



SOLID CARBIDE END MILLS, SLITTING SAWS, PCD TOOLS

RobbJack Corporation – Lincoln, California USA

APPLICATIONSGUIDE2022

Aluminum

Titanium, Steel & High-Temp Alloys

Composites & Plastics

Die/Mold & Hardened Materials

Miniatures

Multiple Applications

Saws

Wood



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NEW!

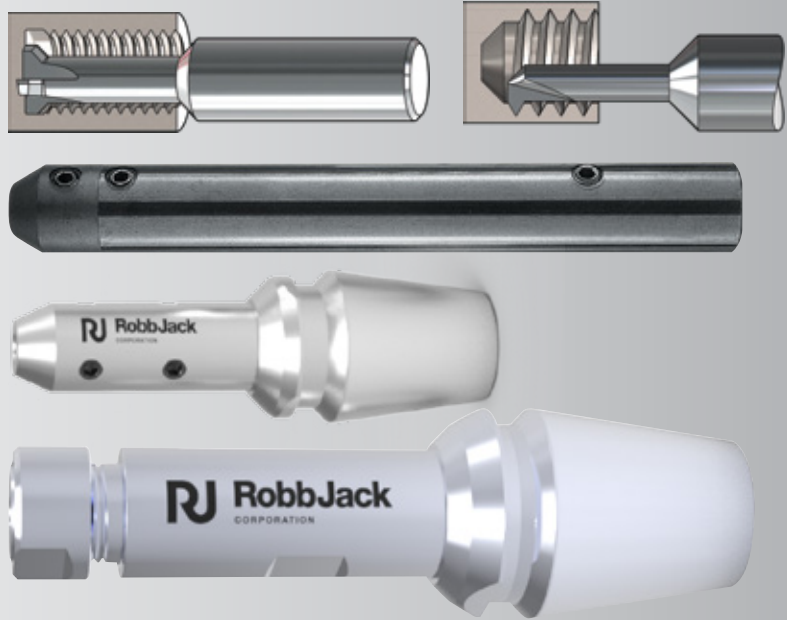
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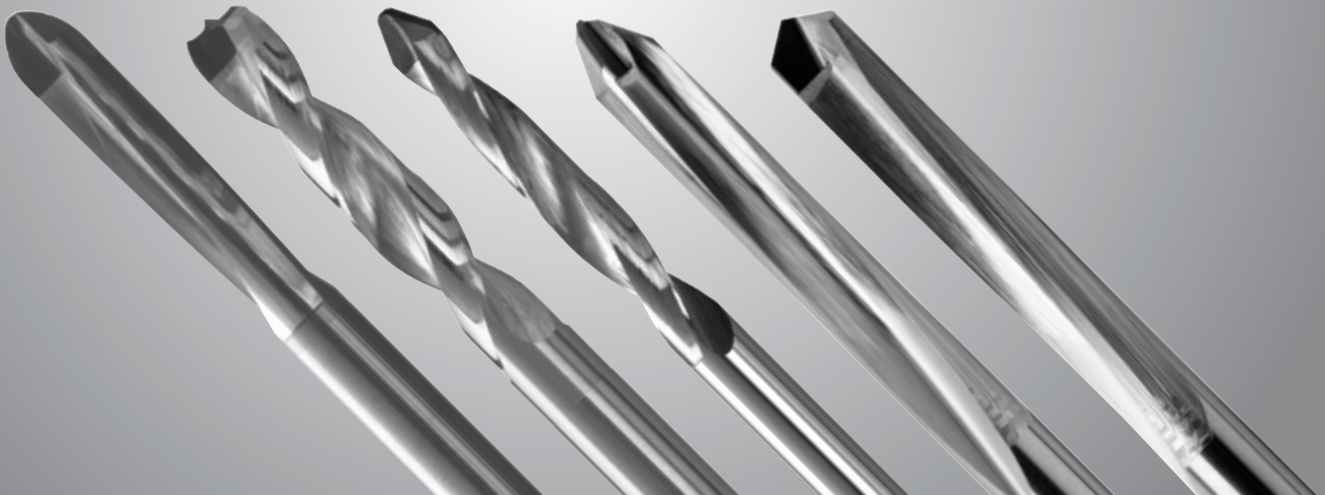
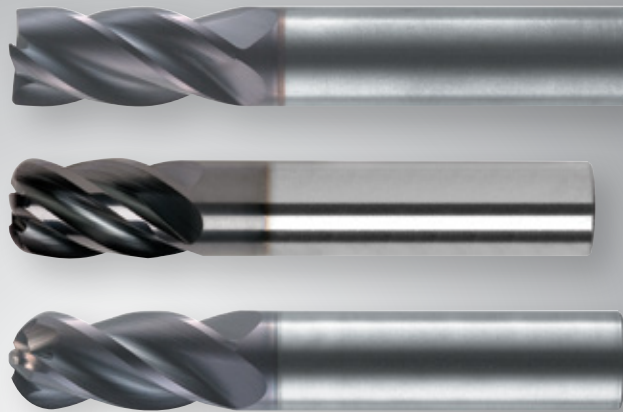
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DIAMOND

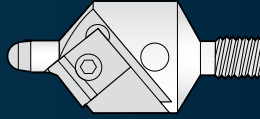
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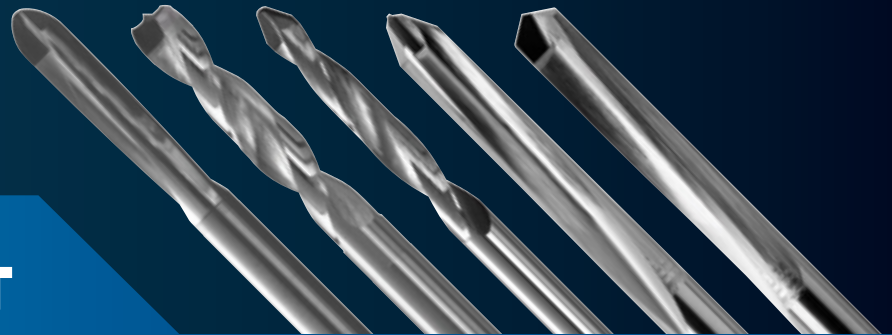
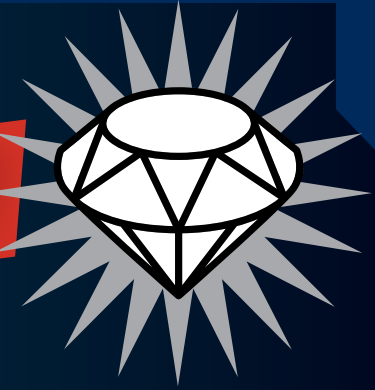
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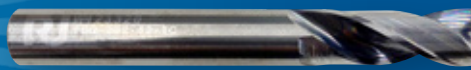
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NEW!



THRU-COOLANT



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NEW!

Alphabetical Tool Listing

Aluminum	Miniatures
Steel & High-Temp Alloys	Multiple Applications
Die Mold	Saws
Composites	Wood & Plastics

Application	Tool Name	Description	Page(s)
	A1	2 & 3 Flute, High Performance Tools for Aluminum Stub & Standard Length	28
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	ACH-M NEW!	Inch to Metric Accuhold End Mill Extension Holder	141 167 203
	AIC NEW!	High Shear & Polished Insert Face Mill Body	72
	AL3 NEW!	3 Flute, High Performance Aluminum Carbide End Mill Std., Long, Extra-Long Length & Corner Radii	22
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	MPM	Metric 1 Flute, Polished Single Flute Carbide Router Upshear	112 201
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	MSTR	Metric 3 & 4 Flute, Super Tuffy Grade Carbide Ruffers Stub & Standard Length	88
	MTL	Metric 3 Flute, Tuffy Grade Extra Long Carbide End Mills	146
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	NAB	Thru Coolant 15X Gripping Force Saw Arbors	188
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	P810 NEW!	4 Flute, Diamond Coated Drill/Reamer	107
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	PM, PMD	1 Flute, Polished Single Flute Carbide Router Upshear & Downshear	112
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	TL	3 Flute, Tuffy Grade Extra Long Carbide End Mills	146
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	WU1, WD1, WTL	2 & 3 Flute, Up & Downshear Routers for CNC Production Stub, Standard & Extra Long Length	196
	XF	6 & 8 Flute, High Performance High-Efficiency Finisher Standard Length	83
	XG NEW SIZES!	4 & 5 Flute, High Performance Variable Helix Rougher/Finisher Stub & Standard Length	80

END MILL General Speeds & Feeds/Formulas

Material	SFM <i>Surface Feet/Minute</i>	SMM <i>Surface Meters/Minute</i>	Chip Load per Tooth
Aluminum / Non-Ferrous			
Ferrous			
2024	Max RPM	Max RPM	tool diameter x .0256
6061 (T1–T3)	Max RPM	Max RPM	tool diameter x .0128
6061 (T4–T6)	Max RPM	Max RPM	tool diameter x .0256
7075	Max RPM	Max RPM	tool diameter x .0256
Non-Ferrous			
Brass	750	230	tool diameter x .0128
Copper	600	190	tool diameter x .0128
Magnesium	Max RPM	Max RPM	tool diameter x .0256
Titanium, Steel and High-Temp Alloys			
Titanium			
Commercially Pure	350	100	tool diameter x .0048
6AL-4V	230	55	tool diameter x .0048
6AL-6V	180	35	tool diameter x .004
Steel			
1018–1020	350	110	tool diameter x .0064
4130	260	80	tool diameter x .0032
4140	220	70	tool diameter x .0032
4340	280	90	tool diameter x .0032
Tool Steel Annealed			
A2	350	110	tool diameter x .0032
D2	260	80	tool diameter x .0032
H13	230	70	tool diameter x .0032
P20	350	110	tool diameter x .00496
Stainless Steel			
303	500	150	tool diameter x .0048
304	225	70	tool diameter x .0032
316	240	75	tool diameter x .0032
15-5/17-4 PH	200	60	tool diameter x .0032
440C	200	60	tool diameter x .0032
Inconel			
625 / 718	100	30	tool diameter x .0036
Composites			
G10 Fiberglass/Polyester	1000	300	tool diameter x .0136
Graphite	1000	300	tool diameter x .0256
Graphite Fiber/Epoxy	800	250	tool diameter x .008
Plastics	1300	400	tool diameter x .0256
Die/Mold			
<i>See Die/Mold section</i>			
Other Material Applications			
Cast Iron			
Ductile Iron	350	110	tool diameter x .0096
Gray Cast Iron	500	150	tool diameter x .0128

INCH SIZES	
Surface Feet per Minute	= RPM × .262 × Tool Diameter
RPM	= $\frac{\text{Surface Feet per Minute} \times 3.82}{\text{Tool Diameter}}$
Feedrate (in/min.)	= $\frac{\text{RPM} \times \text{Chip Load per Tooth}}{\text{Number of Flutes}}$
in ³ /min	= Width × Depth × Inches per Minute
Horsepower	= 1.341 × kW
kW	= .7457 × Horsepower
METRIC SIZES	
Surface Meters per Minute	= RPM × .00314 × Tool Diameter
RPM	= $\frac{\text{Surface Meters per Minute} \times 318.057}{\text{Tool Diameter}}$
Feedrate (mm/min.)	= $\frac{\text{RPM} \times \text{Chip Load per Tooth}}{\text{Number of Flutes}}$
cm ³ /min	= $\frac{\text{Width (mm)} \times \text{Depth (mm)} \times \text{Feedrate (mm/min)}}{1000}$
Horsepower	= 1.341 × kW
kW	= .7457 × Horsepower

Specific End Mill Speeds & Feeds



AL3-303 SPEEDS & FEEDS

Tool Diam.	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
1/8"	Max	0.0020	Max	0.0018	Max	0.0020	Max	0.0020
3/16"	Max	0.0030	Max	0.0026	Max	0.0030	Max	0.0030
1/4"	Max	0.0040	Max	0.0035	Max	0.0040	Max	0.0040
5/16"	Max	0.0050	Max	0.0044	Max	0.0050	Max	0.0050
3/8"	Max	0.0060	Max	0.0053	Max	0.0060	Max	0.0060
1/2"	Max	0.0080	Max	0.0070	Max	0.0080	Max	0.0080
5/8"	Max	0.0100	Max	0.0088	Max	0.0100	Max	0.0100
3/4"	Max	0.0120	Max	0.0105	Max	0.0120	Max	0.0120
1"	Max	0.0160	Max	0.0140	Max	0.0160	Max	0.0160

Axial depth of cut up to $1.5 \times$ diameter of the tool with 50% radial step over.



FBD SPEEDS & FEEDS

Aluminum and similar materials			
Tool Diam.	FBD-201(2x) (SFM 500-1000) RPM**	FBD-202(5x) (SFM 250-500) RPM**	Inch per Revolution*
1/8	15280 - 30560	7640 - 15280	.0016-.0032
3/16	10187 - 20373	5093 - 10187	.0024-.0048
1/4	7640 - 15280	3820 - 7640	.0032-.006
5/16	6112 - 12224	3056 - 6112	.004-.008
3/8	5093 - 10187	2547 - 5093	.0048-.0098
1/2	3820 - 7640	1910 - 3820	.0065-.013

Flat bottom drill for aluminum speed and feeds on page 75

Use maximum RPM if it exceeds your machines RPM

Guide hole recommended if you get chatter. Pecking in small depths might help. Always start holes with short 2X drill first.

*Adjust inch per revolution to 50% when on angled surfaces is 30 degrees or less.

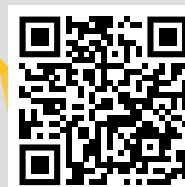
*Adjust inch per revolution to 30% of recommended when on an angled or curved surface is greater than 30 degrees or when the cutter is not fully encapsulated and only drilling a partial hole

**Adjust RPM to 70% of recommended RPM when on an angled or curved surface is greater than 30 degrees or when the cutter is not fully encapsulated and only drilling a partial hole

When using FBD-202 (5x) use FBD-201(2x) to start the hole to reduce walking.

Thru coolant holes recommended on FBD-202 (5x) deep holes

If chip packing is a problem thru coolant holes are recommended. Pecking may help if you do not have thru coolant.



See RobbJack Videos at
robbjack.com/robbjack-tv

The screenshot shows the RobbJack website interface. At the top, there is a navigation bar with links for TOOLS, INDUSTRY SOLUTIONS, TECH INFO, SALES, ABOUT, and CONTACT. Below the navigation bar is a large banner with the text "RESHAPING PERFORMANCE" and "HELPING CUSTOMERS ACHIEVE TARGET PERFORMANCE, EFFICIENCY, AND QUALITY FOR OVER FIVE DECADES". Below the banner, there is a search bar and a "BUY NOW" button. The main content area features a "Recent Videos" section with several video thumbnails, including "High Speed Aluminum Bore by RobbJack Corp", "How to assemble a solid carbide sitting saw, arbor, and tool holder for CNC", and "RobbJack in a Video".

Specific End Mill Speeds & Feeds



A1-201 SPEEDS & FEEDS

Tool Diam.	Aluminum 6061-T6, 7075, 2024		Brass		Copper		Plastic		Magnesium	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
1/8"	Max	0.0032	22900	0.0016	18300	0.0016	39700	0.0032	Max	0.0032
3/16"	Max	0.0048	15300	0.0024	12200	0.0024	26500	0.0048	Max	0.0048
1/4"	Max	0.0064	11500	0.0032	9200	0.0032	19900	0.0064	Max	0.0064
5/16"	Max	0.0080	9200	0.0040	7300	0.0040	15900	0.0080	Max	0.0080
3/8"	Max	0.0096	7600	0.0048	6100	0.0048	13200	0.0096	Max	0.0096
1/2"	Max	0.0128	5700	0.0064	4600	0.0064	9900	0.0128	Max	0.0128
5/8"	Max	0.0160	4600	0.0080	3700	0.0080	7900	0.0160	Max	0.0160
3/4"	Max	0.0192	3800	0.0096	3100	0.0096	6600	0.0192	Max	0.0192
1"	Max	0.0256	2900	0.0128	2300	0.0128	5000	0.0256	Max	0.0256

Axial depth of cut up to 1.5 x diameter of the tool with 50% radial step over.



A1-303 SPEEDS & FEEDS

Tool Diam.	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
1/8"	Max	0.0020	Max	0.0018	Max	0.0020	Max	0.0020
3/16"	Max	0.0030	Max	0.0026	Max	0.0030	Max	0.0030
1/4"	Max	0.0040	Max	0.0035	Max	0.0040	Max	0.0040
5/16"	Max	0.0050	Max	0.0044	Max	0.0050	Max	0.0050
3/8"	Max	0.0060	Max	0.0053	Max	0.0060	Max	0.0060
1/2"	Max	0.0080	Max	0.0070	Max	0.0080	Max	0.0080
5/8"	Max	0.0100	Max	0.0088	Max	0.0100	Max	0.0100
3/4"	Max	0.0120	Max	0.0105	Max	0.0120	Max	0.0120
1"	Max	0.0160	Max	0.0140	Max	0.0160	Max	0.0160

Axial depth of cut up to 1.5 x diameter of the tool with 50% radial step over.

MA1-201 SPEEDS & FEEDS METRIC

Tool Diam.	Aluminum 6061-T6, 7075, 2024		Brass		Copper		Plastic		Magnesium	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
3mm	Max	0.077mm	24300	0.038mm	19400	0.038mm	42000	0.077mm	Max	0.077mm
4mm	Max	0.102mm	18200	0.051mm	14600	0.051mm	31500	0.102mm	Max	0.102mm
5mm	Max	0.128mm	14600	0.064mm	11600	0.064mm	25200	0.128mm	Max	0.128mm
6mm	Max	0.154mm	12100	0.077mm	9700	0.077mm	21000	0.154mm	Max	0.154mm
8mm	Max	0.205mm	9100	0.102mm	7300	0.102mm	15800	0.205mm	Max	0.205mm
10mm	Max	0.256mm	7300	0.128mm	5800	0.128mm	12600	0.256mm	Max	0.256mm
12mm	Max	0.307mm	6100	0.154mm	4900	0.154mm	10500	0.307mm	Max	0.307mm
16mm	Max	0.410mm	4500	0.205mm	3600	0.205mm	7900	0.410mm	Max	0.410mm
20mm	Max	0.512mm	3600	0.256mm	2900	0.256mm	6300	0.512mm	Max	0.512mm

Axial depth of cut up to 1.5 x diameter of the tool with 50% radial step over.

MA1-303 SPEEDS & FEEDS METRIC

Tool Diam.	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
3mm	Max	0.048mm	Max	0.042mm	Max	0.048mm	Max	0.048mm
4mm	Max	0.064mm	Max	0.056mm	Max	0.064mm	Max	0.064mm
5mm	Max	0.080mm	Max	0.070mm	Max	0.080mm	Max	0.080mm
6mm	Max	0.096mm	Max	0.084mm	Max	0.096mm	Max	0.096mm
8mm	Max	0.128mm	Max	0.112mm	Max	0.128mm	Max	0.128mm
10mm	Max	0.160mm	Max	0.140mm	Max	0.160mm	Max	0.160mm
12mm	Max	0.192mm	Max	0.168mm	Max	0.192mm	Max	0.192mm
16mm	Max	0.256mm	Max	0.224mm	Max	0.256mm	Max	0.256mm
20mm	Max	0.320mm	Max	0.280mm	Max	0.320mm	Max	0.320mm

Axial depth of cut up to 1.5 x diameter of the tool with 50% radial step over.

FMHV SPEEDS & FEEDS

Tool Diam.	Chip load per tooth	Typical Depth	Recommended RPM	Type of cut
1"	.008-.015	.300 up to .750	Max Tap Tested RPM Or Max RPM	Slot or profile (stay away from 50% radial step-over)
3/4"	.006-.012	.200 up to .900		
5/8"	.005-.011	.100 up to .750		
1/2"	.004-.010	.100 up to .750		
3/8"	.003-.006	.100 up to .500		
5/16"	.002-.005	.100 up to .500		
1/4"	.002-.004	.100 up to .375		

175 horsepower / 130 kilowatt machines: Speeds and feeds are based on short stickout tools.

MFMHV SPEEDS & FEEDS METRIC

CUTTING DIAMETER	Recommended chip load per tooth fz
6	0.051 - 0.095
8	0.076 - 0.143
10	0.076 - 0.143
12	0.102 - 0.254
16	0.127 - 0.254
20	0.152 - 0.305
25	0.203 - 0.381

Recommended feed per tooth

These speed and feed data are based on super extreme high velocity high horsepower / kilowatt machines. Most machines cannot use these speeds and feeds without causing damage. Be sure not to max out your machine. These tools can max out all machines made today. Adjust speeds and feed to the machine and application. It is recommended to use the highest quality tool holders available. Be careful!



FM SERIES SPEEDS & FEEDS

Tool Dia.	Typical Z-Depth	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
		RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
1/4"	0.1500"	Max	0.0040"	Max	0.0035"	Max	0.0040"	Max	0.0040"
5/16"	0.1500"	Max	0.0050"	Max	0.0044"	Max	0.0050"	Max	0.0050"
3/8"	0.1875"	Max	0.0060"	Max	0.0053"	Max	0.0060"	Max	0.0060"
1/2"	0.2000"	Max	0.0080"	Max	0.0070"	Max	0.0080"	Max	0.0080"
5/8"	0.2000"	Max	0.0100"	Max	0.0088"	Max	0.0100"	Max	0.0100"
3/4"	0.2500"	Max	0.0120"	Max	0.0105"	Max	0.0120"	Max	0.0120"
1"	0.2500"	Max	0.0160"	Max	0.0140"	Max	0.0160"	Max	0.0160"

Z-Depth of cut per pass should be deeper than the corner radius to help reduce chatter

MFM SERIES SPEEDS & FEEDS METRIC

Tool Dia.	Typical Z-Depth	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
		RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
6mm	4mm	Max	0.096mm	Max	0.084mm	Max	0.096mm	Max	0.096mm
8mm	4mm	Max	0.128mm	Max	0.112mm	Max	0.128mm	Max	0.128mm
10mm	5mm	Max	0.16mm	Max	0.14mm	Max	0.16mm	Max	0.16mm
12mm	5mm	Max	0.192mm	Max	0.168mm	Max	0.192mm	Max	0.192mm
16mm	5mm	Max	0.256mm	Max	0.224mm	Max	0.256mm	Max	0.256mm
20mm	6.5mm	Max	0.32mm	Max	0.28mm	Max	0.32mm	Max	0.32mm
25mm	6.5mm	Max	0.4mm	Max	0.35mm	Max	0.4mm	Max	0.4mm

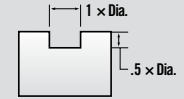
Z-Depth of cut per pass should be deeper than the corner radius to help reduce chatter



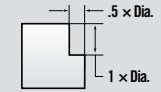
NS SERIES SPEEDS & FEEDS

Material	Surface Footage	3/16"		1/4"		5/16"		3/8"		1/2"		5/8"		3/4"		1"	
		RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min
CAST IRON																	
Ductile	400	8149	20	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
Gray	525	10696	42	8022	42	6418	51	5348	58	4011	64	3209	58	2674	51	2006	45
STEEL																	
1018/1020	500	10187	32	7640	32	6112	39	5093	44	3820	49	3056	44	2547	39	1910	34
4130	400	8149	20	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
4140	400	8149	20	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
4340	415	8455	21	6341	21	5073	25	4227	29	3171	32	2536	29	2114	25	1585	22
TOOL STEEL (ANNEALED)																	
A2	400	8149	17	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
D2	360	7334	16	5501	16	4401	19	3667	22	2750	24	2200	22	1834	19	1375	17
H13	400	8149	17	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
P20	400	8149	23	6112	23	4890	28	4075	31	3056	35	2445	31	2037	28	1528	24

Slotting



Profiling



MNS SERIES SPEEDS & FEEDS **METRIC**

Material	Surface Meters/min	6mm		8mm		10mm		12mm		16mm		20mm		25mm	
		RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min
CAST IRON															
Ductile	400	6475	505	4851	505	3881	621	3234	699	2426	776	1941	699	1552	543
Gray	525	8498	1060	6367	1060	5094	1304	4245	1467	3184	1630	2547	1467	2038	1141
STEEL															
1018/1020	500	8093	807	6064	807	4851	994	4043	1118	3032	1242	2426	1118	1941	869
4130	400	6475	505	4851	505	3881	621	3234	699	2426	776	1941	699	1552	543
4140	400	6475	505	4851	505	3881	621	3234	699	2426	776	1941	699	1552	543
4340	415	6717	523	5033	523	4027	644	3356	725	2517	805	2013	725	1611	564
TOOL STEEL (ANNEALED)															
A2	400	6475	444	4851	444	3881	546	3234	615	2426	683	1941	615	1552	478
D2	360	5827	400	4366	400	3493	492	2911	553	2183	615	1747	553	1397	430
H13	400	6475	444	4851	444	3881	546	3234	615	2426	683	1941	615	1552	478
P20	400	6475	575	4851	575	3881	708	3234	796	2426	885	1941	796	1552	619

General Guidelines for XG-402 and MXG-402

- Speeds and feeds are based on applications with very rigid machine tools, toolholders, and fixturing. Speeds and feeds will vary dramatically depending on the application. Extreme forces can be generated and can cause damage, if not appropriate for the cutting conditions.
- Helical interpolation or ramping should be used to enter pockets.
- For the highest material removal rates and longest tool life profile milling is preferred over slotting (See diagrams near charts).
- Use shrink fit or equivalent tool holder. If not, use flats to eliminate slippage in the tool holder!
- Climb milling is recommended.
- For ball end tools reduce feed rate by 10%.



XG-402 SPEEDS & FEEDS

Material	Surface Feet	1/4"		5/16"		3/8"		1/2"		5/8"		3/4"		1"	
		RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min
CAST IRON															
Ductile	400	6112	28	4890	34	4075	39	3056	43	2445	39	2037	34	1528	30
Gray	525	8022	42	6418	51	5348	58	4011	64	3209	58	2674	51	2006	45
INCONEL															
625/718	100	1528	4	1222	5	1019	6	764	7	611	6	509	5	382	5
STEEL															
1018/1020	500	7640	32	6112	39	5093	44	3820	49	3056	44	2547	39	1910	34
4130	400	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
4140	400	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
4340	415	6341	21	5073	25	4227	29	3171	32	2536	29	2114	25	1585	22

XG-402 SPEEDS & FEEDS

Material	Surface Feet	1/4"		5/16"		3/8"		1/2"		5/8"		3/4"		1"	
		RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min
STAINLESS STEEL															
303	550	8404	31	6723	38	5603	43	4202	48	3362	43	2801	38	2101	34
304	400	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
316	400	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
15-5/17-4	300	4584	13	3667	16	3056	18	2292	20	1834	18	1528	16	1146	14
13-8	300	4584	13	3667	16	3056	18	2292	20	1834	18	1528	16	1146	14
440C	300	4584	13	3667	16	3056	18	2292	20	1834	18	1528	16	1146	14
TOOL STEEL (ANNEALED)															
A2	400	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
D2	360	5501	16	4401	19	3667	22	2750	24	2200	22	1834	19	1375	17
H13	400	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
P20	400	6112	23	4890	28	4075	31	3056	35	2445	31	2037	28	1528	24
TITANIUM															
Com. pure	300	4584	17	3667	21	3056	24	2292	26	1834	24	1528	21	1146	18
6AL-4V	200	3056	9	2445	11	2037	12	1528	13	1222	12	1019	11	764	9
6AL-6V	175	2674	8	2139	9	1783	11	1337	12	1070	11	891	9	669	8

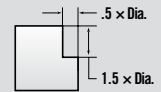
Specific End Mill Speeds & Feeds



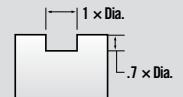
MXG-402 SPEEDS & FEEDS METRIC

Material	Surface Meters	6 mm		8 mm		10 mm		12 mm		16 mm		20 mm	
		RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min
CAST IRON													
Ductile	122	6475	706	4851	869	3881	978	3235	1087	2426	978	1941	869
Gray	160	8498	1060	6367	1304	5094	1467	4245	1630	3184	1467	2547	1304
INCONEL													
625/718	30	1619	108	1213	134	970	150	809	167	606	150	485	134
STEEL													
1018/1020	152	8093	807	6063	994	4851	1118	4043	1242	3032	1118	2426	994
4130	122	6475	505	4851	621	3881	699	3235	776	2426	699	1941	621
4140	122	6475	505	4851	621	3881	699	3235	776	2426	699	1941	621
4340	126	6717	523	5033	644	4027	725	3356	805	2517	725	2013	644
STAINLESS STEEL													
303	168	8903	791	6670	973	5337	1095	4448	1217	3335	1095	2668	973
304	122	6475	444	4851	546	3881	615	3235	683	2426	615	1941	546
316	122	6475	444	4851	546	3881	615	3235	683	2426	615	1941	546
15-5/17-4	91	4856	333	3638	410	2911	461	2426	512	1819	461	1455	410
13-8	91	4856	333	3638	410	2911	461	2426	512	1819	461	1455	410
440C	91	4856	333	3638	410	2911	461	2426	512	1819	461	1455	410
TOOL STEEL (ANNEALED)													
A2	122	6475	444	4851	546	3881	615	3235	683	2426	615	1941	546
D2	110	5827	400	4366	492	3493	553	2911	615	2183	553	1747	492
H13	122	6475	444	4851	546	3881	615	3235	683	2426	615	1941	546
P20	122	6475	575	4851	708	3881	796	3235	885	2426	796	1941	708
TITANIUM													
Com. pure	91	4856	431	3638	531	2911	597	2426	664	1819	597	1455	531
6AL-4V	61	3237	222	2425	273	1941	307	1617	342	1213	307	970	273
6AL-6V	53	2833	194	2122	239	1698	269	1415	299	1061	269	849	239

Profiling



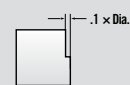
Slotting



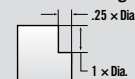
XG-502 AND XF SERIES SPEEDS & FEEDS

Material	Surface Feet	3/8"		1/2"		5/8"		3/4"		1"	
		RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min
CAST IRON											
Ductile	400	4075	58	3056	64	2445	58	2037	68	1528	60
Gray	525	5348	86	4011	96	3209	86	2674	102	2006	90
INCONEL											
625/718	150	1528	12	1146	14	917	12	764	16	573	14
STEEL											
1018/1020	500	5093	62	3820	68	3056	62	2547	74	1910	32
4130	400	4075	42	3056	46	2445	42	2037	48	1528	42
4140	400	4075	42	3056	46	2445	42	2037	48	1528	42
4340	415	4227	42	3171	48	2536	42	2114	50	1585	44
STAINLESS STEEL											
303	550	5603	62	4202	68	3362	62	2801	72	2101	64
304	400	4075	36	3056	40	2445	36	2037	44	1528	38
316	400	4075	36	3056	40	2445	36	2037	44	1528	38
15-5/17-4	300	3056	28	2292	30	1834	28	1528	32	1146	28
13-8	300	3056	28	2292	30	1834	28	1528	32	1146	28
440C	300	3056	28	2292	30	1834	28	1528	32	1146	28
TOOL STEEL (ANNEALED)											
A2	400	4075	36	3056	40	2445	36	2037	44	1528	38
D2	360	3667	32	2750	36	2200	32	1834	38	1375	34
H13	400	4075	36	3056	40	2445	36	2037	44	1528	38
P20	400	4075	44	3056	50	2445	44	2037	52	1528	46
TITANIUM											
Com. pure	300	3056	34	2292	38	1834	34	1528	40	1146	34
6AL-4V	380	3871	42	2903	48	2323	42	1935	50	1452	44
6AL-6V	175	1783	20	1337	22	1070	20	891	24	669	20

XF Finish Profiling



XG-502 Profiling





FBD SPEEDS & FEEDS

Tool Diam.	Ductile Cast Iron		Alloy Steel 4130/ 4140/ A2/ H13 up to 35 HRC		303,304, 316 Stainless Steel		6Al4V Titanium, Inconel, 13-8 & 17-4SS, 440C		Inch per Revolution*
	FBD-201(2x) (SFM 200-350) RPM	FBD-202(5x) (SFM 150-300) RPM	FBD-201(2x) (SFM 150-225) RPM	FBD-202(5x) (SFM 125-200) RPM	FBD-201(2x) (SFM 100-150) RPM	FBD-202(5x) (SFM 90-150) RPM	FBD-201(2x) (SFM 60-90) RPM	FBD-202(5x) (SFM 60-90) RPM	
1/8	6112 - 10696	4584 - 9168	4584 - 6876	3820 - 6112	3056 - 4584	2750 - 4584	1834 - 2750	1834 - 2750	.001-.002
3/16	4075 - 7131	3056 - 6112	3056 - 4584	2547 - 4075	2037 - 3056	1834 - 3056	1222 - 1834	1222 - 1834	.0015-.003
1/4	3056 - 5348	2292 - 4584	2292 - 3438	1910 - 3056	1528 - 2292	1375 - 2292	917 - 1375	917 - 1375	.002-.003
5/16	2445 - 4278	1834 - 3667	1834 - 2750	1528 - 2445	1222 - 1834	1100 - 1834	733 - 1100	733 - 1100	.003-.004
3/8	2037 - 3565	1528 - 3056	1528 - 2292	1273 - 2037	1019 - 1528	917 - 1528	611 - 917	611 - 917	.005-.006
1/2	1528 - 2674	1146 - 2292	1146 - 1719	955 - 1528	764 - 1146	688 - 1146	458 - 688	458 - 688	.006-.007

Mild Carbon Steel/Gray Cast Iron

Tool Diam.	FBD-201(2x) (SFM 200-350) RPM**	FBD-202(5x) (SFM 150-300) RPM**	Inch per Revolution*
1/8	6112 - 10696	4584 - 9168	.002-.003
3/16	4075 - 7131	3056 - 6112	.003-.004
1/4	3056 - 5348	2292 - 4584	.004-.006
5/16	2445 - 4278	1834 - 3667	.006-.007
3/8	2037 - 3565	1528 - 3056	.006-.009
1/2	1528 - 2674	1146 - 2292	.009-.012

Use maximum RPM if it exceeds your machines RPM

Guide hole recommend if you get chatter. Pecking in small depths might help. Always start holes with short 2X drill first.

