aluminum Alloys 2024, 6061, 7075	Slotting	1 x D	1 x D	2	800	.0018	.0036	.0054	.0072	.0090	.0108	.0144
			.75 x D	1 x D	3	800	.0015	.0030	.0045	.0060	.0075	.0090	.0120
		Peripheral - Rough	1 x D	.75 x D	2	1000	.0025	.0050	.0075	.0100	.0125	.0150	.0200
					3	1000	.0020	.0040	.0060	.0080	.0100	.0120	.0160
		Peripheral - Finish	1.5 x D	.01 x D	2	1200	.0030	.0060	.0090	.0120	.0150	.0210	.0240
					3	1200	.0025	.0050	.0075	.0100	.0125	.0150	.0200
	High Silicon-Aluminum A380, A390	Slotting	.75 x D	1 x D	2	500	.0013	.0026	.0039	.0052	.0065	.0078	.0104
			.5 x D	1 x D	3	500	.0011	.0022	.0033	.0044	.0055	.0066	.0088
		Peripheral - Rough	1 x D	.5 x D	2	700	.0016	.0033	.0049	.0065	.0081	.0098	.0130
					3	700	.0014	.0028	.0041	.0055	.0069	.0083	.0110
		Peripheral - Finish	1.5 x D	.01 x D	2	900	.0020	.0041	.0061	.0082	.0102	.0122	.0163
					3	900	.0017	.0035	.0052	.0069	.0086	.0104	.0138
	Magnesium Alloys	Slotting	1 x D	1 x D	2	800	.0018	.0036	.0054	.0072	.0090	.0108	.0144
			.75 x D	1 x D	3	800	.0015	.0030	.0045	.0060	.0075	.0090	.0120
		Peripheral - Rough	1 x D	.75 x D	2	1000	.0025	.0050	.0075	.0100	.0125	.0150	.0200
					3	1000	.0020	.0040	.0060	.0080	.0100	.0120	.0160
		Peripheral - Finish	1.5 x D	.01 x D	2	1200	.0030	.0060	.0090	.0120	.0150	.0210	.0240
					3	1200	.0025	.0050	.0075	.0100	.0125	.0150	.0200
	Copper Alloys, Brass, Bronze	Slotting	.75 x D	1 x D	2	500	.0011	.0022	.0033	.0044	.0055	.0066	.0088
					3	500	.0009	.0018	.0027	.0036	.0045	.0054	.0072
		Peripheral - Rough	1 x D	.75 x D	2	575	.0011	.0022	.0033	.0044	.0055	.0066	.0088
					3	575	.0013	.0026	.0039	.0052	.0065	.0078	.0104
		Peripheral - Finish	1.5 x D	.01 x D	2	650	.0018	.0036	.0054	.0072	.0090	.0108	.0144
					3	650	.0015	.0030	.0045	.0060	.0075	.0090	.0120
Composites, Plastics, Fiberglass	Slotting	1 x D	1 x D	2	500	.0013	.0026	.0039	.0052	.0065	.0078	.0104	
				3	500	.0011	.0022	.0033	.0044	.0055	.0066	.0088	
	Peripheral - Rough	1 x D	.75 x D	2	700	.0016	.0033	.0049	.0065	.0081	.0098	.0130	
				3	700	.0014	.0028	.0041	.0055	.0069	.0083	.0110	
	Peripheral - Finish	1.5 x D	.01 x D	2	900	.0020	.0041	.0061	.0082	.0102	.0122	.0163	
				3	900	.0017	.0035	.0052	.0069	.0086	.0104	.0138	

## Common Machining Formulas

$$RPM = \frac{SFM \times 3.82}{D}$$

$$SFM = RPM \times D \times .262$$

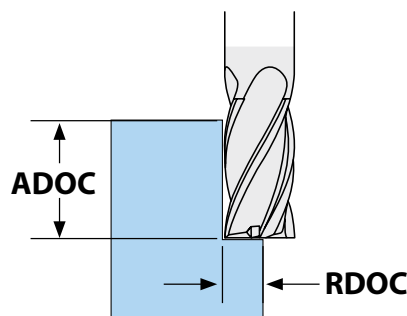
$$IPM = RPM \times IPT \times Z$$

$$MRR = RDOC \times ADOC \times IPM$$

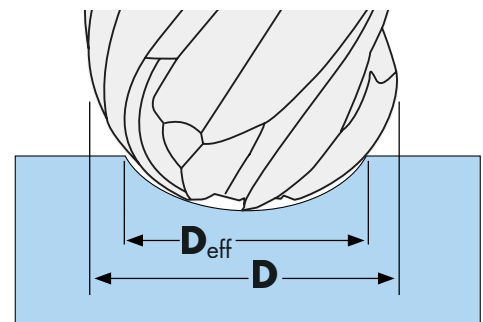
Radial Chip Thinning Adjustment 
$$IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$$