*Adjust inch per revolution to 50% when on angled surfaces is 30° or less.

*Adjust inch per revolution to 30% of recommended when on an angled or curved surface is greater than 30° or when the cutter is not fully encapsulated and only drilling a partial hole

** Adjust RPM to 70% of recommended RPM when on an angled or curved surface is greater than 30° or when the cutter is not fully encapsulated and only drilling a partial hole

When using FBD-202 (5x) use FBD-201(2x) to start the hole to reduce walking.

Thru coolant holes recommended on FBD-202 (5x) deep holes

If chip packing is a problem thru coolant holes are recommended. Pecking may help if you do not have thru coolant.



DM SERIES SPEEDS & FEEDS (Chipload per Tooth)

Tool Number	Cutter Diameter	Steels 30-40 Hrc		Steels 40-50 Hrc		Steels 50-60 Hrc	
		ROUGHING	FINISHING	ROUGHING	FINISHING	ROUGHING	FINISHING
DM-201-01	1/32"	0.0006-0.0008	0.0005-0.0006	0.0005-0.0006	0.0004-0.0005	0.0004-0.0005	0.0003-0.0004
DM-201-02	1/16"	0.0013-0.0015	0.0010-0.0013	0.0010-0.0013	0.0008-0.0010	0.0008-0.0010	0.0005-0.0008
DM-201-03	3/32"	0.0019-0.0023	0.0015-0.0019	0.0015-0.0019	0.0011-0.0015	0.0011-0.0015	0.0008-0.0011
DM-201-04	1/8"	0.0025-0.0030	0.0020-0.0025	0.0020-0.0025	0.0015-0.0020	0.0015-0.0020	0.0010-0.0015
DM-201-06	3/16"	0.0038-0.0045	0.0030-0.0038	0.0030-0.0038	0.0023-0.0030	0.0023-0.0030	0.0015-0.0023
DM-201-08	1/4"	0.0050-0.0060	0.0040-0.0050	0.0040-0.0050	0.0030-0.0040	0.0030-0.0040	0.0020-0.0030
DM-201-10	5/16"	0.0063-0.0075	0.0050-0.0063	0.0050-0.0063	0.0038-0.0050	0.0038-0.0050	0.0025-0.0038
DM-201-12	3/8"	0.0075-0.0090	0.0060-0.0075	0.0060-0.0075	0.0045-0.0060	0.0045-0.0060	0.0030-0.0045
DM-201-14	7/16"	0.0088-0.0105	0.0070-0.0088	0.0070-0.0088	0.0053-0.0070	0.0053-0.0070	0.0035-0.0053
DM-201-16	1/2"	0.0100-0.0120	0.0080-0.0100	0.0080-0.0100	0.0060-0.0080	0.0060-0.0080	0.0040-0.0060



DM SERIES (Roughing & Semi-Finishing)

Tool Number	Cutter Diameter	Rotations Per Minute (RPM)		
		STEELS 30-40Hrc	STEELS 40-50Hrc	STEELS 50-60Hrc
DM-201-01	1/32"	20,000-40,000	20,000-40,000	20,000-40,000
DM-201-02	1/16"	20,000-40,000	20,000-40,000	20,000-36,000
DM-201-03	3/32"	20,000-32,000	20,000-32,000	16,000-24,000
DM-201-04	1/8"	15,000-24,000	18,000-24,000	12,000-18,000
DM-201-06	3/16"	10,000-16,000	12,000-16,000	8,100-12,000
DM-201-08	1/4"	7,600-12,000	9,100-12,000	6,100-9,100
DM-201-10	5/16"	6,000-9,700	7,300-9,700	4,800-7,300
DM-201-12	3/8"	5,000-8,100	6,100-8,100	4,000-6,100
DM-201-14	7/16"	4,300-6,900	5,200-6,900	3,400-5,200
DM-201-16	1/2"	3,800-6,100	4,500-6,100	3,000-4,500



DM SERIES SPEEDS & FEEDS (Finishing)

Tool Number	Cutter Diameter	Rotations Per Minute (RPM)		
		STEELS 30-40Hrc	STEELS 40-50Hrc	STEELS 50-60Hrc
DM-201-01	1/32"	20,000-40,000	20,000-40,000	20,000-40,000
DM-201-02	1/16"	20,000-40,000	20,000-40,000	20,000-36,000
DM-201-03	3/32"	20,000-32,000	20,000-32,000	16,000-24,000
DM-201-04	1/8"	15,000-24,000	18,000-24,000	12,000-18,000
DM-201-06	3/16"	10,000-16,000	12,000-16,000	8,100-12,000
DM-201-08	1/4"	7,600-12,000	9,100-12,000	6,100-9,100
DM-201-10	5/16"	6,000-9,700	7,300-9,700	4,800-7,300
DM-201-12	3/8"	5,000-8,100	6,100-8,100	4,000-6,100
DM-201-14	7/16"	4,300-6,900	5,200-6,900	3,400-5,200
DM-201-16	1/2"	3,800-6,100	4,500-6,100	3,000-4,500

DM Series Guidelines

- Special diameters and lengths are available on a make-to-order basis.
- Air or mist coolant on materials greater than 40 HRC.

Radial Step Over



Roughing or Semi-Finishing
25% - 40% of tool diameter
Radial Step Over for finishing depends on finish requirements.

Axial Depth



30-40 Hrc Axial depth = 10% of tool diameter
40-50 Hrc Axial depth = 5% of tool diameter
50-60 Hrc Axial depth = 4% of tool diameter

Specific End Mill Speeds & Feeds



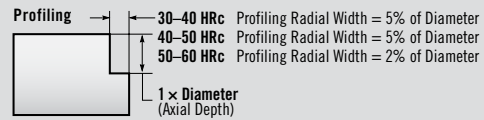
TM SERIES SPEEDS & FEEDS (Semi-Finishing & Finishing)

Tool Number	Cutter Diameter	Steels 30-40 HRC		Steels 40-50 HRC		Steels 50-60 HRC	
		ROUGHING	FINISHING	ROUGHING	FINISHING	ROUGHING	FINISHING
TM-201-01	1/32"	34,000-40,000	0.0001-0.00025	26,000-30,000	0.0001-0.0002	16,000-18,000	0.0001-0.0002
TM-201-02	1/16"	34,000-40,000	0.0003-0.0005	25000-30,000	0.0003-0.0005	16,000-18,000	0.0002-0.0004
TM-201-03	3/32"	22,000-26,000	0.0006-0.00075	16,000-19,000	0.0005-0.0007	10,000-12,000	0.0005-0.0006
TM-201-04	1/8"	17,000-20,000	0.0008-0.001	13,000-17,000	0.0007-0.0009	8,000-13,000	0.0006-0.0008
TM-201-06	3/16"	12,000-14,000	0.0011-0.0015	9,000-12,000	0.0001-0.0014	5,300-9,000	0.0009-0.0012
TM-201-08	1/4"	9,000-10,400	0.0015-0.002	7,000-9,000	0.0014-0.0018	4,000-6,600	0.0012-0.0016
TM-201-10	5/16"	7,200-8,300	0.0019-0.0025	5,500-7,200	0.0017-0.0023	3,200-5,400	0.0015-0.0020
TM-201-12	3/8"	6,000-6,900	0.0020-0.003	4,600-6,000	0.0018-0.0027	2,700-4,500	0.0016-0.0024
TM-201-14	7/16"	5,200-6,000	0.0023-0.0035	4,000-5,200	0.0021-0.0032	2,300-3,900	0.0019-0.0028
TM-201-16	1/2"	4,500-5,200	0.0025-0.004	3,500-4,500	0.0023-0.0036	2,100-3,500	0.0020-0.0032

(Use maximum RPM if suggested RPM is higher than the machine's capabilities)

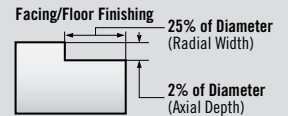
TM Series Guidelines

- Speeds and feeds are only general starting points and may vary depending on specific applications.
- Use Climb Milling for better finish and longer tool life.
- Air or mist coolant on materials greater than 40 HRC.
- Good machines, tool holders, and programming methods all help in extending tool life.
- The best way to engage into the material is by helical interpolation or entering from off the part.
- Use for tight areas like helical bores or tight corners. For large open areas use HM/MMH Series.



Additional Notes

- Special diameters, lengths, and corner radii are available on a make-to-order basis.
- Special draft angles (blend angle) or necked shanks for part clearance are available upon request and usually ship within the next business day.

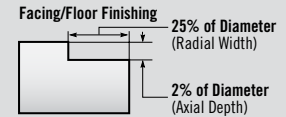
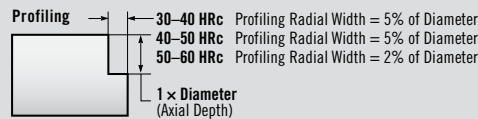


HM SERIES SPEEDS & FEEDS (Semi-Finishing & Finishing)

Tool Number	Cutter Diameter	Steels 30-40 HRC		Steels 40-50 HRC		Steels 50-60 HRC	
		RPM	CLPT	RPM	CLPT	RPM	CLPT
HM-402-04	1/8"	17,000-20,000	0.0008-0.001	13,000-17,000	0.0007-0.0009	8,000-13,000	0.0006-0.0008
HM-402-06	3/16"	12,000-14,000	0.0011-0.0015	9,000-12,000	0.0010-0.0014	5,300-9,000	0.0009-0.0012
HM-602-08	1/4"	9,000-10,400	0.0015-0.002	7,000-9,000	0.0014-0.0018	4,000-6,600	0.0012-0.0016
HM-602-10	5/16"	7,200-8,300	0.0019-0.0025	5,500-7,200	0.0017-0.0023	3,200-5,400	0.0015-0.0020
HM-602-12	3/8"	6,000-6,900	0.0020-0.003	4,600-6,000	0.0018-0.0027	2,700-4,500	0.0016-0.0024
HM-602-14	7/16"	5,200-6,000	0.0023-0.0035	4,000-5,200	0.0021-0.0032	2,300-3,900	0.0019-0.0028
HM-602-16	1/2"	4,500-5,200	0.0025-0.004	3,500-4,500	0.0023-0.0036	2,100-3,500	0.0020-0.0032
HM-602-20	5/8"	3,600-4,150	0.0026-0.0042	2,800-3,600	0.0023-0.0038	1,600-2,750	0.0021-0.0034
HM-802-24	3/4"	3,000-3,500	0.0028-0.005	2,300-3,000	0.0025-0.0045	1,350-2,250	0.0023-0.0041
HM-102-32	1"	2,200-2,600	0.0030-0.006	1,700-2,200	0.0027-0.0054	1,000-1,700	0.0024-0.0049

HM Series Guidelines

- Speeds and feeds are only general starting points and may vary depending on specific applications.
- Use Climb Milling for better finish and longer tool life.
- Air or mist coolant on materials greater than 40 HRC.
- Good machines, tool holders, and programming methods all help in extending tool life.
- The best way to engage into the material is by helical interpolation or entering from off the part.
- Use for open areas of floors or walls. For tight areas like helical bores or tight corners use TM/MTM Series.



GRAPHITE SPEEDS & FEEDS (Chipload per Tooth) P38 Series Diamond Coated

Tool Diameter	Soft Graphite Chipload		Medium Graphite Chipload		Hard Graphite Chipload	
	Roughing (ipt)	Finishing (ipt)	Roughing (ipt)	Finishing (ipt)	Roughing (ipt)	Finishing (ipt)
1/32"	0.0006-0.0008	0.0005-0.0006	0.0005-0.0006	0.0004-0.0005	0.0004-0.0005	0.0003-0.0004
1/16"	0.0013-0.0015	0.0010-0.0013	0.0010-0.0013	0.0008-0.0010	0.0008-0.0010	0.0005-0.0008
3/32"	0.0019-0.0023	0.0015-0.0019	0.0015-0.0019	0.0011-0.0015	0.0011-0.0015	0.0008-0.0011
1/8"	0.0025-0.0030	0.0020-0.0025	0.0020-0.0025	0.0015-0.0020	0.0015-0.0020	0.0010-0.0015
3/16"	0.0038-0.0045	0.0030-0.0038	0.0030-0.0038	0.0023-0.0030	0.0023-0.0030	0.0015-0.0023
1/4"	0.0050-0.0060	0.0040-0.0050	0.0040-0.0050	0.0030-0.0040	0.0030-0.0040	0.0020-0.0030
5/16"	0.0063-0.0075	0.0050-0.0063	0.0050-0.0063	0.0038-0.0050	0.0038-0.0050	0.0025-0.0038
3/8"	0.0075-0.0090	0.0060-0.0075	0.0060-0.0075	0.0045-0.0060	0.0045-0.0060	0.0030-0.0045
7/16"	0.0088-0.0105	0.0070-0.0088	0.0070-0.0088	0.0053-0.0070	0.0053-0.0070	0.0035-0.0053
1/2"	0.0100-0.0120	0.0080-0.0100	0.0080-0.0100	0.0060-0.0080	0.0060-0.0080	0.0040-0.0060

Graphite Hardness	Cutting Speed
	Square ft./min
Soft Graphite	1000-2000 sfm
Medium Graphite	750-1500 sfm
Hard Graphite	500-1250 sfm

Speeds and Feeds are only general starting points and may vary depending on specific applications.

SAWS

Material	Max Axial Depth/Pass (Times Thickness)	Teeth	Inch					Metric			
			SFM Surface Feet/Minute	Chip Load per Tooth – Standard			SMM Surface Meters/Minute	Chip Load per Tooth – Metric			
				Saw Thickness .002"-.031"	Saw Thickness .031"-.100"	Saw Thickness >.100"		Saw Thickness .05mm-1.0mm	Saw Thickness 1.0mm-3.0mm	Saw Thickness >3.0mm	
Aluminum / Non-Ferrous											
Ferrous											
2024	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
6061 (T1-T3)	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
6061 (T4-T6)	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
7075	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
Non-Ferrous											
Brass	4	Coarse	750	.000234"/.000273"	.000273"/.00052"	0.00052"	230	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
Copper	4	Coarse	600	.000234"/.000273"	.000273"/.00052"	0.00052"	190	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
Magnesium	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
Titanium, Steel and High-Temp Alloys											
Titanium											
Commercially Pure	2	Fine	700	.00018"/.00021"	.00021"/.0004"	0.0004"	210	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
6AL-4V	2	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	105	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
6AL-6V	2	Fine	230	.00018"/.00021"	.00021"/.0004"	0.0004"	70	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
Steel											
1018-1020	4	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	110	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
4130	2	Fine	260	.00018"/.00021"	.00021"/.0004"	0.0004"	80	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
4140	2	Fine	220	.00018"/.00021"	.00021"/.0004"	0.0004"	70	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
4340	2	Fine	280	.00018"/.00021"	.00021"/.0004"	0.0004"	90	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
Tool Steel Annealed											
A2	2	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	110	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
D2	2	Fine	260	.00018"/.00021"	.00021"/.0004"	0.0004"	80	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
H13	2	Fine	230	.00018"/.00021"	.00021"/.0004"	0.0004"	70	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
P20	2	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	110	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
Stainless Steel											
303	2	Fine	500	.00018"/.00021"	.00021"/.0004"	0.0004"	150	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
304	2	Fine	200	.00018"/.00021"	.00021"/.0004"	0.0004"	70	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
316	2	Fine	240	.00018"/.00021"	.00021"/.0004"	0.0004"	75	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
15-5/17-4 PH	2	Fine	200	.00018"/.00021"	.00021"/.0004"	0.0004"	60	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
440C	2	Fine	200	.00018"/.00021"	.00021"/.0004"	0.0004"	60	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
Inconel											
625 / 718	2	Fine	100	.00018"/.00021"	.00021"/.0004"	0.0004"	30	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
Composites											
G10 Fiberglass/Polyester	4	Coarse	1000	.000234"/.000273"	.000273"/.00052"	0.00052"	300	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
Graphite	4	Coarse	1000	.000234"/.000273"	.000273"/.00052"	0.00052"	300	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
Graphite Fiber/Epoxy	4	Coarse	800	.000234"/.000273"	.000273"/.00052"	0.00052"	250	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
Other Material Applications											
Cast Iron											
Ductile Iron	2	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	110	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
Gray Cast Iron	2	Fine	500	.00018"/.00021"	.00021"/.0004"	0.0004"	150	.0046mm/.0053mm	.0053mm/.010mm	0.010mm	
Wood & Plastics											
Wood	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	
Plastics	4	Coarse	1600	.000234"/.000273"	.000273"/.00052"	0.00052"	400	.0059mm/.0069mm	.0069mm/.013mm	0.013mm	

Speeds & Feeds



ET SPEEDS & FEEDS

Material	5000 RPM	7500 RPM	10,000 RPM
	in/min	in/min	in/min
NON-FERROUS METALS			
Aluminum/Aluminum Alloys	10 ipm	15 ipm	20 ipm
Brass/Bronze	10 ipm	15 ipm	20 ipm
Copper/Copper Alloys	10 ipm	15 ipm	20 ipm
Magnesium	10 ipm	15 ipm	20 ipm
COMPOSITES			
G10 Fiberglass	15 ipm	22.5 ipm	30 ipm
Graphite	15 ipm	22.5 ipm	30 ipm
Carbon Fiber	15 ipm	22.5 ipm	30 ipm
Plastics	15 ipm	22.5 ipm	30 ipm
FERROUS METALS			
Cast Iron	5 ipm	7.5 ipm	10 ipm
Steel, Low Carbon	5 ipm	7.5 ipm	10 ipm
Steel, Medium Carbon	7.5 ipm	11.25 ipm	15 ipm
Steel, Hardened	2.5 ipm	3.75 ipm	5 ipm
Stainless Steel, Soft	5 ipm	7.5 ipm	10 ipm
Stainless Steel, Hard	2.5 ipm	3.75 ipm	5 ipm
Inconel	4 ipm	6 ipm	8 ipm
Titanium, Soft	5 ipm	7.5 ipm	10 ipm
Titanium, Hard	2.5 ipm	3.75 ipm	5 ipm



WOOD SERIES SPEEDS & FEEDS

Material	RPM (1/4")	Feed Inches/Minute
Wood		
Hardwoods	18,000	180–250
Softwoods	18,000	180–250
MDF	18,000	150–250
Laminated Materials	18,000	150–250
Plastics, Others		
Solid Surface	15,300	70–130
Fiberglass	15,300	80–150
Phenolic	15,300	80–150
Aluminum (Soft)	18,000	90–120
Aluminum (Aircraft Grade)	18,000	180–230
Copper	9,200	45–60
Foam	18,000	150–300
Plastics (Soft)	18,000	180–250
Plastics (Hard)	18,000	150–200

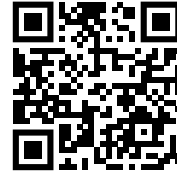
General Guidelines

- Select the shortest flute length possible for the application. Shorter flute length router tools offer better stability and increased feed rates.
- Select the largest diameter tool for the job. Increasing diameter by 10% provides 25% more strength.
- Adjust RPM and feed rate to reduce vibration. Vibration will cause poor finish and chip tools. Feed rates that are too slow can also cause vibration and poor tool life.
- Regular cleaning of tool holders and collets help ensure the tool's performance and life.
- Securing the part as rigidly as possible will improve finishes and tool life.

Visit RobbJack's New Website!

Dynamic Tool Search

at RobbJack.com



1 Click on RJ Tool Search to find the exact tool you're looking for.

2 Make your selections here

3 See Search Results Here

4 Click on a Tool Number

5 Complete Tool Description

Now Online!

Speed & Feed Calculations now online robbjack.com/speeds-and-feeds/

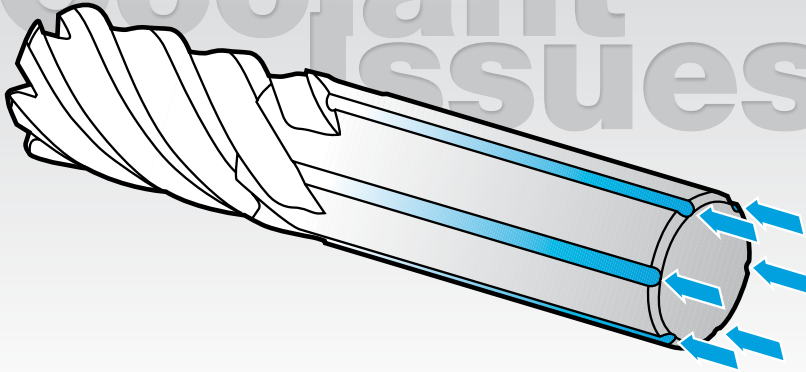
- ▶ Quick, easy calculations, both metric and standard
- ▶ End mill speeds and feeds
- ▶ Slitting saw speeds and feeds
- ▶ Troubleshooting
- ▶ Printable results
- ▶ Simultaneous tool recommendations



Tools with coatings or other modifications are non returnable.

End Mill Modifications

Coolant Grooves



Coolant Grooves allow coolant to flow around the outside of the tool for through-spindle coolant applications. It is a lower-cost option to through-the-tool coolant holes.

To order a RobbJack tool with a **Coolant Grooves**, use the existing standard *Part Number*, and add **-CG**.

Example:

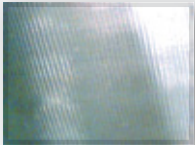
An A1-201-12 with coolant grooves is Part Number:

▶ **A1-201-12-CG**
See price sheet for pricing



Mirror Edge™

Our edge preparation dampens vibration to help eliminate chatter.



Mirror Edge



Non-Mirror Edge

Applications

- Deep pocket and thin wall aluminum
- Long reaches more than 3:1 length-to-diameter ratio
- Plunging corners in titanium, steels, stainless, aluminum, etc.
- High end valves used with Feather Blend and T-Process

Must Use Coolant

Our patented Mirror Edge geometry helps to eliminate chatter. This geometry can be used in any application where chatter is a problem, usually for thin walls, valves, deep pockets or where the tool sticks out more than 3:1 length to diameter ratio.

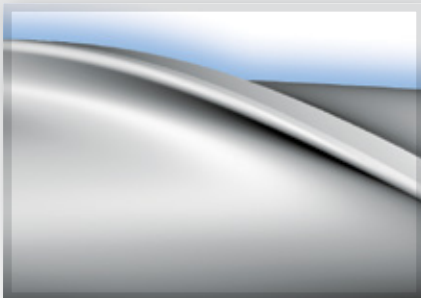
To order RobbJack tools with **Mirror Edge**, use the existing standard *Part Number*, and add **-ME**.

Example:

An A1-201-12 with Mirror Edge is Part Number:

▶ **A1-201-12-ME**
See price sheet for pricing

T-Process



T-Process is a honed edge we put on an end mill to help eliminate chipping.



Pros: T-Process strengthens the edge, helps eliminate chipping and gives a smooth edge. **Cons:** T-Process will bring up a burr in certain materials, and it is not for materials that like a sharp edge, such as aluminum and plastics.

To order a RobbJack tool with a **T-Process**, use the existing standard *Part Number*, and add **-TP**.

Example:

An XG-402-16 with a T-Process is Part Number:

▶ **XG-402-16-TP**
See price sheet for pricing

Tools with coatings or other modifications are non returnable.



Reach

Modify any standard tool with a neck to get the job done quickly.

A neck will increase rigidity, reduce tool deflection and last longer than a long length of cut tool. Necking can be added to most standard tools in 1–2 days.

To order a RobbJack tool with a **Reach**, use the existing standard *Part Number*, and add *-N* and the desired length from the end of the tool.

Example:

An A1-201-12 necked with 1.0" Reach is Part Number:

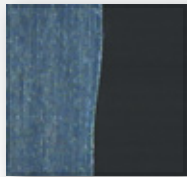
▶ **A1-201-12-N 1.0"**

See price sheet for pricing

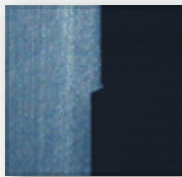
A tool necked with Feather Blend has a reduction in the tool diameter after the cutting length so the tool can cut deeper than its cutting length. It features a smooth transition from the cutting diameter to the neck diameter. Feather Blend reduces staircase marks and stress risers in parts and helps maintain the strongest tool possible.

Feather Blend™

A smooth transition from the cutting diameter to the neck diameter.



Feather Blend



Standard Neck

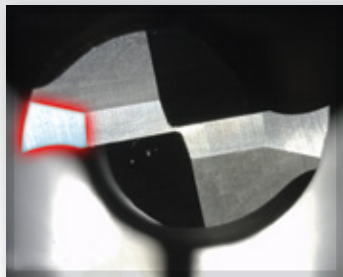
Applications

- Any necked tool
- Eliminates swirl lines during plunging
- Eliminates stress risers in parts



Swirl Marks?

Wiper Flats



A Wiper Flat is a small flat on the end of the tool where there is no concavity. It is used to minimize swirl marks on the floor of parts.



Pros: A Wiper Flat gives better floor finishes. **Cons:** Wiper Flats will increase surface contact, not for use on thin floors.

To order a RobbJack tool with a **Wiper Flats**, use the existing standard *Part Number*, and add *-WF*.

Example:

An A1-201-12 with wiper flats is Part Number:

▶ **A1-201-12-WF**

See price sheet for pricing

45° Chamfer



To order a RobbJack tool with a **45° Chamfer**, use the existing standard *Part Number*, add *-CH* and amount of *Chamfer*.

Example:

A1-201-12 with a .040" 45° chamfer is Part Number:

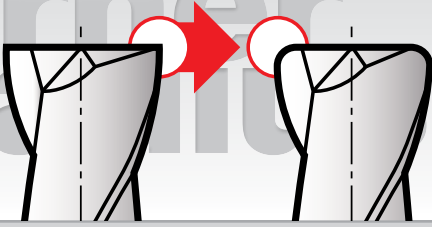
▶ **A1-201-12-CH .040"**

See price sheet for pricing

Tools with coatings or other modifications are non returnable.

End Mill Modifications

Corner Radius



To order a RobbJack tool with a **Corner Radius**, use the existing standard *Part Number*, add **-CR** and desired *Radius Size*.

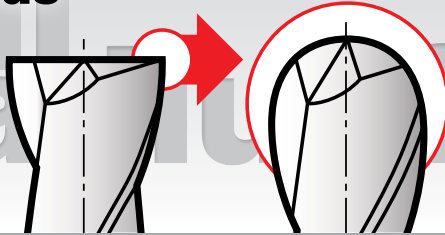
Example: An A1-201-12 with a .005 corner radius is Part Number:

▶ **A1-201-12-CR .005**

See price sheet for pricing

SPECIAL NOTE: 2 flutes under .050" call for pricing.
3 or more flutes under .080" call for pricing.

Full Radius



To order a RobbJack tool with a **Full Radius** (or Ball End), use the existing standard *Part Number*, and add **-BN**.

Example: An A1-201-12 with a Full Radius (Ball End) is Part Number:

▶ **A1-201-12-BN**

See price sheet for pricing

Weldon Flats



To order RobbJack tools with **Weldon Flats**, use the existing standard *Part Number*, and add **-FL**.

Example: An A1-201-12 with a Weldon Flat is Part Number:

▶ **A1-201-12-FL**

No Charge

Regrinding

Let RobbJack recondition your used cutting tools and get RobbJack quality grinds and specifications on tools with any brand name!

Wouldn't it be nice if resharpened tools performed as well as new? Let us regrind yours the way we do ours and it can happen. We will add our grinds and finishes to any tools, regardless of manufacturer. Our prices are competitive, our delivery is the best in the industry, and we do our own, in-house PVD coatings and re-coatings.

GO GREEN

Try RobbJack's in-house carbide recycling program.

Many times the tools we receive for regrinding are too badly damaged to justify reconditioning. For all tools that we determine fall into this category, **we will either:**

▶ **Return the tools to you marked "No Work Done" (NWD)**

OR...

▶ **Put the tools, as scrap, into our recycling program and send you a certificate for a 10% discount on your next regrinding order.**

We will offer you this choice every time we receive tools that we determine are NWD. We recycle scrap tools to carbide re-manufacturers, who crush the tools and use the recycled shards and powder to make shredders or non-critical carbide grades.

YOUR OWN COATING

Get state-of-the art coating technology without delivery hassles.

RobbJack owns and operates their PVD coating facility in Lincoln, CA under the tenets of ISO9000 certification. Our factory-trained technicians take the same special care with your tools as with ours, assuring you of the best PVD coatings available. We do this as part of our process, reducing or eliminating delays in delivery.

Download our Regrinding Order Form at www.robbjack.com/technical/regrindform to get started.

Or email or call us!

Phone: (916) 645-6045
Toll-Free: (800) 527-8883
Fax: (916) 645-0146

sales@robbjack.com
sherry@robbjack.com



Tools with coatings or other modifications are non returnable.



TiN PVD Coating Titanium Nitride

TiN is a general purpose coating for ferrous materials. Some prefer TiN coating in kovar material others prefer AlTiN coating in kovar.

To order a RobbJack tool with a **TiN Coating**, use the existing standard Part Number, and add *-T*.

Example:

▶ **C1-301-16-T**
See price sheet for pricing



TiCN PVD Coating Titanium Carbo-Nitride

TiCN adds Carbon into the traditional TiN coating for added hardness and abrasion resistance.

To order a RobbJack tool with a **TiCN Coating**, use the existing standard Part Number, and add *-C*.

Example:

▶ **C1-301-16-C**
See price sheet for pricing



AlTiN PVD Coating Aluminum Titanium Nitride

The best PVD coating for high heat applications due to its ability to resist high temperatures. Used for ferrous materials and difficult alloys such as inconel, titanium, stainless steel, very hard die mold materials up to 70 HRc, and other steel alloys. AlTiN coating has a unique ability to form an aluminum oxide heat shield during cutting that helps block heat from effecting the tool and pushes the heat into the chip. An excellent coating when dry machining of ferrous materials is needed.

To order a RobbJack tool with an **AlTiN Coating**, use the existing standard Part Number, and add *-A*.

Example:

▶ **C1-301-16-A**
See price sheet for pricing



DLC PVD Coating Diamond-Like Carbon

DLC- Diamond Like Carbon coating also known as amorphous diamond is a very hard lubricous coating that works well in non-ferrous applications like aluminum, copper , and high silicon aluminum. DLC coating is the best coating when you have to cut aluminum and copper with no coolant or MQL (minimum quantity lubricant). It is recommended to use coolant in these applications but if the application does not allow coolant, DLC is still the best coating.

To order a RobbJack tool with a **DLC Coating**, use the existing standard Part Number, and add *-DLC*.

Example:

▶ **C1-301-16-DLC**
See price sheet for pricing

Tools for ALUMINUM



Aluminum Machining Without Chatter!

Scan this code to:

- Watch Videos
- Get Technical Info
- Get Tips and Tricks to Cut Thin Wall and Deep Pocket Parts
- And More...

Featured Tools: FM/FMHV Series – 41 Hours vs 1 Hour*

**MAX RPM!
MAX Feed Rate!
No Chatter!**

Cycle Time Before FM

*Actual results from a major defense manufacturer in deep pocket/thin wall aluminum



VS.

Cycle Time After FM

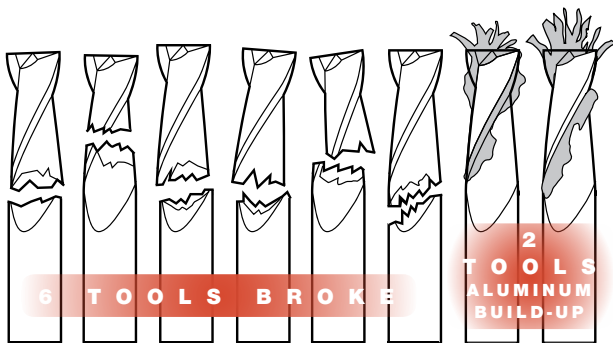


"I just wish we tried this tool sooner! It is truly amazing!"

Eliminate Tool Pull Out!
ALL Tools H4 Shank Tolerance up to 150% more gripping force
Tightest in the Industry!



A1-303/AL3 The **Only** Tool That Could Make the Part*



8 Other High-Performance Tools (Tried and Failed)

* Automotive aluminum part. No chatter, superfast feed rates, very high production 450 ipm in an aluminum extrusion.


















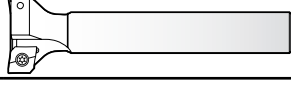

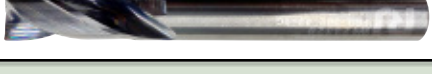
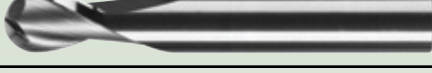
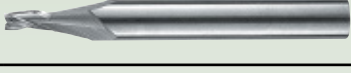





VS.

1 RJ A1-303 Tool

**MAX RPM!
MAX Feed Rate!
No Chatter!**

A1-303 Series: Polished & Mirror Edge!



AL3 303/304/305	 3 Flute Chatter Reduction Hi-Performance with radii Standard, Long, and Extra-Long length		22
A1 / MA1 201	2 flute Stub Length tool to reduce required Horse-Power		28
A1 / MA1 303	3 Flute Chatter Reduction Hi-Performance with chamfer Standard length		30
FMHV 201-205/301-305	 2 & 3 Flute High Velocity Chatter Reduction with Reach and Radii for High Horse-Power Short, Medium, Long, and Extra-Long length		32
MFMHV  201-205/301-305	 2 & 3 Flute High Velocity Chatter Reduction with Reach and Radii for High Horse-Power Short, Medium, Long, and Extra-Long length		40
FM 201-205/301-305	2 & 3 Flute Chatter Reduction with Reach and Radii Short, Medium, Long, and Extra-Long length		52
MFM  201-205/301-305	2 & 3 Flute Chatter Reduction with Reach and Radii Short, Medium, Long, and Extra-Long length		60
S1 / MS1 201/301/401	2,3,4 Flute Stub Length		66
C1 / MC1 201/301/401	2,3,4 Flute Standard Length		68
PM / MPM / PMD Routers	1 Flute Router for Gummy Material		70
WU1 / WD1 310	3 Flute Up and Down-Shear Standard Length		71
AIC / INS FaceMills	 Insertable Face Mill and Polished Inserts		72
FBD 201/202	 Flat Bottom Drills for Aluminum 3x and 5x Lengths		74
SB / MSB 201 B / MB 203	2 Flute Ball End (See Multiple Applications)		156
C8 201/203/301/303	2 and 3 Flute on 1/4" Shank (See Multiple Applications)		151
NR / MNR 204/303/404	2, 3 and 4 Flute (See Multiple Applications)		160
PCD 203 Routers	2 Flute PCD-Tipped Routers (See Composites & Plastics)		109
PCD-BN 201 Routers	2 Flute PCD-Tipped Routers, Ball Nose (See Composites & Plastics)		109
MINIATURES	(See Miniatures Applications)		132
SAWS	(See Saws Applications)		170

AL3 3 Flute High Performance Aluminum Carbide End Mill



Characteristics

- Square End
- Corner Radius
- 3 Flute
- 35° Helix
- Mirror Edge
- Polished
- Thru Coolant Holes

Applications

- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Wet

Materials

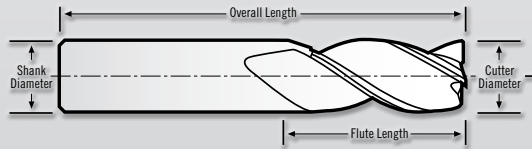
- Aluminum
- Copper
- Magnesium
- Brass

Coatings

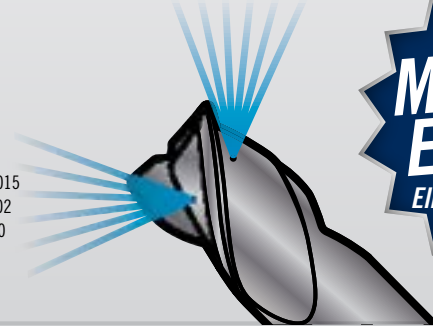
- Diamond-Like Carbon (DLC)

Eliminate Tool Pull Out!
 ALL Tools h4 Shank Tolerance up to 150% more gripping force
Tightest in the Industry!

NEXT GENERATION Mirror Edge!
 Eliminates Chatter & Vibration



AL3 Series Tolerances:
 Cutting Dia. = $-.0007/-0.0015$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+.060/-0.000$
 OAL = $+/- .060$



NEW!

AL3 3 Flute

	Cutting Diam.	Shank Diam.	Flute Length	Corner radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
STANDARD	1/8"	1/8"	3/8"	Sharp Corner	1-1/2"	AL3-303-04	AL3-303-04-DLC	AL3-303-04-TC*	AL3-303-04-TC-DLC*	1/8" DIAMETER
	1/8"	1/8"	3/8"	0.01"	1-1/2"	AL3-303-04-010	AL3-303-04-010-DLC	AL3-303-04-010-TC*	AL3-303-04-010-TC-DLC*	
	1/8"	1/8"	3/8"	0.03"	1-1/2"	AL3-303-04-030	AL3-303-04-030-DLC	AL3-303-04-030-TC*	AL3-303-04-030-TC-DLC*	
	1/8"	1/8"	3/8"	Ball End	1-1/2"	AL3-303-04-BN	AL3-303-04-BN-DLC			
LONG	1/8"	1/8"	5/8"	Sharp Corner	2"	AL3-304-04	AL3-304-04-DLC	AL3-304-04-TC*	AL3-304-04-TC-DLC*	1/8" DIAMETER
	1/8"	1/8"	5/8"	0.01"	2"	AL3-304-04-010	AL3-304-04-010-DLC	AL3-304-04-010-TC*	AL3-304-04-010-TC-DLC*	
	1/8"	1/8"	5/8"	0.03"	2"	AL3-304-04-030	AL3-304-04-030-DLC	AL3-304-04-030-TC*	AL3-304-04-030-TC-DLC*	
	1/8"	1/8"	5/8"	Ball End	2"	AL3-304-04-BN	AL3-304-04-BN-DLC			
EXTRA LONG	1/8"	1/8"	1"	Sharp Corner	2"	AL3-305-04	AL3-305-04-DLC	AL3-305-04-TC*	AL3-305-04-TC-DLC*	1/8" DIAMETER
	1/8"	1/8"	1"	0.01"	2"	AL3-305-04-010	AL3-305-04-010-DLC	AL3-305-04-010-TC*	AL3-305-04-010-TC-DLC*	
	1/8"	1/8"	1"	0.03"	2"	AL3-305-04-030	AL3-305-04-030-DLC	AL3-305-04-030-TC*	AL3-305-04-030-TC-DLC*	
	1/8"	1/8"	1"	Ball End	2"	AL3-305-04-BN	AL3-305-04-BN-DLC			
STANDARD	3/16"	3/16"	9/16"	Sharp Corner	2"	AL3-303-06	AL3-303-06-DLC	AL3-303-06-TC*	AL3-303-06-TC-DLC*	3/16" DIAMETER
	3/16"	3/16"	9/16"	0.01"	2"	AL3-303-06-010	AL3-303-06-010-DLC	AL3-303-06-010-TC*	AL3-303-06-010-TC-DLC*	
	3/16"	3/16"	9/16"	0.03"	2"	AL3-303-06-030	AL3-303-06-030-DLC	AL3-303-06-030-TC*	AL3-303-06-030-TC-DLC*	
	3/16"	3/16"	9/16"	0.06"	2"	AL3-303-06-060	AL3-303-06-060-DLC	AL3-303-06-060-TC*	AL3-303-06-060-TC-DLC*	
	3/16"	3/16"	9/16"	Ball End	2"	AL3-303-06-BN	AL3-303-06-BN-DLC			
LONG	3/16"	3/16"	3/4"	Sharp Corner	2"	AL3-304-06	AL3-304-06-DLC	AL3-304-06-TC*	AL3-304-06-TC-DLC*	3/16" DIAMETER
	3/16"	3/16"	3/4"	0.01"	2"	AL3-304-06-010	AL3-304-06-010-DLC	AL3-304-06-010-TC*	AL3-304-06-010-TC-DLC*	
	3/16"	3/16"	3/4"	0.03"	2"	AL3-304-06-030	AL3-304-06-030-DLC	AL3-304-06-030-TC*	AL3-304-06-030-TC-DLC*	
	3/16"	3/16"	3/4"	0.06"	2"	AL3-304-06-060	AL3-304-06-060-DLC	AL3-304-06-060-TC*	AL3-304-06-060-TC-DLC*	
	3/16"	3/16"	3/4"	Ball End	2"	AL3-304-06-BN	AL3-304-06-BN-DLC			

* non center cutting single thru hole for 1/8" and 3/16" diameters

Due to the large offering of AL3 series many of these are made to order and non-returnable.

NEW!



Aluminum

AL3 3 Flute – continued



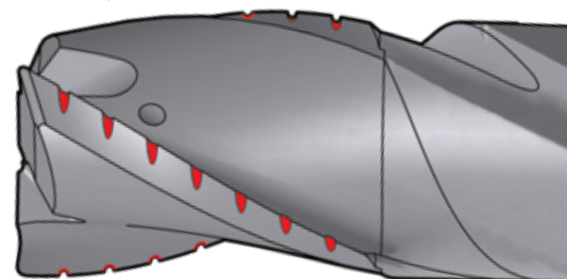
	Cutting Diam.	Shank Diam.	Flute Length	Corner radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
EXTRA LONG	3/16"	3/16"	1"	Sharp Corner	2-1/2"	AL3-305-06	AL3-305-06-DLC	AL3-305-06-TC*	AL3-305-06-TC-DLC*	3/16" DIAMETER
	3/16"	3/16"	1"	0.01"	2-1/2"	AL3-305-06-010	AL3-305-06-010-DLC	AL3-305-06-010-TC*	AL3-305-06-010-TC-DLC*	
	3/16"	3/16"	1"	0.03"	2-1/2"	AL3-305-06-030	AL3-305-06-030-DLC	AL3-305-06-030-TC*	AL3-305-06-030-TC-DLC*	
	3/16"	3/16"	1"	0.06"	2-1/2"	AL3-305-06-060	AL3-305-06-060-DLC	AL3-305-06-060-TC*	AL3-305-06-060-TC-DLC*	
	3/16"	3/16"	1"	Ball End	2-1/2"	AL3-305-06-BN	AL3-305-06-BN-DLC			
STANDARD	1/4"	1/4"	3/4"	Sharp Corner	2-1/2"	AL3-303-08	AL3-303-08-DLC	AL3-303-08-TC	AL3-303-08-TC-DLC	1/4" DIAMETER
	1/4"	1/4"	3/4"	0.01"	2-1/2"	AL3-303-08-010	AL3-303-08-010-DLC	AL3-303-08-010-TC	AL3-303-08-010-TC-DLC	
	1/4"	1/4"	3/4"	0.03"	2-1/2"	AL3-303-08-030	AL3-303-08-030-DLC	AL3-303-08-030-TC	AL3-303-08-030-TC-DLC	
	1/4"	1/4"	3/4"	0.06"	2-1/2"	AL3-303-08-060	AL3-303-08-060-DLC	AL3-303-08-060-TC	AL3-303-08-060-TC-DLC	
	1/4"	1/4"	3/4"	0.09"	2-1/2"	AL3-303-08-090	AL3-303-08-090-DLC	AL3-303-08-090-TC	AL3-303-08-090-TC-DLC	
	1/4"	1/4"	3/4"	Ball End	2-1/2"	AL3-303-08-BN	AL3-303-08-BN-DLC	AL3-303-08-BN-TC	AL3-303-08-BN-TC-DLC	
LONG	1/4"	1/4"	1"	Sharp Corner	3"	AL3-304-08	AL3-304-08-DLC	AL3-304-08-TC	AL3-304-08-TC-DLC	1/4" DIAMETER
	1/4"	1/4"	1"	0.01"	3"	AL3-304-08-010	AL3-304-08-010-DLC	AL3-304-08-010-TC	AL3-304-08-010-TC-DLC	
	1/4"	1/4"	1"	0.03"	3"	AL3-304-08-030	AL3-304-08-030-DLC	AL3-304-08-030-TC	AL3-304-08-030-TC-DLC	
	1/4"	1/4"	1"	0.06"	3"	AL3-304-08-060	AL3-304-08-060-DLC	AL3-304-08-060-TC	AL3-304-08-060-TC-DLC	
	1/4"	1/4"	1"	0.09"	3"	AL3-304-08-090	AL3-304-08-090-DLC	AL3-304-08-090-TC	AL3-304-08-090-TC-DLC	
	1/4"	1/4"	1"	Ball End	3"	AL3-304-08-BN	AL3-304-08-BN-DLC	AL3-304-08-BN-TC	AL3-304-08-BN-TC-DLC	
EXTRA LONG	1/4"	1/4"	1-1/4"	Sharp Corner	3"	AL3-305-08	AL3-305-08-DLC	AL3-305-08-TC	AL3-305-08-TC-DLC	1/4" DIAMETER
	1/4"	1/4"	1-1/4"	0.01"	3"	AL3-305-08-010	AL3-305-08-010-DLC	AL3-305-08-010-TC	AL3-305-08-010-TC-DLC	
	1/4"	1/4"	1-1/4"	0.03"	3"	AL3-305-08-030	AL3-305-08-030-DLC	AL3-305-08-030-TC	AL3-305-08-030-TC-DLC	
	1/4"	1/4"	1-1/4"	0.06"	3"	AL3-305-08-060	AL3-305-08-060-DLC	AL3-305-08-060-TC	AL3-305-08-060-TC-DLC	
	1/4"	1/4"	1-1/4"	0.09"	3"	AL3-305-08-090	AL3-305-08-090-DLC	AL3-305-08-090-TC	AL3-305-08-090-TC-DLC	
	1/4"	1/4"	1-1/4"	Ball End	3"	AL3-305-08-BN	AL3-305-08-BN-DLC	AL3-305-08-BN-TC	AL3-305-08-BN-TC-DLC	
STANDARD	5/16"	5/16"	15/16"	Sharp Corner	2-1/2"	AL3-303-10	AL3-303-10-DLC	AL3-303-10-TC	AL3-303-10-TC-DLC	5/16" DIAMETER
	5/16"	5/16"	15/16"	0.01"	2-1/2"	AL3-303-10-010	AL3-303-10-010-DLC	AL3-303-10-010-TC	AL3-303-10-010-TC-DLC	
	5/16"	5/16"	15/16"	0.03"	2-1/2"	AL3-303-10-030	AL3-303-10-030-DLC	AL3-303-10-030-TC	AL3-303-10-030-TC-DLC	
	5/16"	5/16"	15/16"	0.06"	2-1/2"	AL3-303-10-060	AL3-303-10-060-DLC	AL3-303-10-060-TC	AL3-303-10-060-TC-DLC	
	5/16"	5/16"	15/16"	0.09"	2-1/2"	AL3-303-10-090	AL3-303-10-090-DLC	AL3-303-10-090-TC	AL3-303-10-090-TC-DLC	
	5/16"	5/16"	15/16"	0.12"	2-1/2"	AL3-303-10-120	AL3-303-10-120-DLC	AL3-303-10-120-TC	AL3-303-10-120-TC-DLC	
	5/16"	5/16"	15/16"	Ball End	2-1/2"	AL3-303-10-BN	AL3-303-10-BN-DLC	AL3-303-10-BN-TC	AL3-303-10-BN-TC-DLC	
LONG	5/16"	5/16"	1-1/4"	Sharp Corner	3"	AL3-304-10	AL3-304-10-DLC	AL3-304-10-TC	AL3-304-10-TC-DLC	5/16" DIAMETER
	5/16"	5/16"	1-1/4"	0.01"	3"	AL3-304-10-010	AL3-304-10-010-DLC	AL3-304-10-010-TC	AL3-304-10-010-TC-DLC	
	5/16"	5/16"	1-1/4"	0.03"	3"	AL3-304-10-030	AL3-304-10-030-DLC	AL3-304-10-030-TC	AL3-304-10-030-TC-DLC	
	5/16"	5/16"	1-1/4"	0.06"	3"	AL3-304-10-060	AL3-304-10-060-DLC	AL3-304-10-060-TC	AL3-304-10-060-TC-DLC	
	5/16"	5/16"	1-1/4"	0.09"	3"	AL3-304-10-090	AL3-304-10-090-DLC	AL3-304-10-090-TC	AL3-304-10-090-TC-DLC	
	5/16"	5/16"	1-1/4"	0.12"	3"	AL3-304-10-120	AL3-304-10-120-DLC	AL3-304-10-120-TC	AL3-304-10-120-TC-DLC	
	5/16"	5/16"	1-1/4"	Ball End	3"	AL3-304-10-BN	AL3-304-10-BN-DLC	AL3-304-10-BN-TC	AL3-304-10-BN-TC-DLC	

* non center cutting single thru hole for 1/8" and 3/16" diameters

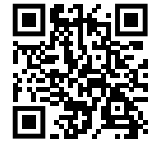
Due to the large offering of AL3 series many of these are made to order and non-returnable.

Chip Breakers

All AL3-304 (Long Length) and AL3-305 (Extra Long Length) come standard with Chip Breakers to control chips!



AL3 3 Flute High Performance Aluminum Carbide End Mill



AL3 3 Flute – continued



	Cutting Diam.	Shank Diam.	Flute Length	Corner radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
EXTRA LONG	5/16"	5/16"	1-9/16"	Sharp Corner	3"	AL3-305-10	AL3-305-10-DLC	AL3-305-10-TC	AL3-305-10-TC-DLC	5/16" DIAMETER
	5/16"	5/16"	1-9/16"	0.01"	3"	AL3-305-10-010	AL3-305-10-010-DLC	AL3-305-10-010-TC	AL3-305-10-010-TC-DLC	
	5/16"	5/16"	1-9/16"	0.03"	3"	AL3-305-10-030	AL3-305-10-030-DLC	AL3-305-10-030-TC	AL3-305-10-030-TC-DLC	
	5/16"	5/16"	1-9/16"	0.06"	3"	AL3-305-10-060	AL3-305-10-060-DLC	AL3-305-10-060-TC	AL3-305-10-060-TC-DLC	
	5/16"	5/16"	1-9/16"	0.09"	3"	AL3-305-10-090	AL3-305-10-090-DLC	AL3-305-10-090-TC	AL3-305-10-090-TC-DLC	
	5/16"	5/16"	1-9/16"	0.12"	3"	AL3-305-10-120	AL3-305-10-120-DLC	AL3-305-10-120-TC	AL3-305-10-120-TC-DLC	
	5/16"	5/16"	1-9/16"	Ball End	3"	AL3-305-10-BN	AL3-305-10-BN-DLC	AL3-305-10-BN-TC	AL3-305-10-BN-TC-DLC	
STANDARD	3/8"	3/8"	1-1/8"	Sharp Corner	3"	AL3-303-12	AL3-303-12-DLC	AL3-303-12-TC	AL3-303-12-TC-DLC	3/8" DIAMETER
	3/8"	3/8"	1-1/8"	0.01"	3"	AL3-303-12-010	AL3-303-12-010-DLC	AL3-303-12-010-TC	AL3-303-12-010-TC-DLC	
	3/8"	3/8"	1-1/8"	0.03"	3"	AL3-303-12-030	AL3-303-12-030-DLC	AL3-303-12-030-TC	AL3-303-12-030-TC-DLC	
	3/8"	3/8"	1-1/8"	0.06"	3"	AL3-303-12-060	AL3-303-12-060-DLC	AL3-303-12-060-TC	AL3-303-12-060-TC-DLC	
	3/8"	3/8"	1-1/8"	0.09"	3"	AL3-303-12-090	AL3-303-12-090-DLC	AL3-303-12-090-TC	AL3-303-12-090-TC-DLC	
	3/8"	3/8"	1-1/8"	0.12"	3"	AL3-303-12-120	AL3-303-12-120-DLC	AL3-303-12-120-TC	AL3-303-12-120-TC-DLC	
	3/8"	3/8"	1-1/8"	Ball End	3"	AL3-303-12-BN	AL3-303-12-BN-DLC	AL3-303-12-BN-TC	AL3-303-12-BN-TC-DLC	
LONG	3/8"	3/8"	1-1/2"	Sharp Corner	3-1/2"	AL3-304-12	AL3-304-12-DLC	AL3-304-12-TC	AL3-304-12-TC-DLC	3/8" DIAMETER
	3/8"	3/8"	1-1/2"	0.01"	3-1/2"	AL3-304-12-010	AL3-304-12-010-DLC	AL3-304-12-010-TC	AL3-304-12-010-TC-DLC	
	3/8"	3/8"	1-1/2"	0.03"	3-1/2"	AL3-304-12-030	AL3-304-12-030-DLC	AL3-304-12-030-TC	AL3-304-12-030-TC-DLC	
	3/8"	3/8"	1-1/2"	0.06"	3-1/2"	AL3-304-12-060	AL3-304-12-060-DLC	AL3-304-12-060-TC	AL3-304-12-060-TC-DLC	
	3/8"	3/8"	1-1/2"	0.09"	3-1/2"	AL3-304-12-090	AL3-304-12-090-DLC	AL3-304-12-090-TC	AL3-304-12-090-TC-DLC	
	3/8"	3/8"	1-1/2"	0.12"	3-1/2"	AL3-304-12-120	AL3-304-12-120-DLC	AL3-304-12-120-TC	AL3-304-12-120-TC-DLC	
	3/8"	3/8"	1-1/2"	Ball End	3-1/2"	AL3-304-12-BN	AL3-304-12-BN-DLC	AL3-304-12-BN-TC	AL3-304-12-BN-TC-DLC	
EXTRA LONG	3/8"	3/8"	1-7/8"	Sharp Corner	3-1/2"	AL3-305-12	AL3-305-12-DLC	AL3-305-12-TC	AL3-305-12-TC-DLC	3/8" DIAMETER
	3/8"	3/8"	1-7/8"	0.01"	3-1/2"	AL3-305-12-010	AL3-305-12-010-DLC	AL3-305-12-010-TC	AL3-305-12-010-TC-DLC	
	3/8"	3/8"	1-7/8"	0.03"	3-1/2"	AL3-305-12-030	AL3-305-12-030-DLC	AL3-305-12-030-TC	AL3-305-12-030-TC-DLC	
	3/8"	3/8"	1-7/8"	0.06"	3-1/2"	AL3-305-12-060	AL3-305-12-060-DLC	AL3-305-12-060-TC	AL3-305-12-060-TC-DLC	
	3/8"	3/8"	1-7/8"	0.09"	3-1/2"	AL3-305-12-090	AL3-305-12-090-DLC	AL3-305-12-090-TC	AL3-305-12-090-TC-DLC	
	3/8"	3/8"	1-7/8"	0.12"	3-1/2"	AL3-305-12-120	AL3-305-12-120-DLC	AL3-305-12-120-TC	AL3-305-12-120-TC-DLC	
	3/8"	3/8"	1-7/8"	Ball End	3-1/2"	AL3-305-12-BN	AL3-305-12-BN-DLC	AL3-305-12-BN-TC	AL3-305-12-BN-TC-DLC	
STANDARD	1/2"	1/2"	1-1/2"	Sharp Corner	3-1/2"	AL3-303-16	AL3-303-16-DLC	AL3-303-16-TC	AL3-303-16-TC-DLC	1/2" DIAMETER
	1/2"	1/2"	1-1/2"	0.01"	3-1/2"	AL3-303-16-010	AL3-303-16-010-DLC	AL3-303-16-010-TC	AL3-303-16-010-TC-DLC	
	1/2"	1/2"	1-1/2"	0.03"	3-1/2"	AL3-303-16-030	AL3-303-16-030-DLC	AL3-303-16-030-TC	AL3-303-16-030-TC-DLC	
	1/2"	1/2"	1-1/2"	0.06"	3-1/2"	AL3-303-16-060	AL3-303-16-060-DLC	AL3-303-16-060-TC	AL3-303-16-060-TC-DLC	
	1/2"	1/2"	1-1/2"	0.09"	3-1/2"	AL3-303-16-090	AL3-303-16-090-DLC	AL3-303-16-090-TC	AL3-303-16-090-TC-DLC	
	1/2"	1/2"	1-1/2"	0.12"	3-1/2"	AL3-303-16-120	AL3-303-16-120-DLC	AL3-303-16-120-TC	AL3-303-16-120-TC-DLC	
	1/2"	1/2"	1-1/2"	0.19"	3-1/2"	AL3-303-16-190	AL3-303-16-190-DLC	AL3-303-16-190-TC	AL3-303-16-190-TC-DLC	
1/2"	1/2"	1-1/2"	Ball End	3-1/2"	AL3-303-16-BN	AL3-303-16-BN-DLC	AL3-303-16-BN-TC	AL3-303-16-BN-TC-DLC		
LONG	1/2"	1/2"	2"	Sharp Corner	4"	AL3-304-16	AL3-304-16-DLC	AL3-304-16-TC	AL3-304-16-TC-DLC	1/2" DIAMETER
	1/2"	1/2"	2"	0.01"	4"	AL3-304-16-010	AL3-304-16-010-DLC	AL3-304-16-010-TC	AL3-304-16-010-TC-DLC	
	1/2"	1/2"	2"	0.03"	4"	AL3-304-16-030	AL3-304-16-030-DLC	AL3-304-16-030-TC	AL3-304-16-030-TC-DLC	
	1/2"	1/2"	2"	0.06"	4"	AL3-304-16-060	AL3-304-16-060-DLC	AL3-304-16-060-TC	AL3-304-16-060-TC-DLC	
	1/2"	1/2"	2"	0.09"	4"	AL3-304-16-090	AL3-304-16-090-DLC	AL3-304-16-090-TC	AL3-304-16-090-TC-DLC	
	1/2"	1/2"	2"	0.12"	4"	AL3-304-16-120	AL3-304-16-120-DLC	AL3-304-16-120-TC	AL3-304-16-120-TC-DLC	
	1/2"	1/2"	2"	0.19"	4"	AL3-304-16-190	AL3-304-16-190-DLC	AL3-304-16-190-TC	AL3-304-16-190-TC-DLC	
	1/2"	1/2"	2"	Ball End	4"	AL3-304-16-BN	AL3-304-16-BN-DLC	AL3-304-16-BN-TC	AL3-304-16-BN-TC-DLC	

Due to the large offering of AL3 series many of these are made to order and non-returnable.

NEW!