Ball Nose "Effective Diameter" 
$$D_{eff} = 2 \times \sqrt{R^2 - (R - ADOC)^2}$$

- D** Tool Cutting Diameter
- R** Tool Radius
- Z** Number of Flutes
- RPM** Revolutions per Minute
- SFM** Surface Feet per Minute
- IPM** Inches per Minute
- MRR** Metal Removal Rate
- RDOC** Radial Depth of Cut
- ADOC** Axial Depth of Cut



Apply chip thinning adjustment when  $RDOC < D$

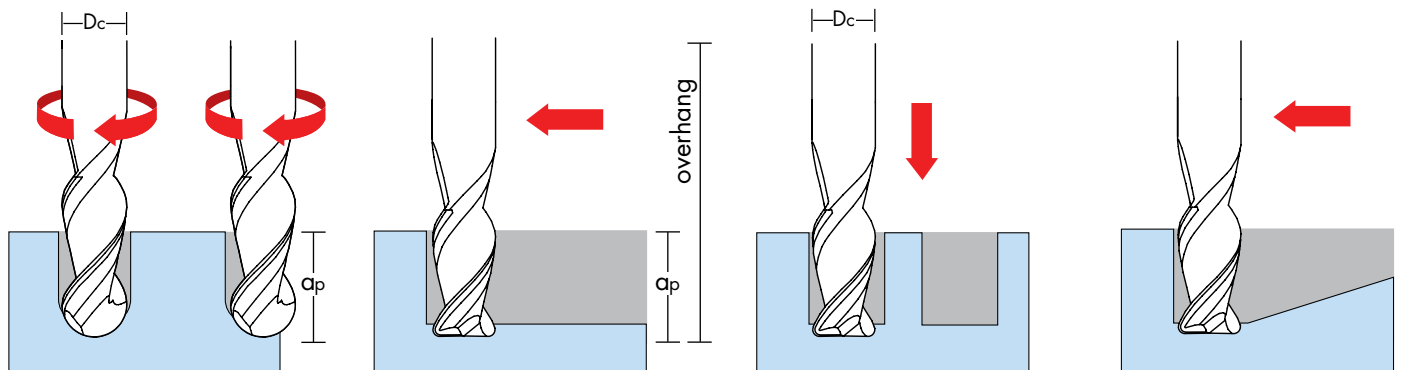


Use  $D_{eff}$  when making shallow cuts with full radius

# M2 Series Application Guide - Speed & Feed (metric)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (M/Min)	Feed (MM per Tooth)					
							3,0	6,0	10,0	12,0	16,0	20,0
N	Aluminum Alloys 2024, 6061, 7075	Slotting	1 x D	1 x D	2	244	0.0431	0.0862	0.1437	0.1724	0.2299	0.2873
			.75 x D	1 x D	3	244	0.0360	0.0720	0.1200	0.1440	0.1920	0.2400
		Peripheral - Rough	1 x D	.75 x D	2	305	0.0599	0.1198	0.1997	0.2396	0.3195	0.3993
					3	305	0.0480	0.0960	0.1600	0.1920	0.2560	0.3200
		Peripheral - Finish	1.5 x D	.01 x D	2	365	0.0719	0.1438	0.2397	0.2876	0.3835	0.4793
					3	365	0.0599	0.1198	0.1997	0.2396	0.3195	0.3993
	High Silicon-Aluminum A380, A390	Slotting	.75 x D	1 x D	2	153	0.0312	0.0624	0.1040	0.1248	0.1664	0.2080
			.5 x D	1 x D	3	153	0.0264	0.0528	0.0880	0.1056	0.1408	0.1760
		Peripheral - Rough	1 x D	.5 x D	2	213	0.0383	0.0766	0.1277	0.1532	0.2043	0.2553
					3	213	0.0335	0.0670	0.1117	0.1340	0.1787	0.2233
		Peripheral - Finish	1.5 x D	.01 x D	2	274	0.0480	0.0960	0.1600	0.1920	0.2560	0.3200
					3	274	0.0408	0.0816	0.1360	0.1632	0.2176	0.2720