Aluminum

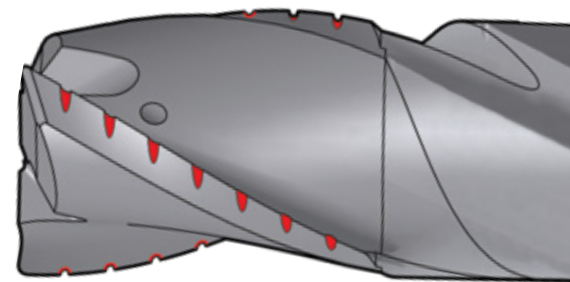
AL3 3 Flute – continued

	Cutting Diam.	Shank Diam.	Flute Length	Corner radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
EXTRA LONG	1/2"	1/2"	2-1/2"	Sharp Corner	4-1/2"	AL3-305-16	AL3-305-16-DLC	AL3-305-16-TC	AL3-305-16-TC-DLC	1/2" DIAMETER
	1/2"	1/2"	2-1/2"	0.01"	4-1/2"	AL3-305-16-010	AL3-305-16-010-DLC	AL3-305-16-010-TC	AL3-305-16-010-TC-DLC	
	1/2"	1/2"	2-1/2"	0.03"	4-1/2"	AL3-305-16-030	AL3-305-16-030-DLC	AL3-305-16-030-TC	AL3-305-16-030-TC-DLC	
	1/2"	1/2"	2-1/2"	0.06"	4-1/2"	AL3-305-16-060	AL3-305-16-060-DLC	AL3-305-16-060-TC	AL3-305-16-060-TC-DLC	
	1/2"	1/2"	2-1/2"	0.09"	4-1/2"	AL3-305-16-090	AL3-305-16-090-DLC	AL3-305-16-090-TC	AL3-305-16-090-TC-DLC	
	1/2"	1/2"	2-1/2"	0.12"	4-1/2"	AL3-305-16-120	AL3-305-16-120-DLC	AL3-305-16-120-TC	AL3-305-16-120-TC-DLC	
	1/2"	1/2"	2-1/2"	0.19"	4-1/2"	AL3-305-16-190	AL3-305-16-190-DLC	AL3-305-16-190-TC	AL3-305-16-190-TC-DLC	
	1/2"	1/2"	2-1/2"	Ball End	4-1/2"	AL3-305-16-BN	AL3-305-16-BN-DLC	AL3-305-16-BN-TC	AL3-305-16-BN-TC-DLC	
STANDARD	5/8"	5/8"	1-7/8"	Sharp Corner	4"	AL3-303-20	AL3-303-20-DLC	AL3-303-20-TC	AL3-303-20-TC-DLC	5/8" DIAMETER
	5/8"	5/8"	1-7/8"	0.01"	4"	AL3-303-20-010	AL3-303-20-010-DLC	AL3-303-20-010-TC	AL3-303-20-010-TC-DLC	
	5/8"	5/8"	1-7/8"	0.03"	4"	AL3-303-20-030	AL3-303-20-030-DLC	AL3-303-20-030-TC	AL3-303-20-030-TC-DLC	
	5/8"	5/8"	1-7/8"	0.06"	4"	AL3-303-20-060	AL3-303-20-060-DLC	AL3-303-20-060-TC	AL3-303-20-060-TC-DLC	
	5/8"	5/8"	1-7/8"	0.09"	4"	AL3-303-20-090	AL3-303-20-090-DLC	AL3-303-20-090-TC	AL3-303-20-090-TC-DLC	
	5/8"	5/8"	1-7/8"	0.12"	4"	AL3-303-20-120	AL3-303-20-120-DLC	AL3-303-20-120-TC	AL3-303-20-120-TC-DLC	
	5/8"	5/8"	1-7/8"	0.19"	4"	AL3-303-20-190	AL3-303-20-190-DLC	AL3-303-20-190-TC	AL3-303-20-190-TC-DLC	
	5/8"	5/8"	1-7/8"	0.25"	4"	AL3-303-20-250	AL3-303-20-250-DLC	AL3-303-20-250-TC	AL3-303-20-250-TC-DLC	
	5/8"	5/8"	1-7/8"	Ball End	4"	AL3-303-20-BN	AL3-303-20-BN-DLC	AL3-303-20-BN-TC	AL3-303-20-BN-TC-DLC	
LONG	5/8"	5/8"	2-1/2"	Sharp Corner	4-1/2"	AL3-304-20	AL3-304-20-DLC	AL3-304-20-TC	AL3-304-20-TC-DLC	
	5/8"	5/8"	2-1/2"	0.01"	4-1/2"	AL3-304-20-010	AL3-304-20-010-DLC	AL3-304-20-010-TC	AL3-304-20-010-TC-DLC	
	5/8"	5/8"	2-1/2"	0.03"	4-1/2"	AL3-304-20-030	AL3-304-20-030-DLC	AL3-304-20-030-TC	AL3-304-20-030-TC-DLC	
	5/8"	5/8"	2-1/2"	0.06"	4-1/2"	AL3-304-20-060	AL3-304-20-060-DLC	AL3-304-20-060-TC	AL3-304-20-060-TC-DLC	
	5/8"	5/8"	2-1/2"	0.09"	4-1/2"	AL3-304-20-090	AL3-304-20-090-DLC	AL3-304-20-090-TC	AL3-304-20-090-TC-DLC	
	5/8"	5/8"	2-1/2"	0.12"	4-1/2"	AL3-304-20-120	AL3-304-20-120-DLC	AL3-304-20-120-TC	AL3-304-20-120-TC-DLC	
	5/8"	5/8"	2-1/2"	0.19"	4-1/2"	AL3-304-20-190	AL3-304-20-190-DLC	AL3-304-20-190-TC	AL3-304-20-190-TC-DLC	
	5/8"	5/8"	2-1/2"	0.25"	4-1/2"	AL3-304-20-250	AL3-304-20-250-DLC	AL3-304-20-250-TC	AL3-304-20-250-TC-DLC	
	5/8"	5/8"	2-1/2"	Ball End	4-1/2"	AL3-304-20-BN	AL3-304-20-BN-DLC	AL3-304-20-BN-TC	AL3-304-20-BN-TC-DLC	
EXTRA LONG	5/8"	5/8"	3-1/8"	Sharp Corner	5"	AL3-305-20	AL3-305-20-DLC	AL3-305-20-TC	AL3-305-20-TC-DLC	
	5/8"	5/8"	3-1/8"	0.01"	5"	AL3-305-20-010	AL3-305-20-010-DLC	AL3-305-20-010-TC	AL3-305-20-010-TC-DLC	
	5/8"	5/8"	3-1/8"	0.03"	5"	AL3-305-20-030	AL3-305-20-030-DLC	AL3-305-20-030-TC	AL3-305-20-030-TC-DLC	
	5/8"	5/8"	3-1/8"	0.06"	5"	AL3-305-20-060	AL3-305-20-060-DLC	AL3-305-20-060-TC	AL3-305-20-060-TC-DLC	
	5/8"	5/8"	3-1/8"	0.09"	5"	AL3-305-20-090	AL3-305-20-090-DLC	AL3-305-20-090-TC	AL3-305-20-090-TC-DLC	
	5/8"	5/8"	3-1/8"	0.12"	5"	AL3-305-20-120	AL3-305-20-120-DLC	AL3-305-20-120-TC	AL3-305-20-120-TC-DLC	
	5/8"	5/8"	3-1/8"	0.19"	5"	AL3-305-20-190	AL3-305-20-190-DLC	AL3-305-20-190-TC	AL3-305-20-190-TC-DLC	
	5/8"	5/8"	3-1/8"	0.25"	5"	AL3-305-20-250	AL3-305-20-250-DLC	AL3-305-20-250-TC	AL3-305-20-250-TC-DLC	
	5/8"	5/8"	3-1/8"	Ball End	5"	AL3-305-20-BN	AL3-305-20-BN-DLC	AL3-305-20-BN-TC	AL3-305-20-BN-TC-DLC	

Due to the large offering of AL3 series many of these are made to order and non-returnable.

Chip Breakers

All AL3-304 (Long Length) and AL3-305 (Extra Long Length) come standard with Chip Breakers to control chips!



AL3 3 Flute High Performance Aluminum Carbide End Mill



AL3 3 Flute – continued



	Cutting Diam.	Shank Diam.	Flute Length	Corner radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
STANDARD	3/4"	3/4"	2-1/4"	Sharp Corner	4-1/2"	AL3-303-24	AL3-303-24-DLC	AL3-303-24-TC	AL3-303-24-TC-DLC	3/4" DIAMETER
	3/4"	3/4"	2-1/4"	0.01	4-1/2"	AL3-303-24-010	AL3-303-24-010-DLC	AL3-303-24-010-TC	AL3-303-24-010-TC-DLC	
	3/4"	3/4"	2-1/4"	0.03	4-1/2"	AL3-303-24-030	AL3-303-24-030-DLC	AL3-303-24-030-TC	AL3-303-24-030-TC-DLC	
	3/4"	3/4"	2-1/4"	0.06	4-1/2"	AL3-303-24-060	AL3-303-24-060-DLC	AL3-303-24-060-TC	AL3-303-24-060-TC-DLC	
	3/4"	3/4"	2-1/4"	0.09	4-1/2"	AL3-303-24-090	AL3-303-24-090-DLC	AL3-303-24-090-TC	AL3-303-24-090-TC-DLC	
	3/4"	3/4"	2-1/4"	0.12	4-1/2"	AL3-303-24-120	AL3-303-24-120-DLC	AL3-303-24-120-TC	AL3-303-24-120-TC-DLC	
	3/4"	3/4"	2-1/4"	0.19	4-1/2"	AL3-303-24-190	AL3-303-24-190-DLC	AL3-303-24-190-TC	AL3-303-24-190-TC-DLC	
	3/4"	3/4"	2-1/4"	0.25"	4-1/2"	AL3-303-24-250	AL3-303-24-250-DLC	AL3-303-24-250-TC	AL3-303-24-250-TC-DLC	
	3/4"	3/4"	2-1/4"	Ball End	4-1/2"	AL3-303-24-BN	AL3-303-24-BN-DLC	AL3-303-24-BN-TC	AL3-303-24-BN-TC-DLC	
LONG	3/4"	3/4"	3"	Sharp Corner	5"	AL3-304-24	AL3-304-24-DLC	AL3-304-24-TC	AL3-304-24-TC-DLC	3/4" DIAMETER
	3/4"	3/4"	3"	0.01"	5"	AL3-304-24-010	AL3-304-24-010-DLC	AL3-304-24-010-TC	AL3-304-24-010-TC-DLC	
	3/4"	3/4"	3"	0.03"	5"	AL3-304-24-030	AL3-304-24-030-DLC	AL3-304-24-030-TC	AL3-304-24-030-TC-DLC	
	3/4"	3/4"	3"	0.06"	5"	AL3-304-24-060	AL3-304-24-060-DLC	AL3-304-24-060-TC	AL3-304-24-060-TC-DLC	
	3/4"	3/4"	3"	0.09"	5"	AL3-304-24-090	AL3-304-24-090-DLC	AL3-304-24-090-TC	AL3-304-24-090-TC-DLC	
	3/4"	3/4"	3"	0.12"	5"	AL3-304-24-120	AL3-304-24-120-DLC	AL3-304-24-120-TC	AL3-304-24-120-TC-DLC	
	3/4"	3/4"	3"	0.19"	5"	AL3-304-24-190	AL3-304-24-190-DLC	AL3-304-24-190-TC	AL3-304-24-190-TC-DLC	
	3/4"	3/4"	3"	0.25"	5"	AL3-304-24-250	AL3-304-24-250-DLC	AL3-304-24-250-TC	AL3-304-24-250-TC-DLC	
	3/4"	3/4"	3"	Ball End	5"	AL3-304-24-BN	AL3-304-24-BN-DLC	AL3-304-24-BN-TC	AL3-304-24-BN-TC-DLC	
EXTRA LONG	3/4"	3/4"	3-3/4"	Sharp Corner	6"	AL3-305-24	AL3-305-24-DLC	AL3-305-24-TC	AL3-305-24-TC-DLC	3/4" DIAMETER
	3/4"	3/4"	3-3/4"	0.01"	6"	AL3-305-24-010	AL3-305-24-010-DLC	AL3-305-24-010-TC	AL3-305-24-010-TC-DLC	
	3/4"	3/4"	3-3/4"	0.03"	6"	AL3-305-24-030	AL3-305-24-030-DLC	AL3-305-24-030-TC	AL3-305-24-030-TC-DLC	
	3/4"	3/4"	3-3/4"	0.06"	6"	AL3-305-24-060	AL3-305-24-060-DLC	AL3-305-24-060-TC	AL3-305-24-060-TC-DLC	
	3/4"	3/4"	3-3/4"	0.09"	6"	AL3-305-24-090	AL3-305-24-090-DLC	AL3-305-24-090-TC	AL3-305-24-090-TC-DLC	
	3/4"	3/4"	3-3/4"	0.12"	6"	AL3-305-24-120	AL3-305-24-120-DLC	AL3-305-24-120-TC	AL3-305-24-120-TC-DLC	
	3/4"	3/4"	3-3/4"	0.19"	6"	AL3-305-24-190	AL3-305-24-190-DLC	AL3-305-24-190-TC	AL3-305-24-190-TC-DLC	
	3/4"	3/4"	3-3/4"	0.25"	6"	AL3-305-24-250	AL3-305-24-250-DLC	AL3-305-24-250-TC	AL3-305-24-250-TC-DLC	
	3/4"	3/4"	3-3/4"	Ball End	6"	AL3-305-24-BN	AL3-305-24-BN-DLC	AL3-305-24-BN-TC	AL3-305-24-BN-TC-DLC	
STANDARD	1"	1"	3"	Sharp Corner	5"	AL3-303-32	AL3-303-32-DLC	AL3-303-32-TC	AL3-303-32-TC-DLC	1" DIAMETER
	1"	1"	3"	0.01"	5"	AL3-303-32-010	AL3-303-32-010-DLC	AL3-303-32-010-TC	AL3-303-32-010-TC-DLC	
	1"	1"	3"	0.03"	5"	AL3-303-32-030	AL3-303-32-030-DLC	AL3-303-32-030-TC	AL3-303-32-030-TC-DLC	
	1"	1"	3"	0.06"	5"	AL3-303-32-060	AL3-303-32-060-DLC	AL3-303-32-060-TC	AL3-303-32-060-TC-DLC	
	1"	1"	3"	0.09"	5"	AL3-303-32-090	AL3-303-32-090-DLC	AL3-303-32-090-TC	AL3-303-32-090-TC-DLC	
	1"	1"	3"	0.12"	5"	AL3-303-32-120	AL3-303-32-120-DLC	AL3-303-32-120-TC	AL3-303-32-120-TC-DLC	
	1"	1"	3"	0.19"	5"	AL3-303-32-190	AL3-303-32-190-DLC	AL3-303-32-190-TC	AL3-303-32-190-TC-DLC	
	1"	1"	3"	0.25"	5"	AL3-303-32-250	AL3-303-32-250-DLC	AL3-303-32-250-TC	AL3-303-32-250-TC-DLC	
	1"	1"	3"	Ball End	5"	AL3-303-32-BN	AL3-303-32-BN-DLC	AL3-303-32-BN-TC	AL3-303-32-BN-TC-DLC	
LONG	1"	1"	4"	Sharp Corner	7"	AL3-304-32	AL3-304-32-DLC	AL3-304-32-TC	AL3-304-32-TC-DLC	1" DIAMETER
	1"	1"	4"	0.01"	7"	AL3-304-32-010	AL3-304-32-010-DLC	AL3-304-32-010-TC	AL3-304-32-010-TC-DLC	
	1"	1"	4"	0.03"	7"	AL3-304-32-030	AL3-304-32-030-DLC	AL3-304-32-030-TC	AL3-304-32-030-TC-DLC	
	1"	1"	4"	0.06"	7"	AL3-304-32-060	AL3-304-32-060-DLC	AL3-304-32-060-TC	AL3-304-32-060-TC-DLC	
	1"	1"	4"	0.09"	7"	AL3-304-32-090	AL3-304-32-090-DLC	AL3-304-32-090-TC	AL3-304-32-090-TC-DLC	
	1"	1"	4"	0.12"	7"	AL3-304-32-120	AL3-304-32-120-DLC	AL3-304-32-120-TC	AL3-304-32-120-TC-DLC	
	1"	1"	4"	0.19"	7"	AL3-304-32-190	AL3-304-32-190-DLC	AL3-304-32-190-TC	AL3-304-32-190-TC-DLC	
	1"	1"	4"	0.25"	7"	AL3-304-32-250	AL3-304-32-250-DLC	AL3-304-32-250-TC	AL3-304-32-250-TC-DLC	
	1"	1"	4"	Ball End	7"	AL3-304-32-BN	AL3-304-32-BN-DLC	AL3-304-32-BN-TC	AL3-304-32-BN-TC-DLC	

Due to the large offering of AL3 series many of these are made to order and non-returnable.

NEW!



Aluminum

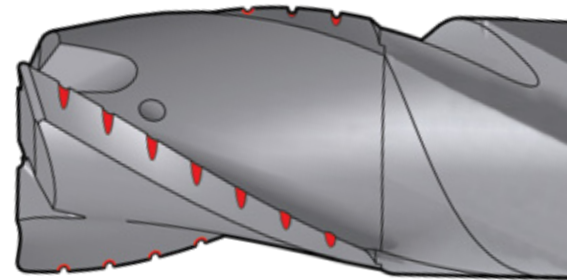
AL3 3 Flute – continued

EXTRA LONG	Cutting Diam.	Shank Diam.	Flute Length	Corner radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	1" DIAMETER
	1"	1"	5"	Sharp Corner	8"	AL3-305-32	AL3-305-32-DLC	AL3-305-32-TC	AL3-305-32-TC-DLC	
	1"	1"	5"	0.01"	8"	AL3-305-32-010	AL3-305-32-010-DLC	AL3-305-32-010-TC	AL3-305-32-010-TC-DLC	
	1"	1"	5"	0.03"	8"	AL3-305-32-030	AL3-305-32-030-DLC	AL3-305-32-030-TC	AL3-305-32-030-TC-DLC	
	1"	1"	5"	0.06"	8"	AL3-305-32-060	AL3-305-32-060-DLC	AL3-305-32-060-TC	AL3-305-32-060-TC-DLC	
	1"	1"	5"	0.09"	8"	AL3-305-32-090	AL3-305-32-090-DLC	AL3-305-32-090-TC	AL3-305-32-090-TC-DLC	
	1"	1"	5"	0.12"	8"	AL3-305-32-120	AL3-305-32-120-DLC	AL3-305-32-120-TC	AL3-305-32-120-TC-DLC	
	1"	1"	5"	0.19"	8"	AL3-305-32-190	AL3-305-32-190-DLC	AL3-305-32-190-TC	AL3-305-32-190-TC-DLC	
	1"	1"	5"	0.25"	8"	AL3-305-32-250	AL3-305-32-250-DLC	AL3-305-32-250-TC	AL3-305-32-250-TC-DLC	
	1"	1"	5"	Ball End	8"	AL3-305-32-BN	AL3-305-32-BN-DLC	AL3-305-32-BN-TC	AL3-305-32-BN-TC-DLC	

Due to the large offering of AL3 series many of these are made to order and non-returnable.

Chip Breakers

All AL3-304 (Long Length) and AL3-305 (Extra Long Length) come standard with Chip Breakers to control chips!



AL3-303 SPEEDS & FEEDS

Tool Diameter	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
1/8"	Max	0.0020	Max	0.0018	Max	0.0020	Max	0.0020
3/16"	Max	0.0030	Max	0.0026	Max	0.0030	Max	0.0030
1/4"	Max	0.0040	Max	0.0035	Max	0.0040	Max	0.0040
5/16"	Max	0.0050	Max	0.0044	Max	0.0050	Max	0.0050
3/8"	Max	0.0060	Max	0.0053	Max	0.0060	Max	0.0060
1/2"	Max	0.0080	Max	0.0070	Max	0.0080	Max	0.0080
5/8"	Max	0.0100	Max	0.0088	Max	0.0100	Max	0.0100
3/4"	Max	0.0120	Max	0.0105	Max	0.0120	Max	0.0120
1"	Max	0.0160	Max	0.0140	Max	0.0160	Max	0.0160

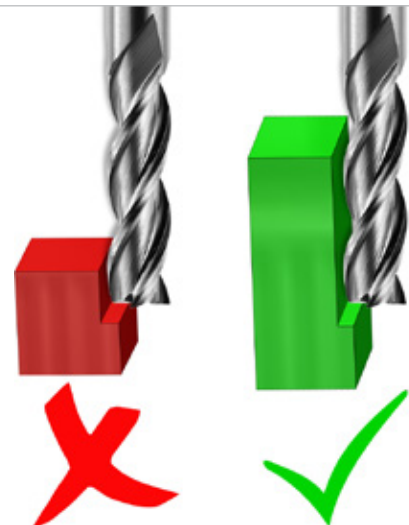
Profiling →

- AL3-303 50% Radial Width 2-3 x Diameter Axial Depth
- AL3-304 30% Radial Width 4 x Diameter Axial Depth at 70% CLPT
- AL3-305 10% Radial Width 5 x Diameter Axial Depth at 70% CLPT



Don't just use the tip of the tool on longer length tools. Make sure to engage most of the cutting edges.

Spring passes with Long length and extra long length tools might be needed to improve finish and deflection. We tested up to 4 spring passes without problems with AL3-305 series using the entire cutting length.



A1/MA1 2 Flute High Performance Tools for Aluminum

Characteristics

- Square End
- Corner Break
- 2 Flute
- 30° Helix

Applications

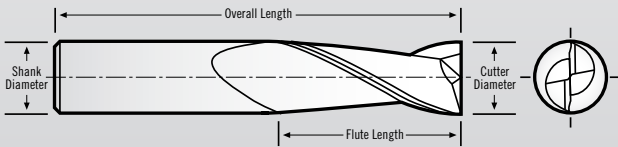
- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Aluminum
- Copper
- Magnesium
- Plastics
- BRASS

Coatings

- Diamond-Like Carbon (DLC)



A1 Series Tolerances:

Cutting Dia. = $-.0007/-0.0015$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+0.060/-0.000$
 OAL = $+/- .060$

MA1 Series Tolerances:

Cutting Dia. = $-0.018/-0.038$ mm
 Shank Dia. = $-0.002/-0.005$ mm
 Flute Length (<10D) = $+0.75/-0.000$ mm
 (>10D) = $+1.5/-0.000$ mm
 OAL = $+/-10$ mm



A1-201 2 Flute Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Chamfer	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/8"	1/8"	3/16"	.005	1-1/2"	A1-201-04	A1-201-04-DLC
3/16"	3/16"	9/32"	.005	2	A1-201-06	A1-201-06-DLC
1/4"	1/4"	3/8"	.005	2	A1-201-08	A1-201-08-DLC
5/16"	5/16"	15/32"	.005	2-1/2"	A1-201-10	A1-201-10-DLC
3/8"	3/8"	9/16"	.010	2-1/2"	A1-201-12	A1-201-12-DLC
1/2"	1/2"	3/4"	.010	3	A1-201-16	A1-201-16-DLC
5/8"	5/8"	10-5/16"	.010	3-1/2"	A1-201-20	A1-201-20-DLC
3/4"	3/4"	1-1/8"	.010	4	A1-201-24	A1-201-24-DLC
1	1	1-1/2"	.015	4	A1-201-32	A1-201-32-DLC



MA1-201 Metric 2 Flute Stub Length **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Corner Chamfer	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
3mm	3mm	4.5mm	0.12mm	38mm	MA1-201-03	MA1-201-03-DLC
4mm	4mm	6mm	0.12mm	50mm	MA1-201-04	MA1-201-04-DLC
5mm	5mm	7.5mm	0.12mm	50mm	MA1-201-05	MA1-201-05-DLC
6mm	6mm	9mm	0.12mm	50mm	MA1-201-06	MA1-201-06-DLC
8mm	8mm	12mm	0.25mm	63mm	MA1-201-08	MA1-201-08-DLC
10mm	10mm	15mm	0.25mm	72mm	MA1-201-10	MA1-201-10-DLC
12mm	12mm	18mm	0.25mm	83mm	MA1-201-12	MA1-201-12-DLC
16mm	16mm	24mm	0.25mm	92mm	MA1-201-16	MA1-201-16-DLC
20mm	20mm	30mm	0.3mm	104mm	MA1-201-20	MA1-201-20-DLC

A1-201 SPEEDS & FEEDS

Tool Diameter	Aluminum 6061-T6, 7075, 2024		Brass		Copper		Plastic		Magnesium	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
1/8"	Max	0.0032	22900	0.0016	18300	0.0016	39700	0.0032	Max	0.0032
3/16"	Max	0.0048	15300	0.0024	12200	0.0024	26500	0.0048	Max	0.0048
1/4"	Max	0.0064	11500	0.0032	9200	0.0032	19900	0.0064	Max	0.0064
5/16"	Max	0.0080	9200	0.0040	7300	0.0040	15900	0.0080	Max	0.0080
3/8"	Max	0.0096	7600	0.0048	6100	0.0048	13200	0.0096	Max	0.0096
1/2"	Max	0.0128	5700	0.0064	4600	0.0064	9900	0.0128	Max	0.0128
5/8"	Max	0.0160	4600	0.0080	3700	0.0080	7900	0.0160	Max	0.0160
3/4"	Max	0.0192	3800	0.0096	3100	0.0096	6600	0.0192	Max	0.0192
1"	Max	0.0256	2900	0.0128	2300	0.0128	5000	0.0256	Max	0.0256

Axial depth of cut up to 1 x diameter of the tool up to a full slot

MA1-201 SPEEDS & FEEDS

Tool Diameter	Aluminum 6061-T6, 7075, 2024		Brass		Copper		Plastic		Magnesium	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
3mm	Max	0.077mm	24300	0.038mm	19400	0.038mm	42000	0.077mm	Max	0.077mm
4mm	Max	0.102mm	18200	0.051mm	14600	0.051mm	31500	0.102mm	Max	0.102mm
5mm	Max	0.128mm	14600	0.064mm	11600	0.064mm	25200	0.128mm	Max	0.128mm
6mm	Max	0.154mm	12100	0.077mm	9700	0.077mm	21000	0.154mm	Max	0.154mm
8mm	Max	0.205mm	9100	0.102mm	7300	0.102mm	15800	0.205mm	Max	0.205mm
10mm	Max	0.256mm	7300	0.128mm	5800	0.128mm	12600	0.256mm	Max	0.256mm
12mm	Max	0.307mm	6100	0.154mm	4900	0.154mm	10500	0.307mm	Max	0.307mm
16mm	Max	0.410mm	4500	0.205mm	3600	0.205mm	7900	0.410mm	Max	0.410mm
20mm	Max	0.512mm	3600	0.256mm	2900	0.256mm	6300	0.512mm	Max	0.512mm

Axial depth of cut up to 1 x diameter of the tool up to a full slot

Available with
Wiper Flats
See Page 17



Available with
Coolant Grooves
See Page 16



See RobbJack Videos at
robbjack.com/robbjack-tv/



RobbJack
TOOLS INDUSTRY SOLUTIONS TECH INFO SALES ABOUT CONTACT

RESHAPING PERFORMANCE
HELPING CUSTOMERS ACHIEVE TARGET PERFORMANCE, EFFICIENCY, AND QUALITY FOR OVER FIVE DECADES

Established in 1958, RobbJack Corporation specializes in the engineering, manufacture and sale of solid carbide cutting tools. We continue to offer the broadest line of carbide end mills with the closest tolerances available for CNC milling equipment. RobbJack staff possesses extraordinary expertise. Our top 200 employees average 22 years with us, a combined 188 years of experience in the cutting tools industry. Application specialists take a consultative role from the initial bid to post-product support, delivering timely feedback and innovative solutions.

Recent Videos

- High Speed Aluminum: Stock by RobbJack Corp
- How to assemble a solid carbide drilling case, arbor, and tool holder for CNC
- RobbJack on Video



A1/MA1 3 Flute High Performance Tools for Aluminum

Characteristics

- Square End
- Corner Break
- 3 Flute
- 35° Helix
- Mirror Edge
- Polished

Applications

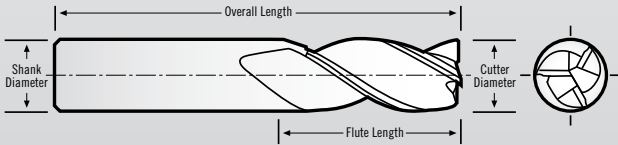
- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Wet

Materials

- Aluminum
- Copper
- Magnesium
- BRASS

Coatings

- Diamond-Like Carbon (DLC)



A1 Series Tolerances:

Cutting Dia. = $-.0007/-0.0015$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+0.060/-0.000$
 OAL = $+/-0.060$

MA1 Series Tolerances:

Cutting Dia. = $-0.018/-0.038$ mm
 Shank Dia. = $-0.002/-0.005$ mm
 Flute Length (<10D) = $+0.750/-0.000$ mm
 (>10D) = $+1.500/-0.000$ mm
 OAL = $+/-10$ mm



A1-303 3 Flute Standard Length



Cutting Diameter	Shank Diameter	Flute Length	Corner Chamfer	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/8"	1/8"	3/8"	.005	1-1/2"	A1-303-04	A1-303-04-DLC
3/16"	3/16"	9/16"	.005	2"	A1-303-06	A1-303-06-DLC
1/4"	1/4"	3/4"	.005	2-1/2"	A1-303-08	A1-303-08-DLC
5/16"	5/16"	7/8"	.005	2-1/2"	A1-303-10	A1-303-10-DLC
3/8"	3/8"	1"	.010	2-1/2"	A1-303-12	A1-303-12-DLC
1/2"	1/2"	1-1/8"	.010	3"	A1-303-16	A1-303-16-DLC
5/8"	5/8"	1-1/4"	.010	3-1/2"	A1-303-20	A1-303-20-DLC
3/4"	3/4"	1-5/8"	.010	4"	A1-303-24	A1-303-24-DLC
1"	1"	2"	.015	4"	A1-303-32	A1-303-32-DLC



MA1-303 Metric 3 Flute Standard Length **METRIC**



Cutting Diameter	Shank Diameter	Flute Length	Corner Chamfer	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
3mm	3mm	8mm	0.1mm	38mm	MA1-303-03	MA1-303-03-DLC
4mm	4mm	12mm	0.1mm	50mm	MA1-303-04	MA1-303-04-DLC
5mm	5mm	14mm	0.1mm	50mm	MA1-303-05	MA1-303-05-DLC
6mm	6mm	15mm	0.1mm	63mm	MA1-303-06	MA1-303-06-DLC
8mm	8mm	20mm	0.1mm	63mm	MA1-303-08	MA1-303-08-DLC
10mm	10mm	22mm	0.1mm	72mm	MA1-303-10	MA1-303-10-DLC
12mm	12mm	26mm	0.2mm	83mm	MA1-303-12	MA1-303-12-DLC
16mm	16mm	33mm	0.2mm	92mm	MA1-303-16	MA1-303-16-DLC
20mm	20mm	42mm	0.2mm	104mm	MA1-303-20	MA1-303-20-DLC

A1-303 SPEEDS & FEEDS

Tool Diameter	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
1/8"	Max	0.0020	Max	0.0018	Max	0.0020	Max	0.0020
3/16"	Max	0.0030	Max	0.0026	Max	0.0030	Max	0.0030
1/4"	Max	0.0040	Max	0.0035	Max	0.0040	Max	0.0040
5/16"	Max	0.0050	Max	0.0044	Max	0.0050	Max	0.0050
3/8"	Max	0.0060	Max	0.0053	Max	0.0060	Max	0.0060
1/2"	Max	0.0080	Max	0.0070	Max	0.0080	Max	0.0080
5/8"	Max	0.0100	Max	0.0088	Max	0.0100	Max	0.0100
3/4"	Max	0.0120	Max	0.0105	Max	0.0120	Max	0.0120
1"	Max	0.0160	Max	0.0140	Max	0.0160	Max	0.0160

Axial depth of cut up to 1.5 x diameter of the tool with 50% radial step over.