	Magnesium Alloys	Slotting	1 x D	1 x D	2	244	0.0431	0.0862	0.1437	0.1724	0.2299	0.2873
			.75 x D	1 x D	3	244	0.0360	0.0720	0.1200	0.1440	0.1920	0.2400
		Peripheral - Rough	1 x D	.75 x D	2	305	0.0599	0.1198	0.1997	0.2396	0.3195	0.3993
					3	305	0.0480	0.0960	0.1600	0.1920	0.2560	0.3200
		Peripheral - Finish	1.5 x D	.01 x D	2	365	0.0719	0.1438	0.2397	0.2876	0.3835	0.4793
					3	365	0.0599	0.1198	0.1997	0.2396	0.3195	0.3993
	Copper Alloys, Brass, Bronze	Slotting	.75 x D	1 x D	2	153	0.0239	0.0478	0.0797	0.0956	0.1275	0.1593
					3	153	0.0216	0.0432	0.0720	0.0864	0.1152	0.1440
		Peripheral - Rough	1 x D	.75 x D	2	175	0.0264	0.0528	0.0880	0.1056	0.1408	0.1760
					3	175	0.0312	0.0624	0.1040	0.1248	0.1664	0.2080
		Peripheral - Finish	1.5 x D	.01 x D	2	198	0.0431	0.0862	0.1437	0.1724	0.2299	0.2873
					3	198	0.0360	0.0720	0.1200	0.1440	0.1920	0.2400
Composites, Plastics, Fiberglass	Slotting	1 x D	1 x D	2	153	0.0312	0.0624	0.1040	0.1248	0.1664	0.2080	
				3	153	0.0264	0.0528	0.0880	0.1056	0.1408	0.1760	
	Peripheral - Rough	1 x D	.75 x D	2	213	0.0383	0.0766	0.1277	0.1532	0.2043	0.2553	
				3	213	0.0335	0.0670	0.1117	0.1340	0.1787	0.2233	
	Peripheral - Finish	1.5 x D	.01 x D	2	274	0.0480	0.0960	0.1600	0.1920	0.2560	0.3200	
				3	274	0.0408	0.0816	0.1360	0.1632	0.2176	0.2720	

**Adjustments** – Apply these adjustments when programming the following applications.



### 1. Ball-nose end mills

- Reduce chip load by 25% from roughing/slotting recommendation when axial DOC ( $a_p$ ) exceeds 75% of  $D_c$

### 2. Long reach mills with large overhang

- Reduce speed rate and chip load by 10%

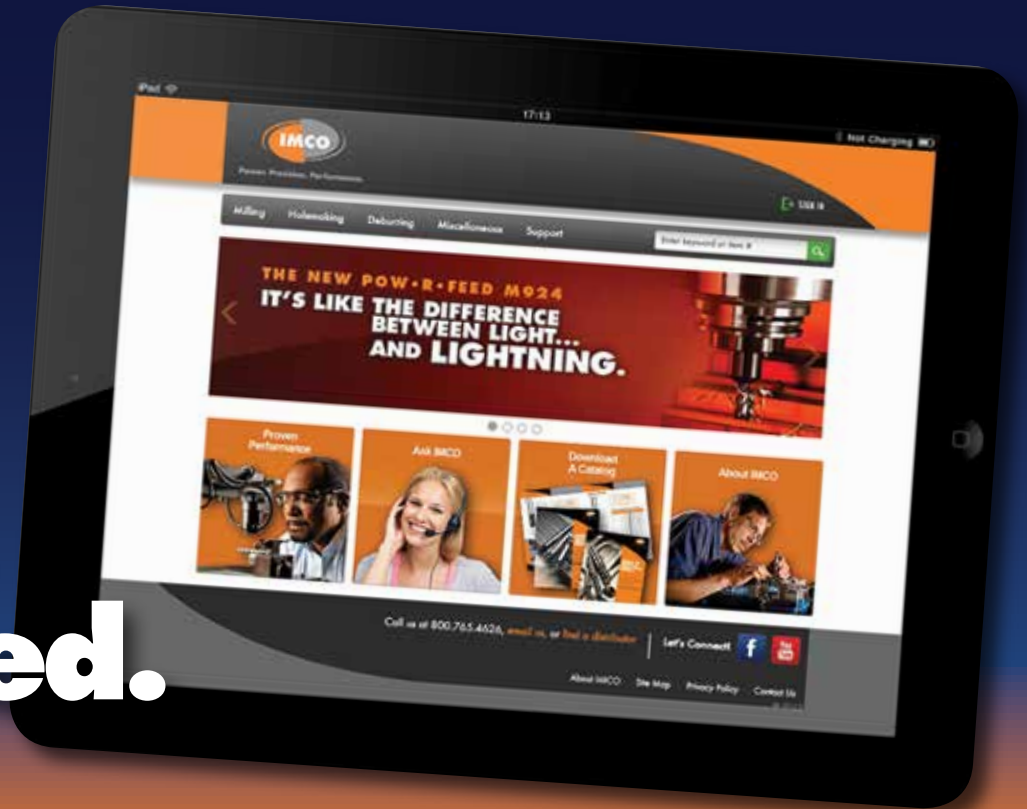
### 3. Plunge entry into work piece

- Reduce chip load by 80% of recommended slotting rate
- Peck mill if axial DOC ( $a_p$ ) exceeds 50% of  $D_c$

### 4. Ramp entry into work piece

- Ramp at 1.5°–2.5° angle
- Reduce chip load by 20% of recommended slotting rate

# Point. Click. Game changed.



**User-focused navigation** – Start with machining type (milling, holemaking, deburring, etc.), then you choose how you want look further – by tool family, by application or by end type, whatever works best for you.

**Complete tool info** – Dimensions and drawings, flutes, coatings, end cuts, sizes ... everything you need to know. Downloadable catalogs, too.

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*“Our information technology should be as advanced, intuitive and productivity-driven as our cutting tool technology. Now, it is.”*

– IMCO President Perry Osburn

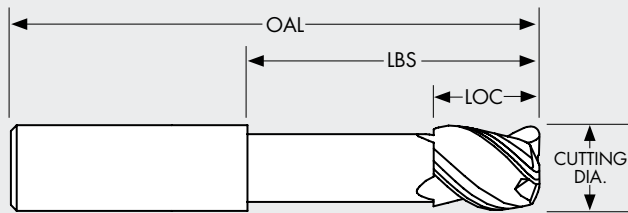
# How to build the EZ-ID code



IMCO's smart coding system saves you time locating part numbers. Just use the specifics of the tool you need, "plug" them into the coding system, and you're there!

## How EZ-ID works.

Each EZ-ID part number actually describes the tool itself. It starts with general information (type of tool and tool family) and gets more specific as you go.



## Building the EZ-ID code, step by step.

Insert the numbers in the segments as indicated here. If a certain segment doesn't apply (neck dimension, nonstandard length or special shank), just skip it. Separate the segments with hyphens.

- 1** Enter the **model number**.  
For example, the model number for a 3-Flute STREAKERS end mill would be M203.
- 2** Enter the **tool diameter** (always to three decimal places). Include the leading zero for diameters less than 1 in. or 10mm.
- 3** Enter the **length of cut (LOC)**. Include the leading zero for an LOC less than 1 in. or 10mm.
- 4** Enter the **length below shank (LBS) or reach**. Include the leading zero for an LBS less than 1 in. or 100mm. Indicate that this is a neck dimension by placing an N before the number. (If the tool has no neck, you can skip this segment altogether.)
- 5** Enter the **end/corner** type or size. Include the leading zero for corner radii less than 1 in. or 1 mm. For any other end/corner type, just indicate the type: SQ = square end, BN = ball nose, CC = corner chamfer.
- 6** If the **overall length** you need is not the standard length for the combination of tool diameter, LOC and LBS, then enter the overall length (**OAL**) here. Indicate that this is an overall length by placing an L before the number. If you do not specify an overall length, we will assume it is standard length.
- 7** Enter the code for the **type of shank** you need (W = Weldon flat, WN = whistle notch, P = plain). If you do not specify a shank style, we will assume it is a plain shank.

	1	2	3	4	5	6	7
	MODEL	TOOL DIAMETER	LENGTH OF CUT (LOC)	LENGTH BELOW SHANK (LBS)	END	OVERALL LENGTH	SHANK
INCH	M806	0375	0750	N2375	030	L4	W
METRIC	M203	060	008	N020	050	L075	W

Segments highlighted in white may be omitted.

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