MA1-303 SPEEDS & FEEDS

Tool Diameter	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
	RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
3mm	Max	0.048mm	Max	0.042mm	Max	0.048mm	Max	0.048mm
4mm	Max	0.064mm	Max	0.056mm	Max	0.064mm	Max	0.064mm
5mm	Max	0.080mm	Max	0.070mm	Max	0.080mm	Max	0.080mm
6mm	Max	0.096mm	Max	0.084mm	Max	0.096mm	Max	0.096mm
8mm	Max	0.128mm	Max	0.112mm	Max	0.128mm	Max	0.128mm
10mm	Max	0.160mm	Max	0.140mm	Max	0.160mm	Max	0.160mm
12mm	Max	0.192mm	Max	0.168mm	Max	0.192mm	Max	0.192mm
16mm	Max	0.256mm	Max	0.224mm	Max	0.256mm	Max	0.256mm
20mm	Max	0.320mm	Max	0.280mm	Max	0.320mm	Max	0.320mm

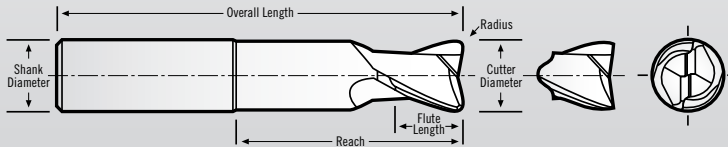
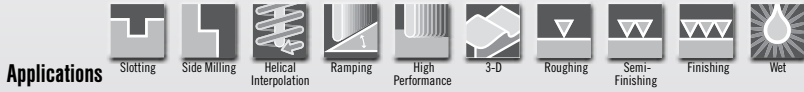
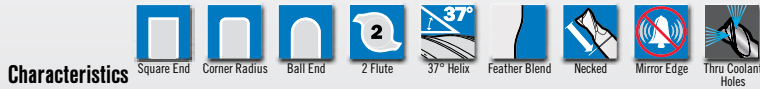
Axial depth of cut up to 1.5 x diameter of the tool with 50% radial step over.

See RobbJack Videos at
robbjack.com/robbjack-tv/

The screenshot shows the RobbJack website interface. At the top, there is a navigation bar with 'TOOLS', 'INDUSTRY SOLUTIONS', 'TECH INFO', 'SALES', 'ABOUT', and 'CONTACT'. Below this is a large banner with the text 'RESHAPING PERFORMANCE' and 'HELPING CUSTOMERS ACHIEVE TARGET PERFORMANCE, EFFICIENCY, AND QUALITY FOR OVER FIVE DECADES'. A search bar is visible in the top right corner. Below the banner, there is a 'TOOL SEARCH' section with a search icon and the text 'Filter by type, speed, geometry, material or applications'. To the right of the search section, there is a 'Recent Videos' section with several video thumbnails. A large red play button icon is overlaid on the page, pointing towards the 'Recent Videos' section.



FMHV 2 Flute Ultra-High Velocity Tools for Aluminum



FMHV Series Tolerances:

Cutting Dia. = $-.001/-0.0015$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+.060/-0.000$
 OAL = $+/- .060$

Eliminate Tool Pull Out!
 h4 Shank Tolerance up to 150% more gripping force
Tightest in the Industry!

NEXT GENERATION
Mirror Edge!
 Eliminates Chatter & Vibration



NEW!

FMHV 2 Flute (Short to Long Reach)

	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
SHORT	1/4"	1/4"	3/8"	Sq. End	3/4"	2"	FMHV-201-08	FMHV-201-08-DLC	FMHV-201-08-TC	FMHV-201-08-DLC-TC	1/4" DIAMETER
	1/4"	1/4"	3/8"	0.03"	3/4"	2"	FMHV-201-08-030	FMHV-201-08-030-DLC	FMHV-201-08-030-TC	FMHV-201-08-030-DLC-TC	
	1/4"	1/4"	3/8"	0.06"	3/4"	2"	FMHV-201-08-060	FMHV-201-08-060-DLC	FMHV-201-08-060-TC	FMHV-201-08-060-DLC-TC	
	1/4"	1/4"	3/8"	0.09"	3/4"	2"	FMHV-201-08-090	FMHV-201-08-090-DLC	FMHV-201-08-090-TC	FMHV-201-08-090-DLC-TC	
	1/4"	1/4"	3/8"	Ball End	3/4"	2"	FMHV-201-08-BN	FMHV-201-08-BN-DLC	FMHV-201-08-BN-TC	FMHV-201-08-BN-DLC-TC	
MEDIUM	1/4"	1/4"	3/8"	Sq. End	1-1/16"	2-1/2"	FMHV-202-08	FMHV-202-08-DLC	FMHV-202-08-TC	FMHV-202-08-DLC-TC	1/4" DIAMETER
	1/4"	1/4"	3/8"	0.03"	1-1/16"	2-1/2"	FMHV-202-08-030	FMHV-202-08-030-DLC	FMHV-202-08-030-TC	FMHV-202-08-030-DLC-TC	
	1/4"	1/4"	3/8"	0.06"	1-1/16"	2-1/2"	FMHV-202-08-060	FMHV-202-08-060-DLC	FMHV-202-08-060-TC	FMHV-202-08-060-DLC-TC	
	1/4"	1/4"	3/8"	0.09"	1-1/16"	2-1/2"	FMHV-202-08-090	FMHV-202-08-090-DLC	FMHV-202-08-090-TC	FMHV-202-08-090-DLC-TC	
	1/4"	1/4"	3/8"	Ball End	1-1/16"	2-1/2"	FMHV-202-08-BN	FMHV-202-08-BN-DLC	FMHV-202-08-BN-TC	FMHV-202-08-BN-DLC-TC	
LONG	1/4"	1/4"	3/8"	Sq. End	1-1/2"	3"	FMHV-203-08	FMHV-203-08-DLC	FMHV-203-08-TC	FMHV-203-08-DLC-TC	1/4" DIAMETER
	1/4"	1/4"	3/8"	0.03"	1-1/2"	3"	FMHV-203-08-030	FMHV-203-08-030-DLC	FMHV-203-08-030-TC	FMHV-203-08-030-DLC-TC	
	1/4"	1/4"	3/8"	0.06"	1-1/2"	3"	FMHV-203-08-060	FMHV-203-08-060-DLC	FMHV-203-08-060-TC	FMHV-203-08-060-DLC-TC	
	1/4"	1/4"	3/8"	0.09"	1-1/2"	3"	FMHV-203-08-090	FMHV-203-08-090-DLC	FMHV-203-08-090-TC	FMHV-203-08-090-DLC-TC	
	1/4"	1/4"	3/8"	Ball End	1-1/2"	3"	FMHV-203-08-BN	FMHV-203-08-BN-DLC	FMHV-203-08-BN-TC	FMHV-203-08-BN-DLC-TC	
SHORT	5/16"	5/16"	1/2"	Sq. End	3/4"	2"	FMHV-201-10	FMHV-201-10-DLC	FMHV-201-10-TC	FMHV-201-10-DLC-TC	5/16" DIAMETER
	5/16"	5/16"	1/2"	0.03"	3/4"	2"	FMHV-201-10-030	FMHV-201-10-030-DLC	FMHV-201-10-030-TC	FMHV-201-10-030-DLC-TC	
	5/16"	5/16"	1/2"	0.06"	3/4"	2"	FMHV-201-10-060	FMHV-201-10-060-DLC	FMHV-201-10-060-TC	FMHV-201-10-060-DLC-TC	
	5/16"	5/16"	1/2"	0.09"	3/4"	2"	FMHV-201-10-090	FMHV-201-10-090-DLC	FMHV-201-10-090-TC	FMHV-201-10-090-DLC-TC	
	5/16"	5/16"	1/2"	Ball End	3/4"	2"	FMHV-201-10-BN	FMHV-201-10-BN-DLC	FMHV-201-10-BN-TC	FMHV-201-10-BN-DLC-TC	
MEDIUM	5/16"	5/16"	1/2"	Sq. End	1-1/16"	2-1/2"	FMHV-202-10	FMHV-202-10-DLC	FMHV-202-10-TC	FMHV-202-10-DLC-TC	5/16" DIAMETER
	5/16"	5/16"	1/2"	0.03"	1-1/16"	2-1/2"	FMHV-202-10-030	FMHV-202-10-030-DLC	FMHV-202-10-030-TC	FMHV-202-10-030-DLC-TC	
	5/16"	5/16"	1/2"	0.06"	1-1/16"	2-1/2"	FMHV-202-10-060	FMHV-202-10-060-DLC	FMHV-202-10-060-TC	FMHV-202-10-060-DLC-TC	
	5/16"	5/16"	1/2"	0.09"	1-1/16"	2-1/2"	FMHV-202-10-090	FMHV-202-10-090-DLC	FMHV-202-10-090-TC	FMHV-202-10-090-DLC-TC	
	5/16"	5/16"	1/2"	Ball End	1-1/16"	2-1/2"	FMHV-202-10-BN	FMHV-202-10-BN-DLC	FMHV-202-10-BN-TC	FMHV-202-10-BN-DLC-TC	
LONG	5/16"	5/16"	1/2"	Sq. End	1-1/2"	3"	FMHV-203-10	FMHV-203-10-DLC	FMHV-203-10-TC	FMHV-203-10-DLC-TC	5/16" DIAMETER
	5/16"	5/16"	1/2"	0.03"	1-1/2"	3"	FMHV-203-10-030	FMHV-203-10-030-DLC	FMHV-203-10-030-TC	FMHV-203-10-030-DLC-TC	
	5/16"	5/16"	1/2"	0.06"	1-1/2"	3"	FMHV-203-10-060	FMHV-203-10-060-DLC	FMHV-203-10-060-TC	FMHV-203-10-060-DLC-TC	
	5/16"	5/16"	1/2"	0.09"	1-1/2"	3"	FMHV-203-10-090	FMHV-203-10-090-DLC	FMHV-203-10-090-TC	FMHV-203-10-090-DLC-TC	
	5/16"	5/16"	1/2"	Ball End	1-1/2"	3"	FMHV-203-10-BN	FMHV-203-10-BN-DLC	FMHV-203-10-BN-TC	FMHV-203-10-BN-DLC-TC	

FMHV 2 Flute (Short to Long Reach)



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
SHORT	3/8"	3/8"	1/2"	Sq. End	1-1/4"	3"	FMHV-201-12	FMHV-201-12-DLC	FMHV-201-12-TC	FMHV-201-12-DLC-TC	3/8" DIAMETER
	3/8"	3/8"	1/2"	0.03"	1-1/4"	3"	FMHV-201-12-030	FMHV-201-12-030-DLC	FMHV-201-12-030-TC	FMHV-201-12-030-DLC-TC	
	3/8"	3/8"	1/2"	0.06"	1-1/4"	3"	FMHV-201-12-060	FMHV-201-12-060-DLC	FMHV-201-12-060-TC	FMHV-201-12-060-DLC-TC	
	3/8"	3/8"	1/2"	0.09"	1-1/4"	3"	FMHV-201-12-090	FMHV-201-12-090-DLC	FMHV-201-12-090-TC	FMHV-201-12-090-DLC-TC	
	3/8"	3/8"	1/2"	Ball End	1-1/4"	3"	FMHV-201-12-BN	FMHV-201-12-BN-DLC	FMHV-201-12-BN-TC	FMHV-201-12-BN-DLC-TC	
MEDIUM	3/8"	3/8"	1/2"	Sq. End	1-3/4"	3-1/2"	FMHV-202-12	FMHV-202-12-DLC	FMHV-202-12-TC	FMHV-202-12-DLC-TC	
	3/8"	3/8"	1/2"	0.03"	1-3/4"	3-1/2"	FMHV-202-12-030	FMHV-202-12-030-DLC	FMHV-202-12-030-TC	FMHV-202-12-030-DLC-TC	
	3/8"	3/8"	1/2"	0.06"	1-3/4"	3-1/2"	FMHV-202-12-060	FMHV-202-12-060-DLC	FMHV-202-12-060-TC	FMHV-202-12-060-DLC-TC	
	3/8"	3/8"	1/2"	0.09"	1-3/4"	3-1/2"	FMHV-202-12-090	FMHV-202-12-090-DLC	FMHV-202-12-090-TC	FMHV-202-12-090-DLC-TC	
	3/8"	3/8"	1/2"	Ball End	1-3/4"	3-1/2"	FMHV-202-12-BN	FMHV-202-12-BN-DLC	FMHV-202-12-BN-TC	FMHV-202-12-BN-DLC-TC	
LONG	3/8"	3/8"	1/2"	Sq. End	2-1/4"	4"	FMHV-203-12	FMHV-203-12-DLC	FMHV-203-12-TC	FMHV-203-12-DLC-TC	
	3/8"	3/8"	1/2"	0.03"	2-1/4"	4"	FMHV-203-12-030	FMHV-203-12-030-DLC	FMHV-203-12-030-TC	FMHV-203-12-030-DLC-TC	
	3/8"	3/8"	1/2"	0.06"	2-1/4"	4"	FMHV-203-12-060	FMHV-203-12-060-DLC	FMHV-203-12-060-TC	FMHV-203-12-060-DLC-TC	
	3/8"	3/8"	1/2"	0.09"	2-1/4"	4"	FMHV-203-12-090	FMHV-203-12-090-DLC	FMHV-203-12-090-TC	FMHV-203-12-090-DLC-TC	
	3/8"	3/8"	1/2"	Ball End	2-1/4"	4"	FMHV-203-12-BN	FMHV-203-12-BN-DLC	FMHV-203-12-BN-TC	FMHV-203-12-BN-DLC-TC	
SHORT	1/2"	1/2"	3/4"	Sq. End	1-1/4"	3"	FMHV-201-16	FMHV-201-16-DLC	FMHV-201-16-TC	FMHV-201-16-DLC-TC	1/2" DIAMETER
	1/2"	1/2"	3/4"	0.03"	1-1/4"	3"	FMHV-201-16-030	FMHV-201-16-030-DLC	FMHV-201-16-030-TC	FMHV-201-16-030-DLC-TC	
	1/2"	1/2"	3/4"	0.06"	1-1/4"	3"	FMHV-201-16-060	FMHV-201-16-060-DLC	FMHV-201-16-060-TC	FMHV-201-16-060-DLC-TC	
	1/2"	1/2"	3/4"	0.09"	1-1/4"	3"	FMHV-201-16-090	FMHV-201-16-090-DLC	FMHV-201-16-090-TC	FMHV-201-16-090-DLC-TC	
	1/2"	1/2"	3/4"	0.12"	1-1/4"	3"	FMHV-201-16-120	FMHV-201-16-120-DLC	FMHV-201-16-120-TC	FMHV-201-16-120-DLC-TC	
	1/2"	1/2"	3/4"	Ball End	1-1/4"	3"	FMHV-201-16-BN	FMHV-201-16-BN-DLC	FMHV-201-16-BN-TC	FMHV-201-16-BN-DLC-TC	
MEDIUM	1/2"	1/2"	3/4"	Sq. End	1-5/8"	3-1/2"	FMHV-202-16	FMHV-202-16-DLC	FMHV-202-16-TC	FMHV-202-16-DLC-TC	
	1/2"	1/2"	3/4"	0.03"	1-5/8"	3-1/2"	FMHV-202-16-030	FMHV-202-16-030-DLC	FMHV-202-16-030-TC	FMHV-202-16-030-DLC-TC	
	1/2"	1/2"	3/4"	0.06"	1-5/8"	3-1/2"	FMHV-202-16-060	FMHV-202-16-060-DLC	FMHV-202-16-060-TC	FMHV-202-16-060-DLC-TC	
	1/2"	1/2"	3/4"	0.09"	1-5/8"	3-1/2"	FMHV-202-16-090	FMHV-202-16-090-DLC	FMHV-202-16-090-TC	FMHV-202-16-090-DLC-TC	
	1/2"	1/2"	3/4"	0.12"	1-5/8"	3-1/2"	FMHV-202-16-120	FMHV-202-16-120-DLC	FMHV-202-16-120-TC	FMHV-202-16-120-DLC-TC	
	1/2"	1/2"	3/4"	Ball End	1-5/8"	3-1/2"	FMHV-202-16-BN	FMHV-202-16-BN-DLC	FMHV-202-16-BN-TC	FMHV-202-16-BN-DLC-TC	
LONG	1/2"	1/2"	3/4"	Sq. End	2-1/8"	4"	FMHV-203-16	FMHV-203-16-DLC	FMHV-203-16-TC	FMHV-203-16-DLC-TC	
	1/2"	1/2"	3/4"	0.03"	2-1/8"	4"	FMHV-203-16-030	FMHV-203-16-030-DLC	FMHV-203-16-030-TC	FMHV-203-16-030-DLC-TC	
	1/2"	1/2"	3/4"	0.06"	2-1/8"	4"	FMHV-203-16-060	FMHV-203-16-060-DLC	FMHV-203-16-060-TC	FMHV-203-16-060-DLC-TC	
	1/2"	1/2"	3/4"	0.09"	2-1/8"	4"	FMHV-203-16-090	FMHV-203-16-090-DLC	FMHV-203-16-090-TC	FMHV-203-16-090-DLC-TC	
	1/2"	1/2"	3/4"	0.12"	2-1/8"	4"	FMHV-203-16-120	FMHV-203-16-120-DLC	FMHV-203-16-120-TC	FMHV-203-16-120-DLC-TC	
	1/2"	1/2"	3/4"	Ball End	2-1/8"	4"	FMHV-203-16-BN	FMHV-203-16-BN-DLC	FMHV-203-16-BN-TC	FMHV-203-16-BN-DLC-TC	
EXTRA LONG	1/2"	1/2"	3/4"	Sq. End	2-5/8"	4-1/2"	FMHV-204-16	FMHV-204-16-DLC	FMHV-204-16-TC	FMHV-204-16-DLC-TC	
	1/2"	1/2"	3/4"	0.03"	2-5/8"	4-1/2"	FMHV-204-16-030	FMHV-204-16-030-DLC	FMHV-204-16-030-TC	FMHV-204-16-030-DLC-TC	
	1/2"	1/2"	3/4"	0.06"	2-5/8"	4-1/2"	FMHV-204-16-060	FMHV-204-16-060-DLC	FMHV-204-16-060-TC	FMHV-204-16-060-DLC-TC	
	1/2"	1/2"	3/4"	0.09"	2-5/8"	4-1/2"	FMHV-204-16-090	FMHV-204-16-090-DLC	FMHV-204-16-090-TC	FMHV-204-16-090-DLC-TC	
	1/2"	1/2"	3/4"	0.12"	2-5/8"	4-1/2"	FMHV-204-16-120	FMHV-204-16-120-DLC	FMHV-204-16-120-TC	FMHV-204-16-120-DLC-TC	
	1/2"	1/2"	3/4"	Ball End	2-5/8"	4-1/2"	FMHV-204-16-BN	FMHV-204-16-BN-DLC	FMHV-204-16-BN-TC	FMHV-204-16-BN-DLC-TC	
SHORT	5/8"	5/8"	7/8"	Sq. End	1-9/16"	3-1/2"	FMHV-201-20	FMHV-201-20-DLC	FMHV-201-20-TC	FMHV-201-20-DLC-TC	5/8" DIAMETER
	5/8"	5/8"	7/8"	0.03"	1-9/16"	3-1/2"	FMHV-201-20-030	FMHV-201-20-030-DLC	FMHV-201-20-030-TC	FMHV-201-20-030-DLC-TC	
	5/8"	5/8"	7/8"	0.06"	1-9/16"	3-1/2"	FMHV-201-20-060	FMHV-201-20-060-DLC	FMHV-201-20-060-TC	FMHV-201-20-060-DLC-TC	
	5/8"	5/8"	7/8"	0.09"	1-9/16"	3-1/2"	FMHV-201-20-090	FMHV-201-20-090-DLC	FMHV-201-20-090-TC	FMHV-201-20-090-DLC-TC	
	5/8"	5/8"	7/8"	0.12"	1-9/16"	3-1/2"	FMHV-201-20-120	FMHV-201-20-120-DLC	FMHV-201-20-120-TC	FMHV-201-20-120-DLC-TC	
	5/8"	5/8"	7/8"	Ball End	1-9/16"	3-1/2"	FMHV-201-20-BN	FMHV-201-20-BN-DLC	FMHV-201-20-BN-TC	FMHV-201-20-BN-DLC-TC	

*Other Reach Lengths available upon request.

Due to the large offering of FMHV series many of these are made to order and non-returnable.

CONTINUED ON NEXT PAGE—

FMHV 2 Flute Ultra-High Velocity Tools for Aluminum

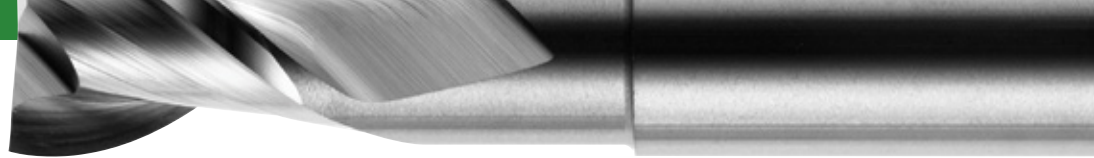


FMHV 2 Flute (Short to Long Reach)



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
MEDIUM	5/8"	5/8"	7/8"	Sq. End	2-1/16"	4"	FMHV-202-20	FMHV-202-20-DLC	FMHV-202-20-TC	FMHV-202-20-DLC-TC	5/8" DIAMETER
	5/8"	5/8"	7/8"	0.03"	2-1/16"	4"	FMHV-202-20-030	FMHV-202-20-030-DLC	FMHV-202-20-030-TC	FMHV-202-20-030-DLC-TC	
	5/8"	5/8"	7/8"	0.06"	2-1/16"	4"	FMHV-202-20-060	FMHV-202-20-060-DLC	FMHV-202-20-060-TC	FMHV-202-20-060-DLC-TC	
	5/8"	5/8"	7/8"	0.09"	2-1/16"	4"	FMHV-202-20-090	FMHV-202-20-090-DLC	FMHV-202-20-090-TC	FMHV-202-20-090-DLC-TC	
	5/8"	5/8"	7/8"	0.12"	2-1/16"	4"	FMHV-202-20-120	FMHV-202-20-120-DLC	FMHV-202-20-120-TC	FMHV-202-20-120-DLC-TC	
	5/8"	5/8"	7/8"	Ball End	2-1/16"	4"	FMHV-202-20-BN	FMHV-202-20-BN-DLC	FMHV-202-20-BN-TC	FMHV-202-20-BN-DLC-TC	
LONG	5/8"	5/8"	7/8"	Sq. End	2-9/16"	4-1/2"	FMHV-203-20	FMHV-203-20-DLC	FMHV-203-20-TC	FMHV-203-20-DLC-TC	5/8" DIAMETER
	5/8"	5/8"	7/8"	0.03"	2-9/16"	4-1/2"	FMHV-203-20-030	FMHV-203-20-030-DLC	FMHV-203-20-030-TC	FMHV-203-20-030-DLC-TC	
	5/8"	5/8"	7/8"	0.06"	2-9/16"	4-1/2"	FMHV-203-20-060	FMHV-203-20-060-DLC	FMHV-203-20-060-TC	FMHV-203-20-060-DLC-TC	
	5/8"	5/8"	7/8"	0.09"	2-9/16"	4-1/2"	FMHV-203-20-090	FMHV-203-20-090-DLC	FMHV-203-20-090-TC	FMHV-203-20-090-DLC-TC	
	5/8"	5/8"	7/8"	0.12"	2-9/16"	4-1/2"	FMHV-203-20-120	FMHV-203-20-120-DLC	FMHV-203-20-120-TC	FMHV-203-20-120-DLC-TC	
	5/8"	5/8"	7/8"	Ball End	2-9/16"	4-1/2"	FMHV-203-20-BN	FMHV-203-20-BN-DLC	FMHV-203-20-BN-TC	FMHV-203-20-BN-DLC-TC	
EXTRA LONG	5/8"	5/8"	7/8"	Sq. End	3-1/16"	5"	FMHV-204-20	FMHV-204-20-DLC	FMHV-204-20-TC	FMHV-204-20-DLC-TC	5/8" DIAMETER
	5/8"	5/8"	7/8"	0.03"	3-1/16"	5"	FMHV-204-20-030	FMHV-204-20-030-DLC	FMHV-204-20-030-TC	FMHV-204-20-030-DLC-TC	
	5/8"	5/8"	7/8"	0.06"	3-1/16"	5"	FMHV-204-20-060	FMHV-204-20-060-DLC	FMHV-204-20-060-TC	FMHV-204-20-060-DLC-TC	
	5/8"	5/8"	7/8"	0.09"	3-1/16"	5"	FMHV-204-20-090	FMHV-204-20-090-DLC	FMHV-204-20-090-TC	FMHV-204-20-090-DLC-TC	
	5/8"	5/8"	7/8"	0.12"	3-1/16"	5"	FMHV-204-20-120	FMHV-204-20-120-DLC	FMHV-204-20-120-TC	FMHV-204-20-120-DLC-TC	
	5/8"	5/8"	7/8"	Ball End	3-1/16"	5"	FMHV-204-20-BN	FMHV-204-20-BN-DLC	FMHV-204-20-BN-TC	FMHV-204-20-BN-DLC-TC	
SHORT	3/4"	3/4"	1"	Sq. End	2-1/8"	4"	FMHV-201-24	FMHV-201-24-DLC	FMHV-201-24-TC	FMHV-201-24-DLC-TC	3/4" DIAMETER
	3/4"	3/4"	1"	0.03"	2-1/8"	4"	FMHV-201-24-030	FMHV-201-24-030-DLC	FMHV-201-24-030-TC	FMHV-201-24-030-DLC-TC	
	3/4"	3/4"	1"	0.06"	2-1/8"	4"	FMHV-201-24-060	FMHV-201-24-060-DLC	FMHV-201-24-060-TC	FMHV-201-24-060-DLC-TC	
	3/4"	3/4"	1"	0.09"	2-1/8"	4"	FMHV-201-24-090	FMHV-201-24-090-DLC	FMHV-201-24-090-TC	FMHV-201-24-090-DLC-TC	
	3/4"	3/4"	1"	0.12"	2-1/8"	4"	FMHV-201-24-120	FMHV-201-24-120-DLC	FMHV-201-24-120-TC	FMHV-201-24-120-DLC-TC	
	3/4"	3/4"	1"	0.19"	2-1/8"	4"	FMHV-201-24-190	FMHV-201-24-190-DLC	FMHV-201-24-190-TC	FMHV-201-24-190-DLC-TC	
MEDIUM	3/4"	3/4"	1"	Ball End	2-1/8"	4"	FMHV-201-24-BN	FMHV-201-24-BN-DLC	FMHV-201-24-BN-TC	FMHV-201-24-BN-DLC-TC	3/4" DIAMETER
	3/4"	3/4"	1"	Sq. End	2-5/8"	4-1/2"	FMHV-202-24	FMHV-202-24-DLC	FMHV-202-24-TC	FMHV-202-24-DLC-TC	
	3/4"	3/4"	1"	0.03"	2-5/8"	4-1/2"	FMHV-202-24-030	FMHV-202-24-030-DLC	FMHV-202-24-030-TC	FMHV-202-24-030-DLC-TC	
	3/4"	3/4"	1"	0.06"	2-5/8"	4-1/2"	FMHV-202-24-060	FMHV-202-24-060-DLC	FMHV-202-24-060-TC	FMHV-202-24-060-DLC-TC	
	3/4"	3/4"	1"	0.09"	2-5/8"	4-1/2"	FMHV-202-24-090	FMHV-202-24-090-DLC	FMHV-202-24-090-TC	FMHV-202-24-090-DLC-TC	
	3/4"	3/4"	1"	0.12"	2-5/8"	4-1/2"	FMHV-202-24-120	FMHV-202-24-120-DLC	FMHV-202-24-120-TC	FMHV-202-24-120-DLC-TC	
LONG	3/4"	3/4"	1"	0.19"	2-5/8"	4-1/2"	FMHV-202-24-190	FMHV-202-24-190-DLC	FMHV-202-24-190-TC	FMHV-202-24-190-DLC-TC	3/4" DIAMETER
	3/4"	3/4"	1"	Ball End	2-5/8"	4-1/2"	FMHV-202-24-BN	FMHV-202-24-BN-DLC	FMHV-202-24-BN-TC	FMHV-202-24-BN-DLC-TC	
	3/4"	3/4"	1"	Sq. End	3-1/8"	5"	FMHV-203-24	FMHV-203-24-DLC	FMHV-203-24-TC	FMHV-203-24-DLC-TC	
	3/4"	3/4"	1"	0.03"	3-1/8"	5"	FMHV-203-24-030	FMHV-203-24-030-DLC	FMHV-203-24-030-TC	FMHV-203-24-030-DLC-TC	
	3/4"	3/4"	1"	0.06"	3-1/8"	5"	FMHV-203-24-060	FMHV-203-24-060-DLC	FMHV-203-24-060-TC	FMHV-203-24-060-DLC-TC	
	3/4"	3/4"	1"	0.09"	3-1/8"	5"	FMHV-203-24-090	FMHV-203-24-090-DLC	FMHV-203-24-090-TC	FMHV-203-24-090-DLC-TC	
EXTRA LONG	3/4"	3/4"	1"	0.12"	3-1/8"	5"	FMHV-203-24-120	FMHV-203-24-120-DLC	FMHV-203-24-120-TC	FMHV-203-24-120-DLC-TC	3/4" DIAMETER
	3/4"	3/4"	1"	0.19"	3-1/8"	5"	FMHV-203-24-190	FMHV-203-24-190-DLC	FMHV-203-24-190-TC	FMHV-203-24-190-DLC-TC	
	3/4"	3/4"	1"	Ball End	3-1/8"	5"	FMHV-203-24-BN	FMHV-203-24-BN-DLC	FMHV-203-24-BN-TC	FMHV-203-24-BN-DLC-TC	
	3/4"	3/4"	1"	Sq. End	3-5/8"	5-1/2"	FMHV-204-24	FMHV-204-24-DLC	FMHV-204-24-TC	FMHV-204-24-DLC-TC	
	3/4"	3/4"	1"	0.03"	3-5/8"	5-1/2"	FMHV-204-24-030	FMHV-204-24-030-DLC	FMHV-204-24-030-TC	FMHV-204-24-030-DLC-TC	
	3/4"	3/4"	1"	0.06"	3-5/8"	5-1/2"	FMHV-204-24-060	FMHV-204-24-060-DLC	FMHV-204-24-060-TC	FMHV-204-24-060-DLC-TC	
EXTRA LONG	3/4"	3/4"	1"	0.09"	3-5/8"	5-1/2"	FMHV-204-24-090	FMHV-204-24-090-DLC	FMHV-204-24-090-TC	FMHV-204-24-090-DLC-TC	3/4" DIAMETER
	3/4"	3/4"	1"	0.12"	3-5/8"	5-1/2"	FMHV-204-24-120	FMHV-204-24-120-DLC	FMHV-204-24-120-TC	FMHV-204-24-120-DLC-TC	
	3/4"	3/4"	1"	0.19"	3-5/8"	5-1/2"	FMHV-204-24-190	FMHV-204-24-190-DLC	FMHV-204-24-190-TC	FMHV-204-24-190-DLC-TC	
	3/4"	3/4"	1"	Ball End	3-5/8"	5-1/2"	FMHV-204-24-BN	FMHV-204-24-BN-DLC	FMHV-204-24-BN-TC	FMHV-204-24-BN-DLC-TC	

NEW!



Aluminum

FMHV 2 Flute (Short to Long Reach)



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated
SHORT	1"	1"	1-1/4"	Sq. End	2-1/8"	4"	FMHV-201-32	FMHV-201-32-DLC	FMHV-201-32-TC	FMHV-201-32-DLC-TC
	1"	1"	1-1/4"	0.03"	2-1/8"	4"	FMHV-201-32-030	FMHV-201-32-030-DLC	FMHV-201-32-030-TC	FMHV-201-32-030-DLC-TC
	1"	1"	1-1/4"	0.06"	2-1/8"	4"	FMHV-201-32-060	FMHV-201-32-060-DLC	FMHV-201-32-060-TC	FMHV-201-32-060-DLC-TC
	1"	1"	1-1/4"	0.09"	2-1/8"	4"	FMHV-201-32-090	FMHV-201-32-090-DLC	FMHV-201-32-090-TC	FMHV-201-32-090-DLC-TC
	1"	1"	1-1/4"	0.12"	2-1/8"	4"	FMHV-201-32-120	FMHV-201-32-120-DLC	FMHV-201-32-120-TC	FMHV-201-32-120-DLC-TC
	1"	1"	1-1/4"	0.19"	2-1/8"	4"	FMHV-201-32-190	FMHV-201-32-190-DLC	FMHV-201-32-190-TC	FMHV-201-32-190-DLC-TC
	1"	1"	1-1/4"	Ball End	2-1/8"	4"	FMHV-201-32-BN	FMHV-201-32-BN-DLC	FMHV-201-32-BN-TC	FMHV-201-32-BN-DLC-TC
MEDIUM	1"	1"	1-1/4"	Sq. End	2-5/8"	4-1/2"	FMHV-202-32	FMHV-202-32-DLC	FMHV-202-32-TC	FMHV-202-32-DLC-TC
	1"	1"	1-1/4"	0.03"	2-5/8"	4-1/2"	FMHV-202-32-030	FMHV-202-32-030-DLC	FMHV-202-32-030-TC	FMHV-202-32-030-DLC-TC
	1"	1"	1-1/4"	0.06"	2-5/8"	4-1/2"	FMHV-202-32-060	FMHV-202-32-060-DLC	FMHV-202-32-060-TC	FMHV-202-32-060-DLC-TC
	1"	1"	1-1/4"	0.09"	2-5/8"	4-1/2"	FMHV-202-32-090	FMHV-202-32-090-DLC	FMHV-202-32-090-TC	FMHV-202-32-090-DLC-TC
	1"	1"	1-1/4"	0.12"	2-5/8"	4-1/2"	FMHV-202-32-120	FMHV-202-32-120-DLC	FMHV-202-32-120-TC	FMHV-202-32-120-DLC-TC
	1"	1"	1-1/4"	0.19"	2-5/8"	4-1/2"	FMHV-202-32-190	FMHV-202-32-190-DLC	FMHV-202-32-190-TC	FMHV-202-32-190-DLC-TC
	1"	1"	1-1/4"	Ball End	2-5/8"	4-1/2"	FMHV-202-32-BN	FMHV-202-32-BN-DLC	FMHV-202-32-BN-TC	FMHV-202-32-BN-DLC-TC
LONG	1"	1"	1-1/4"	Sq. End	3-1/8"	5"	FMHV-203-32	FMHV-203-32-DLC	FMHV-203-32-TC	FMHV-203-32-DLC-TC
	1"	1"	1-1/4"	0.03"	3-1/8"	5"	FMHV-203-32-030	FMHV-203-32-030-DLC	FMHV-203-32-030-TC	FMHV-203-32-030-DLC-TC
	1"	1"	1-1/4"	0.06"	3-1/8"	5"	FMHV-203-32-060	FMHV-203-32-060-DLC	FMHV-203-32-060-TC	FMHV-203-32-060-DLC-TC
	1"	1"	1-1/4"	0.09"	3-1/8"	5"	FMHV-203-32-090	FMHV-203-32-090-DLC	FMHV-203-32-090-TC	FMHV-203-32-090-DLC-TC
	1"	1"	1-1/4"	0.12"	3-1/8"	5"	FMHV-203-32-120	FMHV-203-32-120-DLC	FMHV-203-32-120-TC	FMHV-203-32-120-DLC-TC
	1"	1"	1-1/4"	0.19"	3-1/8"	5"	FMHV-203-32-190	FMHV-203-32-190-DLC	FMHV-203-32-190-TC	FMHV-203-32-190-DLC-TC
	1"	1"	1-1/4"	Ball End	3-1/8"	5"	FMHV-203-32-BN	FMHV-203-32-BN-DLC	FMHV-203-32-BN-TC	FMHV-203-32-BN-DLC-TC
EXTRA LONG	1"	1"	1-1/4"	Sq. End	3-5/8"	5-1/2"	FMHV-204-32	FMHV-204-32-DLC	FMHV-204-32-TC	FMHV-204-32-DLC-TC
	1"	1"	1-1/4"	0.03"	3-5/8"	5-1/2"	FMHV-204-32-030	FMHV-204-32-030-DLC	FMHV-204-32-030-TC	FMHV-204-32-030-DLC-TC
	1"	1"	1-1/4"	0.06"	3-5/8"	5-1/2"	FMHV-204-32-060	FMHV-204-32-060-DLC	FMHV-204-32-060-TC	FMHV-204-32-060-DLC-TC
	1"	1"	1-1/4"	0.09"	3-5/8"	5-1/2"	FMHV-204-32-090	FMHV-204-32-090-DLC	FMHV-204-32-090-TC	FMHV-204-32-090-DLC-TC
	1"	1"	1-1/4"	0.12"	3-5/8"	5-1/2"	FMHV-204-32-120	FMHV-204-32-120-DLC	FMHV-204-32-120-TC	FMHV-204-32-120-DLC-TC
	1"	1"	1-1/4"	0.19"	3-5/8"	5-1/2"	FMHV-204-32-190	FMHV-204-32-190-DLC	FMHV-204-32-190-TC	FMHV-204-32-190-DLC-TC
	1"	1"	1-1/4"	Ball End	3-5/8"	5-1/2"	FMHV-204-32-BN	FMHV-204-32-BN-DLC	FMHV-204-32-BN-TC	FMHV-204-32-BN-DLC-TC
DOUBLE EXTRA LONG	1"	1"	1-1/4"	Sq. End	4-1/8"	6"	FMHV-205-32	FMHV-205-32-DLC	FMHV-205-32-TC	FMHV-205-32-DLC-TC
	1"	1"	1-1/4"	0.03"	4-1/8"	6"	FMHV-205-32-030	FMHV-205-32-030-DLC	FMHV-205-32-030-TC	FMHV-205-32-030-DLC-TC
	1"	1"	1-1/4"	0.06"	4-1/8"	6"	FMHV-205-32-060	FMHV-205-32-060-DLC	FMHV-205-32-060-TC	FMHV-205-32-060-DLC-TC
	1"	1"	1-1/4"	0.09"	4-1/8"	6"	FMHV-205-32-090	FMHV-205-32-090-DLC	FMHV-205-32-090-TC	FMHV-205-32-090-DLC-TC
	1"	1"	1-1/4"	0.12"	4-1/8"	6"	FMHV-205-32-120	FMHV-205-32-120-DLC	FMHV-205-32-120-TC	FMHV-205-32-120-DLC-TC
	1"	1"	1-1/4"	0.19"	4-1/8"	6"	FMHV-205-32-190	FMHV-205-32-190-DLC	FMHV-205-32-190-TC	FMHV-205-32-190-DLC-TC
	1"	1"	1-1/4"	Ball End	4-1/8"	6"	FMHV-205-32-BN	FMHV-205-32-BN-DLC	FMHV-205-32-BN-TC	FMHV-205-32-BN-DLC-TC

1" DIAMETER

Due to the large offering of FMHV series many of these are made to order and non-returnable.

FMHV Technical data:

Diameter	Chip load per tooth	Typical Depth	Recommended RPM	Type of cut
1" Diameter	.008-.015	.300 up to .750	Max Tap Tested RPM Or Max RPM	Slot or profile (stay away from 50% radial step-over)
3/4" Diameter	.006-.012	.200 up to .900		
5/8" Diameter	.005-.011	.100 up to .750		
1/2" Diameter	.004-.010	.100 up to .750		
3/8" Diameter	.003-.006	.100 up to .500		
5/16" Diameter	.002-.005	.100 up to .500		
1/4" Diameter	.002-.004	.100 up to .375		

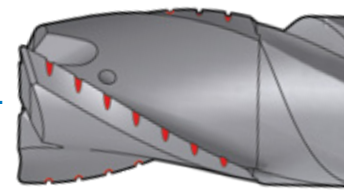
175 horsepower / 130 kilowatt machines: Speeds and feeds are based on short stickout tools.

These speed and feed data are based on super extreme high-velocity high-horsepower / kilowatt machines. Most machines cannot use these speeds and feeds without causing damage. Be sure not to max out your machine. These tools can max out all machines made today. Adjust speeds and feed to the machine and application. It is recommended to use the highest quality tool holders available. Be careful!

Chip Breakers

If you "Need Chip Breakers" add "-CB" to the end of any part number to get chip breakers added.

Example: MFMHV-202-25-CB



FMHV 3 Flute Ultra-High Velocity Tools for Aluminum



Characteristics

- Square End
- Corner Radius
- Ball End
- 3 Flute
- 37° Helix
- Feather Blend
- Necked
- Mirror Edge
- Thru Coolant Holes

Applications

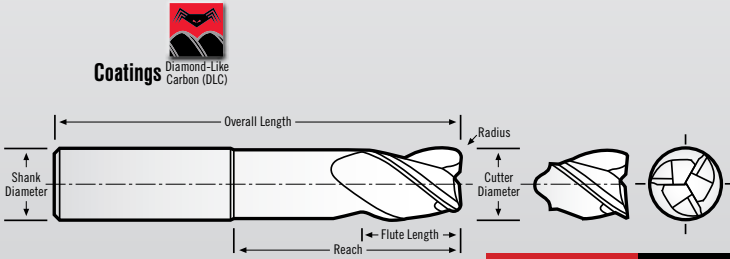
- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Wet

Materials

- Aluminum
- Copper
- Magnesium
- BRASS

Eliminate Tool Pull Out!
h4 Shank Tolerance up to 150% more gripping force
Tightest in the Industry!

NEXT GENERATION
Mirror Edge!
Eliminates Chatter & Vibration



FM Series Tolerances:
 Cutting Dia. = $-.001/-0.0015$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+.060/-0.000$
 OAL = $+/- .060$

ALL-NEW BALANCED END DESIGN

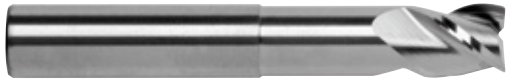
CANNOT PLUNGE



NEW!

FMHV 3 Flute (Short to Long Reach)

	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
SHORT	1/4"	1/4"	3/8"	Sq. End	3/4"	2"	FMHV-301-08	FMHV-301-08-DLC	FMHV-301-08-TC	FMHV-301-08-DLC-TC	1/4" DIAMETER
	1/4"	1/4"	3/8"	0.03"	3/4"	2"	FMHV-301-08-030	FMHV-301-08-030-DLC	FMHV-301-08-030-TC	FMHV-301-08-030-DLC-TC	
	1/4"	1/4"	3/8"	0.06"	3/4"	2"	FMHV-301-08-060	FMHV-301-08-060-DLC	FMHV-301-08-060-TC	FMHV-301-08-060-DLC-TC	
	1/4"	1/4"	3/8"	0.09"	3/4"	2"	FMHV-301-08-090	FMHV-301-08-090-DLC	FMHV-301-08-090-TC	FMHV-301-08-090-DLC-TC	
	1/4"	1/4"	3/8"	Ball End	3/4"	2"	FMHV-301-08-BN	FMHV-301-08-BN-DLC	FMHV-301-08-BN-TC	FMHV-301-08-BN-DLC-TC	
MEDIUM	1/4"	1/4"	3/8"	Sq. End	1-1/16"	2-1/2"	FMHV-302-08	FMHV-302-08-DLC	FMHV-302-08-TC	FMHV-302-08-DLC-TC	1/4" DIAMETER
	1/4"	1/4"	3/8"	0.03"	1-1/16"	2-1/2"	FMHV-302-08-030	FMHV-302-08-030-DLC	FMHV-302-08-030-TC	FMHV-302-08-030-DLC-TC	
	1/4"	1/4"	3/8"	0.06"	1-1/16"	2-1/2"	FMHV-302-08-060	FMHV-302-08-060-DLC	FMHV-302-08-060-TC	FMHV-302-08-060-DLC-TC	
	1/4"	1/4"	3/8"	0.09"	1-1/16"	2-1/2"	FMHV-302-08-090	FMHV-302-08-090-DLC	FMHV-302-08-090-TC	FMHV-302-08-090-DLC-TC	
	1/4"	1/4"	3/8"	Ball End	1-1/16"	2-1/2"	FMHV-302-08-BN	FMHV-302-08-BN-DLC	FMHV-302-08-BN-TC	FMHV-302-08-BN-DLC-TC	
LONG	1/4"	1/4"	3/8"	Sq. End	1-1/2"	3"	FMHV-303-08	FMHV-303-08-DLC	FMHV-303-08-TC	FMHV-303-08-DLC-TC	1/4" DIAMETER
	1/4"	1/4"	3/8"	0.03"	1-1/2"	3"	FMHV-303-08-030	FMHV-303-08-030-DLC	FMHV-303-08-030-TC	FMHV-303-08-030-DLC-TC	
	1/4"	1/4"	3/8"	0.06"	1-1/2"	3"	FMHV-303-08-060	FMHV-303-08-060-DLC	FMHV-303-08-060-TC	FMHV-303-08-060-DLC-TC	
	1/4"	1/4"	3/8"	0.09"	1-1/2"	3"	FMHV-303-08-090	FMHV-303-08-090-DLC	FMHV-303-08-090-TC	FMHV-303-08-090-DLC-TC	
	1/4"	1/4"	3/8"	Ball End	1-1/2"	3"	FMHV-303-08-BN	FMHV-303-08-BN-DLC	FMHV-303-08-BN-TC	FMHV-303-08-BN-DLC-TC	
SHORT	5/16"	5/16"	1/2"	Sq. End	3/4"	2"	FMHV-301-10	FMHV-301-10-DLC	FMHV-301-10-TC	FMHV-301-10-DLC-TC	5/16" DIAMETER
	5/16"	5/16"	1/2"	0.03"	3/4"	2"	FMHV-301-10-030	FMHV-301-10-030-DLC	FMHV-301-10-030-TC	FMHV-301-10-030-DLC-TC	
	5/16"	5/16"	1/2"	0.06"	3/4"	2"	FMHV-301-10-060	FMHV-301-10-060-DLC	FMHV-301-10-060-TC	FMHV-301-10-060-DLC-TC	
	5/16"	5/16"	1/2"	0.09"	3/4"	2"	FMHV-301-10-090	FMHV-301-10-090-DLC	FMHV-301-10-090-TC	FMHV-301-10-090-DLC-TC	
	5/16"	5/16"	1/2"	Ball End	3/4"	2"	FMHV-301-10-BN	FMHV-301-10-BN-DLC	FMHV-301-10-BN-TC	FMHV-301-10-BN-DLC-TC	
MEDIUM	5/16"	5/16"	1/2"	Sq. End	1-1/16"	2-1/2"	FMHV-302-10	FMHV-302-10-DLC	FMHV-302-10-TC	FMHV-302-10-DLC-TC	5/16" DIAMETER
	5/16"	5/16"	1/2"	0.03"	1-1/16"	2-1/2"	FMHV-302-10-030	FMHV-302-10-030-DLC	FMHV-302-10-030-TC	FMHV-302-10-030-DLC-TC	
	5/16"	5/16"	1/2"	0.06"	1-1/16"	2-1/2"	FMHV-302-10-060	FMHV-302-10-060-DLC	FMHV-302-10-060-TC	FMHV-302-10-060-DLC-TC	
	5/16"	5/16"	1/2"	0.09"	1-1/16"	2-1/2"	FMHV-302-10-090	FMHV-302-10-090-DLC	FMHV-302-10-090-TC	FMHV-302-10-090-DLC-TC	
	5/16"	5/16"	1/2"	Ball End	1-1/16"	2-1/2"	FMHV-302-10-BN	FMHV-302-10-BN-DLC	FMHV-302-10-BN-TC	FMHV-302-10-BN-DLC-TC	



NEW!

3 Flute **FMHV**

Aluminum

FMHV 3 Flute (Short to Long Reach)

	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
LONG	5/16"	5/16"	1/2"	Sq. End	1-1/2"	3"	FMHV-303-10	FMHV-303-10-DLC	FMHV-303-10-TC	FMHV-303-10-DLC-TC	5/16" DIAMETER
	5/16"	5/16"	1/2"	0.03"	1-1/2"	3"	FMHV-303-10-030	FMHV-303-10-030-DLC	FMHV-303-10-030-TC	FMHV-303-10-030-DLC-TC	
	5/16"	5/16"	1/2"	0.06"	1-1/2"	3"	FMHV-303-10-060	FMHV-303-10-060-DLC	FMHV-303-10-060-TC	FMHV-303-10-060-DLC-TC	
	5/16"	5/16"	1/2"	0.09"	1-1/2"	3"	FMHV-303-10-090	FMHV-303-10-090-DLC	FMHV-303-10-090-TC	FMHV-303-10-090-DLC-TC	
	5/16"	5/16"	1/2"	Ball End	1-1/2"	3"	FMHV-303-10-BN	FMHV-303-10-BN-DLC	FMHV-303-10-BN-TC	FMHV-303-10-BN-DLC-TC	
SHORT	3/8"	3/8"	1/2"	Sq. End	1-1/4"	3"	FMHV-301-12	FMHV-301-12-DLC	FMHV-301-12-TC	FMHV-301-12-DLC-TC	3/8" DIAMETER
	3/8"	3/8"	1/2"	0.03"	1-1/4"	3"	FMHV-301-12-030	FMHV-301-12-030-DLC	FMHV-301-12-030-TC	FMHV-301-12-030-DLC-TC	
	3/8"	3/8"	1/2"	0.06"	1-1/4"	3"	FMHV-301-12-060	FMHV-301-12-060-DLC	FMHV-301-12-060-TC	FMHV-301-12-060-DLC-TC	
	3/8"	3/8"	1/2"	0.09"	1-1/4"	3"	FMHV-301-12-090	FMHV-301-12-090-DLC	FMHV-301-12-090-TC	FMHV-301-12-090-DLC-TC	
	3/8"	3/8"	1/2"	Ball End	1-1/4"	3"	FMHV-301-12-BN	FMHV-301-12-BN-DLC	FMHV-301-12-BN-TC	FMHV-301-12-BN-DLC-TC	
MEDIUM	3/8"	3/8"	1/2"	Sq. End	1-3/4"	3-1/2"	FMHV-302-12	FMHV-302-12-DLC	FMHV-302-12-TC	FMHV-302-12-DLC-TC	
	3/8"	3/8"	1/2"	0.03"	1-3/4"	3-1/2"	FMHV-302-12-030	FMHV-302-12-030-DLC	FMHV-302-12-030-TC	FMHV-302-12-030-DLC-TC	
	3/8"	3/8"	1/2"	0.06"	1-3/4"	3-1/2"	FMHV-302-12-060	FMHV-302-12-060-DLC	FMHV-302-12-060-TC	FMHV-302-12-060-DLC-TC	
	3/8"	3/8"	1/2"	0.09"	1-3/4"	3-1/2"	FMHV-302-12-090	FMHV-302-12-090-DLC	FMHV-302-12-090-TC	FMHV-302-12-090-DLC-TC	
	3/8"	3/8"	1/2"	Ball End	1-3/4"	3-1/2"	FMHV-302-12-BN	FMHV-302-12-BN-DLC	FMHV-302-12-BN-TC	FMHV-302-12-BN-DLC-TC	
LONG	3/8"	3/8"	1/2"	Sq. End	2-1/4"	4"	FMHV-303-12	FMHV-303-12-DLC	FMHV-303-12-TC	FMHV-303-12-DLC-TC	
	3/8"	3/8"	1/2"	0.03"	2-1/4"	4"	FMHV-303-12-030	FMHV-303-12-030-DLC	FMHV-303-12-030-TC	FMHV-303-12-030-DLC-TC	
	3/8"	3/8"	1/2"	0.06"	2-1/4"	4"	FMHV-303-12-060	FMHV-303-12-060-DLC	FMHV-303-12-060-TC	FMHV-303-12-060-DLC-TC	
	3/8"	3/8"	1/2"	0.09"	2-1/4"	4"	FMHV-303-12-090	FMHV-303-12-090-DLC	FMHV-303-12-090-TC	FMHV-303-12-090-DLC-TC	
	3/8"	3/8"	1/2"	Ball End	2-1/4"	4"	FMHV-303-12-BN	FMHV-303-12-BN-DLC	FMHV-303-12-BN-TC	FMHV-303-12-BN-DLC-TC	
SHORT	1/2"	1/2"	3/4"	Sq. End	1-1/4"	3"	FMHV-301-16	FMHV-301-16-DLC	FMHV-301-16-TC	FMHV-301-16-DLC-TC	1/2" DIAMETER
	1/2"	1/2"	3/4"	0.03"	1-1/4"	3"	FMHV-301-16-030	FMHV-301-16-030-DLC	FMHV-301-16-030-TC	FMHV-301-16-030-DLC-TC	
	1/2"	1/2"	3/4"	0.06"	1-1/4"	3"	FMHV-301-16-060	FMHV-301-16-060-DLC	FMHV-301-16-060-TC	FMHV-301-16-060-DLC-TC	
	1/2"	1/2"	3/4"	0.09"	1-1/4"	3"	FMHV-301-16-090	FMHV-301-16-090-DLC	FMHV-301-16-090-TC	FMHV-301-16-090-DLC-TC	
	1/2"	1/2"	3/4"	0.12"	1-1/4"	3"	FMHV-301-16-120	FMHV-301-16-120-DLC	FMHV-301-16-120-TC	FMHV-301-16-120-DLC-TC	
	1/2"	1/2"	3/4"	Ball End	1-1/4"	3"	FMHV-301-16-BN	FMHV-301-16-BN-DLC	FMHV-301-16-BN-TC	FMHV-301-16-BN-DLC-TC	
	1/2"	1/2"	3/4"	Sq. End	1-5/8"	3-1/2"	FMHV-302-16	FMHV-302-16-DLC	FMHV-302-16-TC	FMHV-302-16-DLC-TC	
MEDIUM	1/2"	1/2"	3/4"	0.03"	1-5/8"	3-1/2"	FMHV-302-16-030	FMHV-302-16-030-DLC	FMHV-302-16-030-TC	FMHV-302-16-030-DLC-TC	
	1/2"	1/2"	3/4"	0.06"	1-5/8"	3-1/2"	FMHV-302-16-060	FMHV-302-16-060-DLC	FMHV-302-16-060-TC	FMHV-302-16-060-DLC-TC	
	1/2"	1/2"	3/4"	0.09"	1-5/8"	3-1/2"	FMHV-302-16-090	FMHV-302-16-090-DLC	FMHV-302-16-090-TC	FMHV-302-16-090-DLC-TC	
	1/2"	1/2"	3/4"	0.12"	1-5/8"	3-1/2"	FMHV-302-16-120	FMHV-302-16-120-DLC	FMHV-302-16-120-TC	FMHV-302-16-120-DLC-TC	
	1/2"	1/2"	3/4"	Ball End	1-5/8"	3-1/2"	FMHV-302-16-BN	FMHV-302-16-BN-DLC	FMHV-302-16-BN-TC	FMHV-302-16-BN-DLC-TC	
	1/2"	1/2"	3/4"	Sq. End	2-1/8"	4"	FMHV-303-16	FMHV-303-16-DLC	FMHV-303-16-TC	FMHV-303-16-DLC-TC	
	1/2"	1/2"	3/4"	0.03"	2-1/8"	4"	FMHV-303-16-030	FMHV-303-16-030-DLC	FMHV-303-16-030-TC	FMHV-303-16-030-DLC-TC	
LONG	1/2"	1/2"	3/4"	0.06"	2-1/8"	4"	FMHV-303-16-060	FMHV-303-16-060-DLC	FMHV-303-16-060-TC	FMHV-303-16-060-DLC-TC	
	1/2"	1/2"	3/4"	0.09"	2-1/8"	4"	FMHV-303-16-090	FMHV-303-16-090-DLC	FMHV-303-16-090-TC	FMHV-303-16-090-DLC-TC	
	1/2"	1/2"	3/4"	0.12"	2-1/8"	4"	FMHV-303-16-120	FMHV-303-16-120-DLC	FMHV-303-16-120-TC	FMHV-303-16-120-DLC-TC	
	1/2"	1/2"	3/4"	Ball End	2-1/8"	4"	FMHV-303-16-BN	FMHV-303-16-BN-DLC	FMHV-303-16-BN-TC	FMHV-303-16-BN-DLC-TC	
	1/2"	1/2"	3/4"	Sq. End	2-5/8"	4-1/2"	FMHV-304-16	FMHV-304-16-DLC	FMHV-304-16-TC	FMHV-304-16-DLC-TC	
	1/2"	1/2"	3/4"	0.03"	2-5/8"	4-1/2"	FMHV-304-16-030	FMHV-304-16-030-DLC	FMHV-304-16-030-TC	FMHV-304-16-030-DLC-TC	
	1/2"	1/2"	3/4"	0.06"	2-5/8"	4-1/2"	FMHV-304-16-060	FMHV-304-16-060-DLC	FMHV-304-16-060-TC	FMHV-304-16-060-DLC-TC	
EXTRA LONG	1/2"	1/2"	3/4"	0.09"	2-5/8"	4-1/2"	FMHV-304-16-090	FMHV-304-16-090-DLC	FMHV-304-16-090-TC	FMHV-304-16-090-DLC-TC	
	1/2"	1/2"	3/4"	0.12"	2-5/8"	4-1/2"	FMHV-304-16-120	FMHV-304-16-120-DLC	FMHV-304-16-120-TC	FMHV-304-16-120-DLC-TC	
	1/2"	1/2"	3/4"	Ball End	2-5/8"	4-1/2"	FMHV-304-16-BN	FMHV-304-16-BN-DLC	FMHV-304-16-BN-TC	FMHV-304-16-BN-DLC-TC	

*Other Reach Lengths available upon request.

Due to the large offering of FMHV series many of these are made to order and non-returnable.

CONTINUED ON NEXT PAGE—

FMHV 3 Flute Ultra-High Velocity Tools for Aluminum

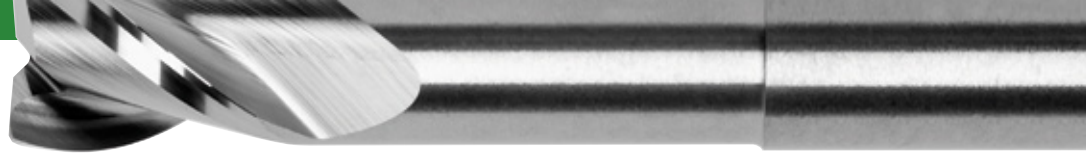


FMHV 3 Flute (Short to Long Reach)



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
SHORT	5/8"	5/8"	7/8"	Sq. End	1-9/16"	3-1/2"	FMHV-301-20	FMHV-301-20-DLC	FMHV-301-20-TC	FMHV-301-20-DLC-TC	5/8" DIAMETER
	5/8"	5/8"	7/8"	0.03	1-9/16"	3-1/2"	FMHV-301-20-030	FMHV-301-20-030-DLC	FMHV-301-20-030-TC	FMHV-301-20-030-DLC-TC	
	5/8"	5/8"	7/8"	0.06	1-9/16"	3-1/2"	FMHV-301-20-060	FMHV-301-20-060-DLC	FMHV-301-20-060-TC	FMHV-301-20-060-DLC-TC	
	5/8"	5/8"	7/8"	0.09	1-9/16"	3-1/2"	FMHV-301-20-090	FMHV-301-20-090-DLC	FMHV-301-20-090-TC	FMHV-301-20-090-DLC-TC	
	5/8"	5/8"	7/8"	0.12	1-9/16"	3-1/2"	FMHV-301-20-120	FMHV-301-20-120-DLC	FMHV-301-20-120-TC	FMHV-301-20-120-DLC-TC	
	5/8"	5/8"	7/8"	Ball End	1-9/16"	3-1/2"	FMHV-301-20-BN	FMHV-301-20-BN-DLC	FMHV-301-20-BN-TC	FMHV-301-20-BN-DLC-TC	
MEDIUM	5/8"	5/8"	7/8"	Sq. End	2-1/16"	4"	FMHV-302-20	FMHV-302-20-DLC	FMHV-302-20-TC	FMHV-302-20-DLC-TC	5/8" DIAMETER
	5/8"	5/8"	7/8"	0.03	2-1/16"	4"	FMHV-302-20-030	FMHV-302-20-030-DLC	FMHV-302-20-030-TC	FMHV-302-20-030-DLC-TC	
	5/8"	5/8"	7/8"	0.06	2-1/16"	4"	FMHV-302-20-060	FMHV-302-20-060-DLC	FMHV-302-20-060-TC	FMHV-302-20-060-DLC-TC	
	5/8"	5/8"	7/8"	0.09	2-1/16"	4"	FMHV-302-20-090	FMHV-302-20-090-DLC	FMHV-302-20-090-TC	FMHV-302-20-090-DLC-TC	
	5/8"	5/8"	7/8"	0.12	2-1/16"	4"	FMHV-302-20-120	FMHV-302-20-120-DLC	FMHV-302-20-120-TC	FMHV-302-20-120-DLC-TC	
	5/8"	5/8"	7/8"	Ball End	2-1/16"	4"	FMHV-302-20-BN	FMHV-302-20-BN-DLC	FMHV-302-20-BN-TC	FMHV-302-20-BN-DLC-TC	
LONG	5/8"	5/8"	7/8"	Sq. End	2-9/16"	4-1/2"	FMHV-303-20	FMHV-303-20-DLC	FMHV-303-20-TC	FMHV-303-20-DLC-TC	5/8" DIAMETER
	5/8"	5/8"	7/8"	0.03	2-9/16"	4-1/2"	FMHV-303-20-030	FMHV-303-20-030-DLC	FMHV-303-20-030-TC	FMHV-303-20-030-DLC-TC	
	5/8"	5/8"	7/8"	0.06	2-9/16"	4-1/2"	FMHV-303-20-060	FMHV-303-20-060-DLC	FMHV-303-20-060-TC	FMHV-303-20-060-DLC-TC	
	5/8"	5/8"	7/8"	0.09	2-9/16"	4-1/2"	FMHV-303-20-090	FMHV-303-20-090-DLC	FMHV-303-20-090-TC	FMHV-303-20-090-DLC-TC	
	5/8"	5/8"	7/8"	0.12	2-9/16"	4-1/2"	FMHV-303-20-120	FMHV-303-20-120-DLC	FMHV-303-20-120-TC	FMHV-303-20-120-DLC-TC	
	5/8"	5/8"	7/8"	Ball End	2-9/16"	4-1/2"	FMHV-303-20-BN	FMHV-303-20-BN-DLC	FMHV-303-20-BN-TC	FMHV-303-20-BN-DLC-TC	
EXTRA LONG	5/8"	5/8"	7/8"	Sq. End	3-1/16"	5"	FMHV-304-20	FMHV-304-20-DLC	FMHV-304-20-TC	FMHV-304-20-DLC-TC	5/8" DIAMETER
	5/8"	5/8"	7/8"	0.03	3-1/16"	5"	FMHV-304-20-030	FMHV-304-20-030-DLC	FMHV-304-20-030-TC	FMHV-304-20-030-DLC-TC	
	5/8"	5/8"	7/8"	0.06	3-1/16"	5"	FMHV-304-20-060	FMHV-304-20-060-DLC	FMHV-304-20-060-TC	FMHV-304-20-060-DLC-TC	
	5/8"	5/8"	7/8"	0.09	3-1/16"	5"	FMHV-304-20-090	FMHV-304-20-090-DLC	FMHV-304-20-090-TC	FMHV-304-20-090-DLC-TC	
	5/8"	5/8"	7/8"	0.12	3-1/16"	5"	FMHV-304-20-120	FMHV-304-20-120-DLC	FMHV-304-20-120-TC	FMHV-304-20-120-DLC-TC	
	5/8"	5/8"	7/8"	Ball End	3-1/16"	5"	FMHV-304-20-BN	FMHV-304-20-BN-DLC	FMHV-304-20-BN-TC	FMHV-304-20-BN-DLC-TC	
SHORT	3/4"	3/4"	1"	Sq. End	2-1/8"	4"	FMHV-301-24	FMHV-301-24-DLC	FMHV-301-24-TC	FMHV-301-24-DLC-TC	3/4" DIAMETER
	3/4"	3/4"	1"	0.03	2-1/8"	4"	FMHV-301-24-030	FMHV-301-24-030-DLC	FMHV-301-24-030-TC	FMHV-301-24-030-DLC-TC	
	3/4"	3/4"	1"	0.06	2-1/8"	4"	FMHV-301-24-060	FMHV-301-24-060-DLC	FMHV-301-24-060-TC	FMHV-301-24-060-DLC-TC	
	3/4"	3/4"	1"	0.09	2-1/8"	4"	FMHV-301-24-090	FMHV-301-24-090-DLC	FMHV-301-24-090-TC	FMHV-301-24-090-DLC-TC	
	3/4"	3/4"	1"	0.12	2-1/8"	4"	FMHV-301-24-120	FMHV-301-24-120-DLC	FMHV-301-24-120-TC	FMHV-301-24-120-DLC-TC	
	3/4"	3/4"	1"	0.19	2-1/8"	4"	FMHV-301-24-190	FMHV-301-24-190-DLC	FMHV-301-24-190-TC	FMHV-301-24-190-DLC-TC	
	3/4"	3/4"	1"	Ball End	2-1/8"	4"	FMHV-301-24-BN	FMHV-301-24-BN-DLC	FMHV-301-24-BN-TC	FMHV-301-24-BN-DLC-TC	
	3/4"	3/4"	1"	Sq. End	2-5/8"	4-1/2"	FMHV-302-24	FMHV-302-24-DLC	FMHV-302-24-TC	FMHV-302-24-DLC-TC	
MEDIUM	3/4"	3/4"	1"	0.03	2-5/8"	4-1/2"	FMHV-302-24-030	FMHV-302-24-030-DLC	FMHV-302-24-030-TC	FMHV-302-24-030-DLC-TC	3/4" DIAMETER
	3/4"	3/4"	1"	0.06	2-5/8"	4-1/2"	FMHV-302-24-060	FMHV-302-24-060-DLC	FMHV-302-24-060-TC	FMHV-302-24-060-DLC-TC	
	3/4"	3/4"	1"	0.09	2-5/8"	4-1/2"	FMHV-302-24-090	FMHV-302-24-090-DLC	FMHV-302-24-090-TC	FMHV-302-24-090-DLC-TC	
	3/4"	3/4"	1"	0.12	2-5/8"	4-1/2"	FMHV-302-24-120	FMHV-302-24-120-DLC	FMHV-302-24-120-TC	FMHV-302-24-120-DLC-TC	
	3/4"	3/4"	1"	0.19	2-5/8"	4-1/2"	FMHV-302-24-190	FMHV-302-24-190-DLC	FMHV-302-24-190-TC	FMHV-302-24-190-DLC-TC	
	3/4"	3/4"	1"	Ball End	2-5/8"	4-1/2"	FMHV-302-24-BN	FMHV-302-24-BN-DLC	FMHV-302-24-BN-TC	FMHV-302-24-BN-DLC-TC	
LONG	3/4"	3/4"	1"	Sq. End	3-1/8"	5"	FMHV-303-24	FMHV-303-24-DLC	FMHV-303-24-TC	FMHV-303-24-DLC-TC	3/4" DIAMETER
	3/4"	3/4"	1"	0.03	3-1/8"	5"	FMHV-303-24-030	FMHV-303-24-030-DLC	FMHV-303-24-030-TC	FMHV-303-24-030-DLC-TC	
	3/4"	3/4"	1"	0.06	3-1/8"	5"	FMHV-303-24-060	FMHV-303-24-060-DLC	FMHV-303-24-060-TC	FMHV-303-24-060-DLC-TC	
	3/4"	3/4"	1"	0.09	3-1/8"	5"	FMHV-303-24-090	FMHV-303-24-090-DLC	FMHV-303-24-090-TC	FMHV-303-24-090-DLC-TC	
	3/4"	3/4"	1"	0.12	3-1/8"	5"	FMHV-303-24-120	FMHV-303-24-120-DLC	FMHV-303-24-120-TC	FMHV-303-24-120-DLC-TC	
	3/4"	3/4"	1"	0.19	3-1/8"	5"	FMHV-303-24-190	FMHV-303-24-190-DLC	FMHV-303-24-190-TC	FMHV-303-24-190-DLC-TC	
	3/4"	3/4"	1"	Ball End	3-1/8"	5"	FMHV-303-24-BN	FMHV-303-24-BN-DLC	FMHV-303-24-BN-TC	FMHV-303-24-BN-DLC-TC	

NEW!



Aluminum

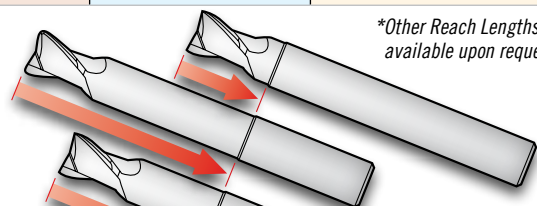
FMHV 3 Flute (Short to Long Reach)



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
EXTRA LONG	3/4"	3/4"	1"	Sq. End	3-5/8"	5-1/2"	FMHV-304-24	FMHV-304-24-DLC	FMHV-304-24-TC	FMHV-304-24-DLC-TC	3/4" DIAMETER
	3/4"	3/4"	1"	0.03"	3-5/8"	5-1/2"	FMHV-304-24-030	FMHV-304-24-030-DLC	FMHV-304-24-030-TC	FMHV-304-24-030-DLC-TC	
	3/4"	3/4"	1"	0.06"	3-5/8"	5-1/2"	FMHV-304-24-060	FMHV-304-24-060-DLC	FMHV-304-24-060-TC	FMHV-304-24-060-DLC-TC	
	3/4"	3/4"	1"	0.09"	3-5/8"	5-1/2"	FMHV-304-24-090	FMHV-304-24-090-DLC	FMHV-304-24-090-TC	FMHV-304-24-090-DLC-TC	
	3/4"	3/4"	1"	0.12"	3-5/8"	5-1/2"	FMHV-304-24-120	FMHV-304-24-120-DLC	FMHV-304-24-120-TC	FMHV-304-24-120-DLC-TC	
	3/4"	3/4"	1"	0.19"	3-5/8"	5-1/2"	FMHV-304-24-190	FMHV-304-24-190-DLC	FMHV-304-24-190-TC	FMHV-304-24-190-DLC-TC	
	3/4"	3/4"	1"	Ball End	3-5/8"	5-1/2"	FMHV-304-24-BN	FMHV-304-24-BN-DLC	FMHV-304-24-BN-TC	FMHV-304-24-BN-DLC-TC	
SHORT	1"	1"	1-1/4"	Sq. End	2-1/8"	4"	FMHV-301-32	FMHV-301-32-DLC	FMHV-301-32-TC	FMHV-301-32-DLC-TC	1" DIAMETER
	1"	1"	1-1/4"	0.03"	2-1/8"	4"	FMHV-301-32-030	FMHV-301-32-030-DLC	FMHV-301-32-030-TC	FMHV-301-32-030-DLC-TC	
	1"	1"	1-1/4"	0.06"	2-1/8"	4"	FMHV-301-32-060	FMHV-301-32-060-DLC	FMHV-301-32-060-TC	FMHV-301-32-060-DLC-TC	
	1"	1"	1-1/4"	0.09"	2-1/8"	4"	FMHV-301-32-090	FMHV-301-32-090-DLC	FMHV-301-32-090-TC	FMHV-301-32-090-DLC-TC	
	1"	1"	1-1/4"	0.12"	2-1/8"	4"	FMHV-301-32-120	FMHV-301-32-120-DLC	FMHV-301-32-120-TC	FMHV-301-32-120-DLC-TC	
	1"	1"	1-1/4"	0.19"	2-1/8"	4"	FMHV-301-32-190	FMHV-301-32-190-DLC	FMHV-301-32-190-TC	FMHV-301-32-190-DLC-TC	
	1"	1"	1-1/4"	Ball End	2-1/8"	4"	FMHV-301-32-BN	FMHV-301-32-BN-DLC	FMHV-301-32-BN-TC	FMHV-301-32-BN-DLC-TC	
MEDIUM	1"	1"	1-1/4"	Sq. End	2-5/8"	4-1/2"	FMHV-302-32	FMHV-302-32-DLC	FMHV-302-32-TC	FMHV-302-32-DLC-TC	
	1"	1"	1-1/4"	0.03"	2-5/8"	4-1/2"	FMHV-302-32-030	FMHV-302-32-030-DLC	FMHV-302-32-030-TC	FMHV-302-32-030-DLC-TC	
	1"	1"	1-1/4"	0.06"	2-5/8"	4-1/2"	FMHV-302-32-060	FMHV-302-32-060-DLC	FMHV-302-32-060-TC	FMHV-302-32-060-DLC-TC	
	1"	1"	1-1/4"	0.09"	2-5/8"	4-1/2"	FMHV-302-32-090	FMHV-302-32-090-DLC	FMHV-302-32-090-TC	FMHV-302-32-090-DLC-TC	
	1"	1"	1-1/4"	0.12"	2-5/8"	4-1/2"	FMHV-302-32-120	FMHV-302-32-120-DLC	FMHV-302-32-120-TC	FMHV-302-32-120-DLC-TC	
	1"	1"	1-1/4"	0.19"	2-5/8"	4-1/2"	FMHV-302-32-190	FMHV-302-32-190-DLC	FMHV-302-32-190-TC	FMHV-302-32-190-DLC-TC	
	1"	1"	1-1/4"	Ball End	2-5/8"	4-1/2"	FMHV-302-32-BN	FMHV-302-32-BN-DLC	FMHV-302-32-BN-TC	FMHV-302-32-BN-DLC-TC	
LONG	1"	1"	1-1/4"	Sq. End	3-1/8"	5"	FMHV-303-32	FMHV-303-32-DLC	FMHV-303-32-TC	FMHV-303-32-DLC-TC	
	1"	1"	1-1/4"	0.03"	3-1/8"	5"	FMHV-303-32-030	FMHV-303-32-030-DLC	FMHV-303-32-030-TC	FMHV-303-32-030-DLC-TC	
	1"	1"	1-1/4"	0.06"	3-1/8"	5"	FMHV-303-32-060	FMHV-303-32-060-DLC	FMHV-303-32-060-TC	FMHV-303-32-060-DLC-TC	
	1"	1"	1-1/4"	0.09"	3-1/8"	5"	FMHV-303-32-090	FMHV-303-32-090-DLC	FMHV-303-32-090-TC	FMHV-303-32-090-DLC-TC	
	1"	1"	1-1/4"	0.12"	3-1/8"	5"	FMHV-303-32-120	FMHV-303-32-120-DLC	FMHV-303-32-120-TC	FMHV-303-32-120-DLC-TC	
	1"	1"	1-1/4"	0.19"	3-1/8"	5"	FMHV-303-32-190	FMHV-303-32-190-DLC	FMHV-303-32-190-TC	FMHV-303-32-190-DLC-TC	
	1"	1"	1-1/4"	Ball End	3-1/8"	5"	FMHV-303-32-BN	FMHV-303-32-BN-DLC	FMHV-303-32-BN-TC	FMHV-303-32-BN-DLC-TC	
EXTRA LONG	1"	1"	1-1/4"	Sq. End	3-5/8"	5-1/2"	FMHV-304-32	FMHV-304-32-DLC	FMHV-304-32-TC	FMHV-304-32-DLC-TC	
	1"	1"	1-1/4"	0.03"	3-5/8"	5-1/2"	FMHV-304-32-030	FMHV-304-32-030-DLC	FMHV-304-32-030-TC	FMHV-304-32-030-DLC-TC	
	1"	1"	1-1/4"	0.06"	3-5/8"	5-1/2"	FMHV-304-32-060	FMHV-304-32-060-DLC	FMHV-304-32-060-TC	FMHV-304-32-060-DLC-TC	
	1"	1"	1-1/4"	0.09"	3-5/8"	5-1/2"	FMHV-304-32-090	FMHV-304-32-090-DLC	FMHV-304-32-090-TC	FMHV-304-32-090-DLC-TC	
	1"	1"	1-1/4"	0.12"	3-5/8"	5-1/2"	FMHV-304-32-120	FMHV-304-32-120-DLC	FMHV-304-32-120-TC	FMHV-304-32-120-DLC-TC	
	1"	1"	1-1/4"	0.19"	3-5/8"	5-1/2"	FMHV-304-32-190	FMHV-304-32-190-DLC	FMHV-304-32-190-TC	FMHV-304-32-190-DLC-TC	
	1"	1"	1-1/4"	Ball End	3-5/8"	5-1/2"	FMHV-304-32-BN	FMHV-304-32-BN-DLC	FMHV-304-32-BN-TC	FMHV-304-32-BN-DLC-TC	
DOUBLE EXTRA LONG	1"	1"	1-1/4"	Sq. End	4-1/8"	6"	FMHV-305-32	FMHV-305-32-DLC	FMHV-305-32-TC	FMHV-305-32-DLC-TC	
	1"	1"	1-1/4"	0.03"	4-1/8"	6"	FMHV-305-32-030	FMHV-305-32-030-DLC	FMHV-305-32-030-TC	FMHV-305-32-030-DLC-TC	
	1"	1"	1-1/4"	0.06"	4-1/8"	6"	FMHV-305-32-060	FMHV-305-32-060-DLC	FMHV-305-32-060-TC	FMHV-305-32-060-DLC-TC	
	1"	1"	1-1/4"	0.09"	4-1/8"	6"	FMHV-305-32-090	FMHV-305-32-090-DLC	FMHV-305-32-090-TC	FMHV-305-32-090-DLC-TC	
	1"	1"	1-1/4"	0.12"	4-1/8"	6"	FMHV-305-32-120	FMHV-305-32-120-DLC	FMHV-305-32-120-TC	FMHV-305-32-120-DLC-TC	
	1"	1"	1-1/4"	0.19"	4-1/8"	6"	FMHV-305-32-190	FMHV-305-32-190-DLC	FMHV-305-32-190-TC	FMHV-305-32-190-DLC-TC	
	1"	1"	1-1/4"	Ball End	4-1/8"	6"	FMHV-305-32-BN	FMHV-305-32-BN-DLC	FMHV-305-32-BN-TC	FMHV-305-32-BN-DLC-TC	

Need a Different Reach?

Any neck length (LBS) available upon request!



*Other Reach Lengths available upon request.

MFMHV 2 Flute Ultra-High Velocity Tools for Aluminum



Characteristics

- Square End
- Corner Radius
- Ball End
- 2 Flute
- 37° Helix
- Feather Blend
- Necked
- Mirror Edge
- Thru Coolant Holes

Applications

- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- 3-D
- Roughing
- Semi-Finishing
- Finishing
- Wet

Materials

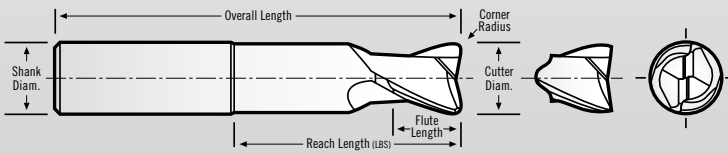
- Aluminum
- Copper
- Magnesium
- BRASS

Coatings

- Diamond-Like Carbon (DLC)

Eliminate Tool Pull Out!
 ALL Tools h4 Shank Tolerance
 up to 150% more gripping force
Tightest in the Industry!

NEXT GENERATION
Mirror Edge!
 Eliminates Chatter & Vibration



MFMHV Series Tolerances:
 Cutting Diam. = -0.018/-0.038 mm
 Shank Diam. = -0.002/-0.005 mm
 Flute Length = +1.500/-0.000 mm
 Overall Length = +/- 1.500 mm



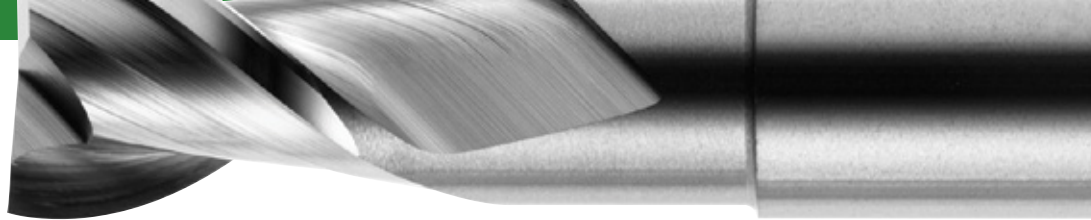
NEW!

MFMHV 2 Flute (Short to Long Reach)

	Cutting Diameter	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Coatings				
								Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
SHORT	6mm	6mm	2	10mm	Sq. End	18mm	51mm	MFMHV-201-06	MFMHV-201-06-DLC	MFMHV-201-06-TC	MFMHV-201-06-DLC-TC	6 mm DIAMETER
	6mm	6mm	2	10mm	0.5mm	18mm	51mm	MFMHV-201-06-050	MFMHV-201-06-050-DLC	MFMHV-201-06-050-TC	MFMHV-201-06-050-DLC-TC	
	6mm	6mm	2	10mm	1mm	18mm	51mm	MFMHV-201-06-100	MFMHV-201-06-100-DLC	MFMHV-201-06-100-TC	MFMHV-201-06-100-DLC-TC	
	6mm	6mm	2	10mm	2mm	18mm	51mm	MFMHV-201-06-200	MFMHV-201-06-200-DLC	MFMHV-201-06-200-TC	MFMHV-201-06-200-DLC-TC	
	6mm	6mm	2	10mm	Ball End	18mm	51mm	MFMHV-201-06-BN	MFMHV-201-06-BN-DLC	MFMHV-201-06-BN-TC	MFMHV-201-06-BN-DLC-TC	
MEDIUM	6mm	6mm	2	10mm	Sq. End	28mm	64mm	MFMHV-202-06	MFMHV-202-06-DLC	MFMHV-202-06-TC	MFMHV-202-06-DLC-TC	6 mm DIAMETER
	6mm	6mm	2	10mm	0.5mm	28mm	64mm	MFMHV-202-06-050	MFMHV-202-06-050-DLC	MFMHV-202-06-050-TC	MFMHV-202-06-050-DLC-TC	
	6mm	6mm	2	10mm	1mm	28mm	64mm	MFMHV-202-06-100	MFMHV-202-06-100-DLC	MFMHV-202-06-100-TC	MFMHV-202-06-100-DLC-TC	
	6mm	6mm	2	10mm	2mm	28mm	64mm	MFMHV-202-06-200	MFMHV-202-06-200-DLC	MFMHV-202-06-200-TC	MFMHV-202-06-200-DLC-TC	
	6mm	6mm	2	10mm	Ball End	28mm	64mm	MFMHV-202-06-BN	MFMHV-202-06-BN-DLC	MFMHV-202-06-BN-TC	MFMHV-202-06-BN-DLC-TC	
LONG	6mm	6mm	2	10mm	Sq. End	40mm	76mm	MFMHV-203-06	MFMHV-203-06-DLC	MFMHV-203-06-TC	MFMHV-203-06-DLC-TC	6 mm DIAMETER
	6mm	6mm	2	10mm	0.5mm	40mm	76mm	MFMHV-203-06-050	MFMHV-203-06-050-DLC	MFMHV-203-06-050-TC	MFMHV-203-06-050-DLC-TC	
	6mm	6mm	2	10mm	1mm	40mm	76mm	MFMHV-203-06-100	MFMHV-203-06-100-DLC	MFMHV-203-06-100-TC	MFMHV-203-06-100-DLC-TC	
	6mm	6mm	2	10mm	2mm	40mm	76mm	MFMHV-203-06-200	MFMHV-203-06-200-DLC	MFMHV-203-06-200-TC	MFMHV-203-06-200-DLC-TC	
	6mm	6mm	2	10mm	Ball End	40mm	76mm	MFMHV-203-06-BN	MFMHV-203-06-BN-DLC	MFMHV-203-06-BN-TC	MFMHV-203-06-BN-DLC-TC	
SHORT	8mm	8mm	2	13mm	Sq. End	19mm	51mm	MFMHV-201-08	MFMHV-201-08-DLC	MFMHV-201-08-TC	MFMHV-201-08-DLC-TC	8 mm DIAMETER
	8mm	8mm	2	13mm	0.5mm	19mm	51mm	MFMHV-201-08-050	MFMHV-201-08-050-DLC	MFMHV-201-08-050-TC	MFMHV-201-08-050-DLC-TC	
	8mm	8mm	2	13mm	1mm	19mm	51mm	MFMHV-201-08-100	MFMHV-201-08-100-DLC	MFMHV-201-08-100-TC	MFMHV-201-08-100-DLC-TC	
	8mm	8mm	2	13mm	2mm	19mm	51mm	MFMHV-201-08-200	MFMHV-201-08-200-DLC	MFMHV-201-08-200-TC	MFMHV-201-08-200-DLC-TC	
	8mm	8mm	2	13mm	3mm	19mm	51mm	MFMHV-201-08-300	MFMHV-201-08-300-DLC	MFMHV-201-08-300-TC	MFMHV-201-08-300-DLC-TC	
	8mm	8mm	2	13mm	Ball End	19mm	51mm	MFMHV-201-08-BN	MFMHV-201-08-BN-DLC	MFMHV-201-08-BN-TC	MFMHV-201-08-BN-DLC-TC	

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

NEW!



Aluminum

MFMHV 2 Flute (Short to Long Reach) – continued



	Cutting Diameter	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
MEDIUM	8mm	8mm	2	13mm	Sq. End	27mm	64mm	MFMHV-202-08	MFMHV-202-08-DLC	MFMHV-202-08-TC	MFMHV-202-08-DLC-TC	8 mm DIAMETER
	8mm	8mm	2	13mm	0.5mm	27mm	64mm	MFMHV-202-08-050	MFMHV-202-08-050-DLC	MFMHV-202-08-050-TC	MFMHV-202-08-050-DLC-TC	
	8mm	8mm	2	13mm	1mm	27mm	64mm	MFMHV-202-08-100	MFMHV-202-08-100-DLC	MFMHV-202-08-100-TC	MFMHV-202-08-100-DLC-TC	
	8mm	8mm	2	13mm	2mm	27mm	64mm	MFMHV-202-08-200	MFMHV-202-08-200-DLC	MFMHV-202-08-200-TC	MFMHV-202-08-200-DLC-TC	
	8mm	8mm	2	13mm	3mm	27mm	64mm	MFMHV-202-08-300	MFMHV-202-08-300-DLC	MFMHV-202-08-300-TC	MFMHV-202-08-300-DLC-TC	
	8mm	8mm	2	13mm	Ball End	27mm	64mm	MFMHV-202-08-BN	MFMHV-202-08-BN-DLC	MFMHV-202-08-BN-TC	MFMHV-202-08-BN-DLC-TC	
LONG	8mm	8mm	2	13mm	Sq. End	38mm	76mm	MFMHV-203-08	MFMHV-203-08-DLC	MFMHV-203-08-TC	MFMHV-203-08-DLC-TC	8 mm DIAMETER
	8mm	8mm	2	13mm	0.5mm	38mm	76mm	MFMHV-203-08-050	MFMHV-203-08-050-DLC	MFMHV-203-08-050-TC	MFMHV-203-08-050-DLC-TC	
	8mm	8mm	2	13mm	1mm	38mm	76mm	MFMHV-203-08-100	MFMHV-203-08-100-DLC	MFMHV-203-08-100-TC	MFMHV-203-08-100-DLC-TC	
	8mm	8mm	2	13mm	2mm	38mm	76mm	MFMHV-203-08-200	MFMHV-203-08-200-DLC	MFMHV-203-08-200-TC	MFMHV-203-08-200-DLC-TC	
	8mm	8mm	2	13mm	3mm	38mm	76mm	MFMHV-203-08-300	MFMHV-203-08-300-DLC	MFMHV-203-08-300-TC	MFMHV-203-08-300-DLC-TC	
	8mm	8mm	2	13mm	Ball End	38mm	76mm	MFMHV-203-08-BN	MFMHV-203-08-BN-DLC	MFMHV-203-08-BN-TC	MFMHV-203-08-BN-DLC-TC	
SHORT	10mm	10mm	2	13mm	Sq. End	32mm	75mm	MFMHV-201-10	MFMHV-201-10-DLC	MFMHV-201-10-TC	MFMHV-201-10-DLC-TC	10 mm DIAMETER
	10mm	10mm	2	13mm	0.5mm	32mm	75mm	MFMHV-201-10-050	MFMHV-201-10-050-DLC	MFMHV-201-10-050-TC	MFMHV-201-10-050-DLC-TC	
	10mm	10mm	2	13mm	1mm	32mm	75mm	MFMHV-201-10-100	MFMHV-201-10-100-DLC	MFMHV-201-10-100-TC	MFMHV-201-10-100-DLC-TC	
	10mm	10mm	2	13mm	2mm	32mm	75mm	MFMHV-201-10-200	MFMHV-201-10-200-DLC	MFMHV-201-10-200-TC	MFMHV-201-10-200-DLC-TC	
	10mm	10mm	2	13mm	3mm	32mm	75mm	MFMHV-201-10-300	MFMHV-201-10-300-DLC	MFMHV-201-10-300-TC	MFMHV-201-10-300-DLC-TC	
	10mm	10mm	2	13mm	4mm	32mm	75mm	MFMHV-201-10-400	MFMHV-201-10-400-DLC	MFMHV-201-10-400-TC	MFMHV-201-10-400-DLC-TC	
	10mm	10mm	2	13mm	Ball End	32mm	75mm	MFMHV-201-10-BN	MFMHV-201-10-BN-DLC	MFMHV-201-10-BN-TC	MFMHV-201-10-BN-DLC-TC	
MEDIUM	10mm	10mm	2	13mm	Sq. End	45mm	88mm	MFMHV-202-10	MFMHV-202-10-DLC	MFMHV-202-10-TC	MFMHV-202-10-DLC-TC	10 mm DIAMETER
	10mm	10mm	2	13mm	0.5mm	45mm	88mm	MFMHV-202-10-050	MFMHV-202-10-050-DLC	MFMHV-202-10-050-TC	MFMHV-202-10-050-DLC-TC	
	10mm	10mm	2	13mm	1mm	45mm	88mm	MFMHV-202-10-100	MFMHV-202-10-100-DLC	MFMHV-202-10-100-TC	MFMHV-202-10-100-DLC-TC	
	10mm	10mm	2	13mm	2mm	45mm	88mm	MFMHV-202-10-200	MFMHV-202-10-200-DLC	MFMHV-202-10-200-TC	MFMHV-202-10-200-DLC-TC	
	10mm	10mm	2	13mm	3mm	45mm	88mm	MFMHV-202-10-300	MFMHV-202-10-300-DLC	MFMHV-202-10-300-TC	MFMHV-202-10-300-DLC-TC	
	10mm	10mm	2	13mm	4mm	45mm	88mm	MFMHV-202-10-400	MFMHV-202-10-400-DLC	MFMHV-202-10-400-TC	MFMHV-202-10-400-DLC-TC	
	10mm	10mm	2	13mm	Ball End	45mm	88mm	MFMHV-202-10-BN	MFMHV-202-10-BN-DLC	MFMHV-202-10-BN-TC	MFMHV-202-10-BN-DLC-TC	
LONG	10mm	10mm	2	13mm	Sq. End	57mm	100mm	MFMHV-203-10	MFMHV-203-10-DLC	MFMHV-203-10-TC	MFMHV-203-10-DLC-TC	10 mm DIAMETER
	10mm	10mm	2	13mm	0.5mm	57mm	100mm	MFMHV-203-10-050	MFMHV-203-10-050-DLC	MFMHV-203-10-050-TC	MFMHV-203-10-050-DLC-TC	
	10mm	10mm	2	13mm	1mm	57mm	100mm	MFMHV-203-10-100	MFMHV-203-10-100-DLC	MFMHV-203-10-100-TC	MFMHV-203-10-100-DLC-TC	
	10mm	10mm	2	13mm	2mm	57mm	100mm	MFMHV-203-10-200	MFMHV-203-10-200-DLC	MFMHV-203-10-200-TC	MFMHV-203-10-200-DLC-TC	
	10mm	10mm	2	13mm	3mm	57mm	100mm	MFMHV-203-10-300	MFMHV-203-10-300-DLC	MFMHV-203-10-300-TC	MFMHV-203-10-300-DLC-TC	
	10mm	10mm	2	13mm	4mm	57mm	100mm	MFMHV-203-10-400	MFMHV-203-10-400-DLC	MFMHV-203-10-400-TC	MFMHV-203-10-400-DLC-TC	
	10mm	10mm	2	13mm	Ball End	57mm	100mm	MFMHV-203-10-BN	MFMHV-203-10-BN-DLC	MFMHV-203-10-BN-TC	MFMHV-203-10-BN-DLC-TC	
SHORT	12mm	12mm	2	19mm	Sq. End	32mm	76mm	MFMHV-201-12	MFMHV-201-12-DLC	MFMHV-201-12-TC	MFMHV-201-12-DLC-TC	12 mm DIAMETER
	12mm	12mm	2	19mm	0.5mm	32mm	76mm	MFMHV-201-12-050	MFMHV-201-12-050-DLC	MFMHV-201-12-050-TC	MFMHV-201-12-050-DLC-TC	
	12mm	12mm	2	19mm	1mm	32mm	76mm	MFMHV-201-12-100	MFMHV-201-12-100-DLC	MFMHV-201-12-100-TC	MFMHV-201-12-100-DLC-TC	
	12mm	12mm	2	19mm	2mm	32mm	76mm	MFMHV-201-12-200	MFMHV-201-12-200-DLC	MFMHV-201-12-200-TC	MFMHV-201-12-200-DLC-TC	
	12mm	12mm	2	19mm	3mm	32mm	76mm	MFMHV-201-12-300	MFMHV-201-12-300-DLC	MFMHV-201-12-300-TC	MFMHV-201-12-300-DLC-TC	
	12mm	12mm	2	19mm	4mm	32mm	76mm	MFMHV-201-12-400	MFMHV-201-12-400-DLC	MFMHV-201-12-400-TC	MFMHV-201-12-400-DLC-TC	
	12mm	12mm	2	19mm	Ball End	32mm	76mm	MFMHV-201-12-BN	MFMHV-201-12-BN-DLC	MFMHV-201-12-BN-TC	MFMHV-201-12-BN-DLC-TC	

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—

MFMHV

2 Flute Ultra-High Velocity Tools for Aluminum



MFMHV 2 Flute (Short to Long Reach) – continued



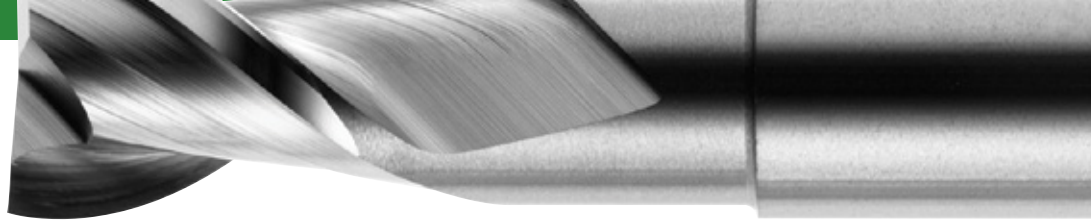
	Cutting Diameter	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
MEDIUM	12mm	12mm	2	19mm	Sq. End	41mm	89mm	MFMHV-202-12	MFMHV-202-12-DLC	MFMHV-202-12-TC	MFMHV-202-12-DLC-TC	12 mm DIAMETER
	12mm	12mm	2	19mm	0.5mm	41mm	89mm	MFMHV-202-12-050	MFMHV-202-12-050-DLC	MFMHV-202-12-050-TC	MFMHV-202-12-050-DLC-TC	
	12mm	12mm	2	19mm	1mm	41mm	89mm	MFMHV-202-12-100	MFMHV-202-12-100-DLC	MFMHV-202-12-100-TC	MFMHV-202-12-100-DLC-TC	
	12mm	12mm	2	19mm	2mm	41mm	89mm	MFMHV-202-12-200	MFMHV-202-12-200-DLC	MFMHV-202-12-200-TC	MFMHV-202-12-200-DLC-TC	
	12mm	12mm	2	19mm	3mm	41mm	89mm	MFMHV-202-12-300	MFMHV-202-12-300-DLC	MFMHV-202-12-300-TC	MFMHV-202-12-300-DLC-TC	
	12mm	12mm	2	19mm	4mm	41mm	89mm	MFMHV-202-12-400	MFMHV-202-12-400-DLC	MFMHV-202-12-400-TC	MFMHV-202-12-400-DLC-TC	
	12mm	12mm	2	19mm	Ball End	41mm	89mm	MFMHV-202-12-BN	MFMHV-202-12-BN-DLC	MFMHV-202-12-BN-TC	MFMHV-202-12-BN-DLC-TC	
LONG	12mm	12mm	2	19mm	Sq. End	54mm	102mm	MFMHV-203-12	MFMHV-203-12-DLC	MFMHV-203-12-TC	MFMHV-203-12-DLC-TC	12 mm DIAMETER
	12mm	12mm	2	19mm	0.5mm	54mm	102mm	MFMHV-203-12-050	MFMHV-203-12-050-DLC	MFMHV-203-12-050-TC	MFMHV-203-12-050-DLC-TC	
	12mm	12mm	2	19mm	1mm	54mm	102mm	MFMHV-203-12-100	MFMHV-203-12-100-DLC	MFMHV-203-12-100-TC	MFMHV-203-12-100-DLC-TC	
	12mm	12mm	2	19mm	2mm	54mm	102mm	MFMHV-203-12-200	MFMHV-203-12-200-DLC	MFMHV-203-12-200-TC	MFMHV-203-12-200-DLC-TC	
	12mm	12mm	2	19mm	3mm	54mm	102mm	MFMHV-203-12-300	MFMHV-203-12-300-DLC	MFMHV-203-12-300-TC	MFMHV-203-12-300-DLC-TC	
	12mm	12mm	2	19mm	4mm	54mm	102mm	MFMHV-203-12-400	MFMHV-203-12-400-DLC	MFMHV-203-12-400-TC	MFMHV-203-12-400-DLC-TC	
	12mm	12mm	2	19mm	Ball End	54mm	102mm	MFMHV-203-12-BN	MFMHV-203-12-BN-DLC	MFMHV-203-12-BN-TC	MFMHV-203-12-BN-DLC-TC	
EXTRA LONG	12mm	12mm	2	19mm	Sq. End	67mm	115mm	MFMHV-204-12	MFMHV-204-12-DLC	MFMHV-204-12-TC	MFMHV-204-12-DLC-TC	12 mm DIAMETER
	12mm	12mm	2	19mm	0.5mm	67mm	115mm	MFMHV-204-12-050	MFMHV-204-12-050-DLC	MFMHV-204-12-050-TC	MFMHV-204-12-050-DLC-TC	
	12mm	12mm	2	19mm	1mm	67mm	115mm	MFMHV-204-12-100	MFMHV-204-12-100-DLC	MFMHV-204-12-100-TC	MFMHV-204-12-100-DLC-TC	
	12mm	12mm	2	19mm	2mm	67mm	115mm	MFMHV-204-12-200	MFMHV-204-12-200-DLC	MFMHV-204-12-200-TC	MFMHV-204-12-200-DLC-TC	
	12mm	12mm	2	19mm	3mm	67mm	115mm	MFMHV-204-12-300	MFMHV-204-12-300-DLC	MFMHV-204-12-300-TC	MFMHV-204-12-300-DLC-TC	
	12mm	12mm	2	19mm	4mm	67mm	115mm	MFMHV-204-12-400	MFMHV-204-12-400-DLC	MFMHV-204-12-400-TC	MFMHV-204-12-400-DLC-TC	
	12mm	12mm	2	19mm	Ball End	67mm	115mm	MFMHV-204-12-BN	MFMHV-204-12-BN-DLC	MFMHV-204-12-BN-TC	MFMHV-204-12-BN-DLC-TC	
SHORT	16mm	16mm	2	22mm	Sq. End	40mm	89mm	MFMHV-201-16	MFMHV-201-16-DLC	MFMHV-201-16-TC	MFMHV-201-16-DLC-TC	16 mm DIAMETER
	16mm	16mm	2	22mm	0.5mm	40mm	89mm	MFMHV-201-16-050	MFMHV-201-16-050-DLC	MFMHV-201-16-050-TC	MFMHV-201-16-050-DLC-TC	
	16mm	16mm	2	22mm	1mm	40mm	89mm	MFMHV-201-16-100	MFMHV-201-16-100-DLC	MFMHV-201-16-100-TC	MFMHV-201-16-100-DLC-TC	
	16mm	16mm	2	22mm	2mm	40mm	89mm	MFMHV-201-16-200	MFMHV-201-16-200-DLC	MFMHV-201-16-200-TC	MFMHV-201-16-200-DLC-TC	
	16mm	16mm	2	22mm	3mm	40mm	89mm	MFMHV-201-16-300	MFMHV-201-16-300-DLC	MFMHV-201-16-300-TC	MFMHV-201-16-300-DLC-TC	
	16mm	16mm	2	22mm	4mm	40mm	89mm	MFMHV-201-16-400	MFMHV-201-16-400-DLC	MFMHV-201-16-400-TC	MFMHV-201-16-400-DLC-TC	
	16mm	16mm	2	22mm	Ball End	40mm	89mm	MFMHV-201-16-BN	MFMHV-201-16-BN-DLC	MFMHV-201-16-BN-TC	MFMHV-201-16-BN-DLC-TC	
MEDIUM	16mm	16mm	2	22mm	Sq. End	52mm	102mm	MFMHV-202-16	MFMHV-202-16-DLC	MFMHV-202-16-TC	MFMHV-202-16-DLC-TC	16 mm DIAMETER
	16mm	16mm	2	22mm	0.5mm	52mm	102mm	MFMHV-202-16-050	MFMHV-202-16-050-DLC	MFMHV-202-16-050-TC	MFMHV-202-16-050-DLC-TC	
	16mm	16mm	2	22mm	1mm	52mm	102mm	MFMHV-202-16-100	MFMHV-202-16-100-DLC	MFMHV-202-16-100-TC	MFMHV-202-16-100-DLC-TC	
	16mm	16mm	2	22mm	2mm	52mm	102mm	MFMHV-202-16-200	MFMHV-202-16-200-DLC	MFMHV-202-16-200-TC	MFMHV-202-16-200-DLC-TC	
	16mm	16mm	2	22mm	3mm	52mm	102mm	MFMHV-202-16-300	MFMHV-202-16-300-DLC	MFMHV-202-16-300-TC	MFMHV-202-16-300-DLC-TC	
	16mm	16mm	2	22mm	4mm	52mm	102mm	MFMHV-202-16-400	MFMHV-202-16-400-DLC	MFMHV-202-16-400-TC	MFMHV-202-16-400-DLC-TC	
	16mm	16mm	2	22mm	Ball End	52mm	102mm	MFMHV-202-16-BN	MFMHV-202-16-BN-DLC	MFMHV-202-16-BN-TC	MFMHV-202-16-BN-DLC-TC	
LONG	16mm	16mm	2	22mm	Sq. End	65mm	115mm	MFMHV-203-16	MFMHV-203-16-DLC	MFMHV-203-16-TC	MFMHV-203-16-DLC-TC	16 mm DIAMETER
	16mm	16mm	2	22mm	0.5mm	65mm	115mm	MFMHV-203-16-050	MFMHV-203-16-050-DLC	MFMHV-203-16-050-TC	MFMHV-203-16-050-DLC-TC	
	16mm	16mm	2	22mm	1mm	65mm	115mm	MFMHV-203-16-100	MFMHV-203-16-100-DLC	MFMHV-203-16-100-TC	MFMHV-203-16-100-DLC-TC	
	16mm	16mm	2	22mm	2mm	65mm	115mm	MFMHV-203-16-200	MFMHV-203-16-200-DLC	MFMHV-203-16-200-TC	MFMHV-203-16-200-DLC-TC	
	16mm	16mm	2	22mm	3mm	65mm	115mm	MFMHV-203-16-300	MFMHV-203-16-300-DLC	MFMHV-203-16-300-TC	MFMHV-203-16-300-DLC-TC	
	16mm	16mm	2	22mm	4mm	65mm	115mm	MFMHV-203-16-400	MFMHV-203-16-400-DLC	MFMHV-203-16-400-TC	MFMHV-203-16-400-DLC-TC	
	16mm	16mm	2	22mm	Ball End	65mm	115mm	MFMHV-203-16-BN	MFMHV-203-16-BN-DLC	MFMHV-203-16-BN-TC	MFMHV-203-16-BN-DLC-TC	

*Other Reach Lengths available upon request.

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

CONTINUED ON NEXT PAGE—

NEW!



Aluminum

MFMHV 2 Flute (Short to Long Reach) — continued



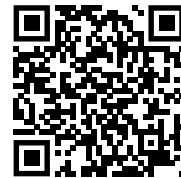
	Cutting Diameter	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
EXTRA LONG	16mm	16mm	2	22mm	Sq. End	78mm	127mm	MFMHV-204-16	MFMHV-204-16-DLC	MFMHV-204-16-TC	MFMHV-204-16-DLC-TC	16 mm DIAMETER
	16mm	16mm	2	22mm	0.5mm	78mm	127mm	MFMHV-204-16-050	MFMHV-204-16-050-DLC	MFMHV-204-16-050-TC	MFMHV-204-16-050-DLC-TC	
	16mm	16mm	2	22mm	1mm	78mm	127mm	MFMHV-204-16-100	MFMHV-204-16-100-DLC	MFMHV-204-16-100-TC	MFMHV-204-16-100-DLC-TC	
	16mm	16mm	2	22mm	2mm	78mm	127mm	MFMHV-204-16-200	MFMHV-204-16-200-DLC	MFMHV-204-16-200-TC	MFMHV-204-16-200-DLC-TC	
	16mm	16mm	2	22mm	3mm	78mm	127mm	MFMHV-204-16-300	MFMHV-204-16-300-DLC	MFMHV-204-16-300-TC	MFMHV-204-16-300-DLC-TC	
	16mm	16mm	2	22mm	4mm	78mm	127mm	MFMHV-204-16-400	MFMHV-204-16-400-DLC	MFMHV-204-16-400-TC	MFMHV-204-16-400-DLC-TC	
	16mm	16mm	2	22mm	Ball End	78mm	127mm	MFMHV-204-16-BN	MFMHV-204-16-BN-DLC	MFMHV-204-16-BN-TC	MFMHV-204-16-BN-DLC-TC	
SHORT	20mm	20mm	2	25mm	Sq. End	54mm	104mm	MFMHV-201-20	MFMHV-201-20-DLC	MFMHV-201-20-TC	MFMHV-201-20-DLC-TC	20 mm DIAMETER
	20mm	20mm	2	25mm	0.5mm	54mm	104mm	MFMHV-201-20-005	MFMHV-201-20-005-DLC	MFMHV-201-20-005-TC	MFMHV-201-20-005-DLC-TC	
	20mm	20mm	2	25mm	1mm	54mm	104mm	MFMHV-201-20-100	MFMHV-201-20-100-DLC	MFMHV-201-20-100-TC	MFMHV-201-20-100-DLC-TC	
	20mm	20mm	2	25mm	2mm	54mm	104mm	MFMHV-201-20-200	MFMHV-201-20-200-DLC	MFMHV-201-20-200-TC	MFMHV-201-20-200-DLC-TC	
	20mm	20mm	2	25mm	3mm	54mm	104mm	MFMHV-201-20-300	MFMHV-201-20-300-DLC	MFMHV-201-20-300-TC	MFMHV-201-20-300-DLC-TC	
	20mm	20mm	2	25mm	4mm	54mm	104mm	MFMHV-201-20-400	MFMHV-201-20-400-DLC	MFMHV-201-20-400-TC	MFMHV-201-20-400-DLC-TC	
	20mm	20mm	2	25mm	Ball End	54mm	104mm	MFMHV-201-20-BN	MFMHV-201-20-BN-DLC	MFMHV-201-20-BN-TC	MFMHV-201-20-BN-DLC-TC	
MEDIUM	20mm	20mm	2	25mm	Sq. End	65mm	115mm	MFMHV-202-20	MFMHV-202-20-DLC	MFMHV-202-20-TC	MFMHV-202-20-DLC-TC	
	20mm	20mm	2	25mm	0.5mm	65mm	115mm	MFMHV-202-20-005	MFMHV-202-20-005-DLC	MFMHV-202-20-005-TC	MFMHV-202-20-005-DLC-TC	
	20mm	20mm	2	25mm	1mm	65mm	115mm	MFMHV-202-20-100	MFMHV-202-20-100-DLC	MFMHV-202-20-100-TC	MFMHV-202-20-100-DLC-TC	
	20mm	20mm	2	25mm	2mm	65mm	115mm	MFMHV-202-20-200	MFMHV-202-20-200-DLC	MFMHV-202-20-200-TC	MFMHV-202-20-200-DLC-TC	
	20mm	20mm	2	25mm	3mm	65mm	115mm	MFMHV-202-20-300	MFMHV-202-20-300-DLC	MFMHV-202-20-300-TC	MFMHV-202-20-300-DLC-TC	
	20mm	20mm	2	25mm	4mm	65mm	115mm	MFMHV-202-20-400	MFMHV-202-20-400-DLC	MFMHV-202-20-400-TC	MFMHV-202-20-400-DLC-TC	
	20mm	20mm	2	25mm	Ball End	65mm	115mm	MFMHV-202-20-BN	MFMHV-202-20-BN-DLC	MFMHV-202-20-BN-TC	MFMHV-202-20-BN-DLC-TC	
LONG	20mm	20mm	2	25mm	Sq. End	78mm	127mm	MFMHV-203-20	MFMHV-203-20-DLC	MFMHV-203-20-TC	MFMHV-203-20-DLC-TC	
	20mm	20mm	2	25mm	0.5mm	78mm	127mm	MFMHV-203-20-005	MFMHV-203-20-005-DLC	MFMHV-203-20-005-TC	MFMHV-203-20-005-DLC-TC	
	20mm	20mm	2	25mm	1mm	78mm	127mm	MFMHV-203-20-100	MFMHV-203-20-100-DLC	MFMHV-203-20-100-TC	MFMHV-203-20-100-DLC-TC	
	20mm	20mm	2	25mm	2mm	78mm	127mm	MFMHV-203-20-200	MFMHV-203-20-200-DLC	MFMHV-203-20-200-TC	MFMHV-203-20-200-DLC-TC	
	20mm	20mm	2	25mm	3mm	78mm	127mm	MFMHV-203-20-300	MFMHV-203-20-300-DLC	MFMHV-203-20-300-TC	MFMHV-203-20-300-DLC-TC	
	20mm	20mm	2	25mm	4mm	78mm	127mm	MFMHV-203-20-400	MFMHV-203-20-400-DLC	MFMHV-203-20-400-TC	MFMHV-203-20-400-DLC-TC	
	20mm	20mm	2	25mm	Ball End	78mm	127mm	MFMHV-203-20-BN	MFMHV-203-20-BN-DLC	MFMHV-203-20-BN-TC	MFMHV-203-20-BN-DLC-TC	
EXTRA LONG	20mm	20mm	2	25mm	Sq. End	92mm	140mm	MFMHV-204-20	MFMHV-204-20-DLC	MFMHV-204-20-TC	MFMHV-204-20-DLC-TC	
	20mm	20mm	2	25mm	0.5mm	92mm	140mm	MFMHV-204-20-005	MFMHV-204-20-005-DLC	MFMHV-204-20-005-TC	MFMHV-204-20-005-DLC-TC	
	20mm	20mm	2	25mm	1mm	92mm	140mm	MFMHV-204-20-100	MFMHV-204-20-100-DLC	MFMHV-204-20-100-TC	MFMHV-204-20-100-DLC-TC	
	20mm	20mm	2	25mm	2mm	92mm	140mm	MFMHV-204-20-200	MFMHV-204-20-200-DLC	MFMHV-204-20-200-TC	MFMHV-204-20-200-DLC-TC	
	20mm	20mm	2	25mm	3mm	92mm	140mm	MFMHV-204-20-300	MFMHV-204-20-300-DLC	MFMHV-204-20-300-TC	MFMHV-204-20-300-DLC-TC	
	20mm	20mm	2	25mm	4mm	92mm	140mm	MFMHV-204-20-400	MFMHV-204-20-400-DLC	MFMHV-204-20-400-TC	MFMHV-204-20-400-DLC-TC	
	20mm	20mm	2	25mm	Ball End	92mm	140mm	MFMHV-204-20-BN	MFMHV-204-20-BN-DLC	MFMHV-204-20-BN-TC	MFMHV-204-20-BN-DLC-TC	
SHORT	25mm	25mm	2	32mm	Sq. End	54mm	102mm	MFMHV-201-25	MFMHV-201-25-DLC	MFMHV-201-25-TC	MFMHV-201-25-DLC-TC	25 mm DIAMETER
	25mm	25mm	2	32mm	0.5mm	54mm	102mm	MFMHV-201-25-050	MFMHV-201-25-050-DLC	MFMHV-201-25-050-TC	MFMHV-201-25-050-DLC-TC	
	25mm	25mm	2	32mm	1mm	54mm	102mm	MFMHV-201-25-100	MFMHV-201-25-100-DLC	MFMHV-201-25-100-TC	MFMHV-201-25-100-DLC-TC	
	25mm	25mm	2	32mm	2mm	54mm	102mm	MFMHV-201-25-200	MFMHV-201-25-200-DLC	MFMHV-201-25-200-TC	MFMHV-201-25-200-DLC-TC	
	25mm	25mm	2	32mm	3mm	54mm	102mm	MFMHV-201-25-300	MFMHV-201-25-300-DLC	MFMHV-201-25-300-TC	MFMHV-201-25-300-DLC-TC	
	25mm	25mm	2	32mm	4mm	54mm	102mm	MFMHV-201-25-400	MFMHV-201-25-400-DLC	MFMHV-201-25-400-TC	MFMHV-201-25-400-DLC-TC	
	25mm	25mm	2	32mm	Ball End	54mm	102mm	MFMHV-201-25-BN	MFMHV-201-25-BN-DLC	MFMHV-201-25-BN-TC	MFMHV-201-25-BN-DLC-TC	

*Other Reach Lengths available upon request.

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

CONTINUED ON NEXT PAGE—

NEW!



MFMHV

2 Flute Ultra-High Velocity Tools for Aluminum

MFMHV 2 Flute (Short to Long Reach) – continued



	Cutting Diameter	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	25 mm DIAMETER
MEDIUM	25mm	25mm	2	32mm	Sq. End	65mm	115mm	MFMHV-202-25	MFMHV-202-25-DLC	MFMHV-202-25-TC	MFMHV-202-25-DLC-TC	
	25mm	25mm	2	32mm	0.5mm	65mm	115mm	MFMHV-202-25-050	MFMHV-202-25-050-DLC	MFMHV-202-25-050-TC	MFMHV-202-25-050-DLC-TC	
	25mm	25mm	2	32mm	1mm	65mm	115mm	MFMHV-202-25-100	MFMHV-202-25-100-DLC	MFMHV-202-25-100-TC	MFMHV-202-25-100-DLC-TC	
	25mm	25mm	2	32mm	2mm	65mm	115mm	MFMHV-202-25-200	MFMHV-202-25-200-DLC	MFMHV-202-25-200-TC	MFMHV-202-25-200-DLC-TC	
	25mm	25mm	2	32mm	3mm	65mm	115mm	MFMHV-202-25-300	MFMHV-202-25-300-DLC	MFMHV-202-25-300-TC	MFMHV-202-25-300-DLC-TC	
	25mm	25mm	2	32mm	4mm	65mm	115mm	MFMHV-202-25-400	MFMHV-202-25-400-DLC	MFMHV-202-25-400-TC	MFMHV-202-25-400-DLC-TC	
	25mm	25mm	2	32mm	Ball End	65mm	115mm	MFMHV-202-25-BN	MFMHV-202-25-BN-DLC	MFMHV-202-25-BN-TC	MFMHV-202-25-BN-DLC-TC	
LONG	25mm	25mm	2	32mm	Sq. End	78mm	127mm	MFMHV-203-25	MFMHV-203-25-DLC	MFMHV-203-25-TC	MFMHV-203-25-DLC-TC	
	25mm	25mm	2	32mm	0.5mm	78mm	127mm	MFMHV-203-25-050	MFMHV-203-25-050-DLC	MFMHV-203-25-050-TC	MFMHV-203-25-050-DLC-TC	
	25mm	25mm	2	32mm	1mm	78mm	127mm	MFMHV-203-25-100	MFMHV-203-25-100-DLC	MFMHV-203-25-100-TC	MFMHV-203-25-100-DLC-TC	
	25mm	25mm	2	32mm	2mm	78mm	127mm	MFMHV-203-25-200	MFMHV-203-25-200-DLC	MFMHV-203-25-200-TC	MFMHV-203-25-200-DLC-TC	
	25mm	25mm	2	32mm	3mm	78mm	127mm	MFMHV-203-25-300	MFMHV-203-25-300-DLC	MFMHV-203-25-300-TC	MFMHV-203-25-300-DLC-TC	
	25mm	25mm	2	32mm	4mm	78mm	127mm	MFMHV-203-25-400	MFMHV-203-25-400-DLC	MFMHV-203-25-400-TC	MFMHV-203-25-400-DLC-TC	
	25mm	25mm	2	32mm	Ball End	78mm	127mm	MFMHV-203-25-BN	MFMHV-203-25-BN-DLC	MFMHV-203-25-BN-TC	MFMHV-203-25-BN-DLC-TC	
EXTRA LONG	25mm	25mm	2	32mm	Sq. End	92mm	140mm	MFMHV-204-25	MFMHV-204-25-DLC	MFMHV-204-25-TC	MFMHV-204-25-DLC-TC	
	25mm	25mm	2	32mm	0.5mm	92mm	140mm	MFMHV-204-25-050	MFMHV-204-25-050-DLC	MFMHV-204-25-050-TC	MFMHV-204-25-050-DLC-TC	
	25mm	25mm	2	32mm	1mm	92mm	140mm	MFMHV-204-25-100	MFMHV-204-25-100-DLC	MFMHV-204-25-100-TC	MFMHV-204-25-100-DLC-TC	
	25mm	25mm	2	32mm	2mm	92mm	140mm	MFMHV-204-25-200	MFMHV-204-25-200-DLC	MFMHV-204-25-200-TC	MFMHV-204-25-200-DLC-TC	
	25mm	25mm	2	32mm	3mm	92mm	140mm	MFMHV-204-25-300	MFMHV-204-25-300-DLC	MFMHV-204-25-300-TC	MFMHV-204-25-300-DLC-TC	
	25mm	25mm	2	32mm	4mm	92mm	140mm	MFMHV-204-25-400	MFMHV-204-25-400-DLC	MFMHV-204-25-400-TC	MFMHV-204-25-400-DLC-TC	
	25mm	25mm	2	32mm	Ball End	92mm	140mm	MFMHV-204-25-BN	MFMHV-204-25-BN-DLC	MFMHV-204-25-BN-TC	MFMHV-204-25-BN-DLC-TC	
SUPER LONG	25mm	25mm	2	32mm	Sq. End	104mm	152mm	MFMHV-205-25	MFMHV-205-25-DLC	MFMHV-205-25-TC	MFMHV-205-25-DLC-TC	
	25mm	25mm	2	32mm	0.5mm	104mm	152mm	MFMHV-205-25-050	MFMHV-205-25-050-DLC	MFMHV-205-25-050-TC	MFMHV-205-25-050-DLC-TC	
	25mm	25mm	2	32mm	1mm	104mm	152mm	MFMHV-205-25-100	MFMHV-205-25-100-DLC	MFMHV-205-25-100-TC	MFMHV-205-25-100-DLC-TC	
	25mm	25mm	2	32mm	2mm	104mm	152mm	MFMHV-205-25-200	MFMHV-205-25-200-DLC	MFMHV-205-25-200-TC	MFMHV-205-25-200-DLC-TC	
	25mm	25mm	2	32mm	3mm	104mm	152mm	MFMHV-205-25-300	MFMHV-205-25-300-DLC	MFMHV-205-25-300-TC	MFMHV-205-25-300-DLC-TC	
	25mm	25mm	2	32mm	4mm	104mm	152mm	MFMHV-205-25-400	MFMHV-205-25-400-DLC	MFMHV-205-25-400-TC	MFMHV-205-25-400-DLC-TC	
	25mm	25mm	2	32mm	Ball End	104mm	152mm	MFMHV-205-25-BN	MFMHV-205-25-BN-DLC	MFMHV-205-25-BN-TC	MFMHV-205-25-BN-DLC-TC	

Technical Information: Run tools at the maximum tap tested Recommended RPM

FMHV Technical data:

Diameter	Chip load per tooth	Typical Depth	Recommended RPM	Type of cut
1" Diameter	.008-.015	.300 up to .750	Max Tap Tested RPM Or Max RPM	Slot or profile (stay away from 50% radial step-over)
3/4" Diameter	.006-.012	.200 up to .900		
5/8" Diameter	.005-.011	.100 up to .750		
1/2" Diameter	.004-.010	.100 up to .750		
3/8" Diameter	.003-.006	.100 up to .500		
5/16" Diameter	.002-.005	.100 up to .500		
1/4" Diameter	.002-.004	.100 up to .375		

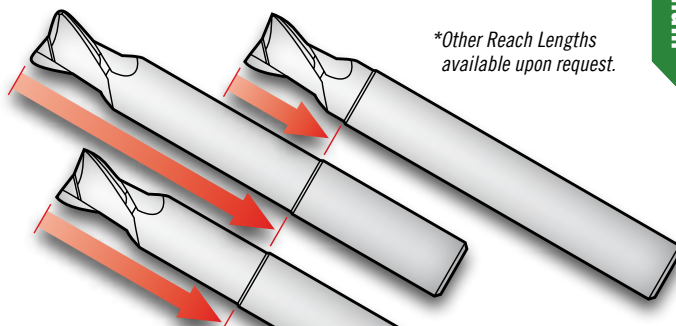
Recommended feed per tooth

CUTTING DIAMETER	Recommended chip load per tooth fz
6	0.051 - 0.095
8	0.076 - 0.143
10	0.076 - 0.143
12	0.102 - 0.254
16	0.127 - 0.254
20	0.152 - 0.305
25	0.203 - 0.381

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

Need a Different Reach?

Any neck length (LBS) available upon request!



CHIP BREAKERS

If you “Need Chip Breakers” add “-CB” to the end of any part number to get chip breakers added.

Example:

MFMHV-202-25-CB



MFMHV 3 Flute Ultra-High Velocity Tools for Aluminum



Characteristics

- Square End
- Corner Radius
- Ball End
- 3 Flute
- 37° Helix
- Feather Blend
- Necked
- Mirror Edge
- Thru Coolant Holes

Applications

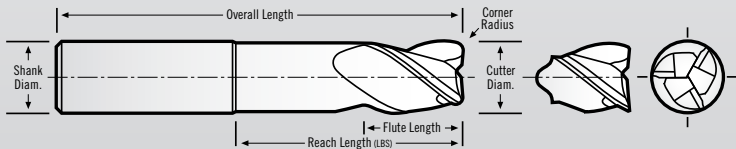
- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Wet

Materials

- Aluminum
- Copper
- Magnesium
- BRASS

Coatings

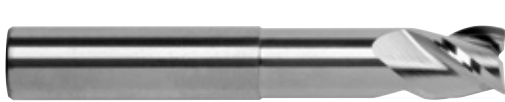
- Diamond-Like Carbon (DLC)



MFMHV Series Tolerances:
 Cutting Diam. = $-0.018/-0.038$ mm
 Shank Diam. = $-0.002/-0.005$ mm
 Flute Length = $+1.500/-0.000$ mm
 Overall Length = $+/- 1.500$ mm

Eliminate Tool Pull Out!
 ALL Tools h4 Shank Tolerance
 up to 150% more gripping force
Tightest in the Industry!

NEXT GENERATION
Mirror Edge!
 Eliminates Chatter & Vibration



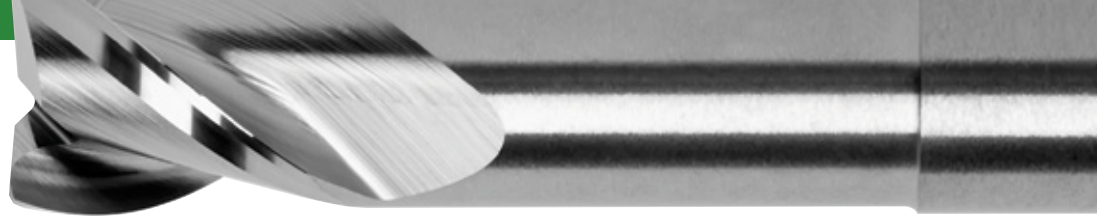
ALL-NEW BALANCED END DESIGN
 CANNOT PLUNGE

MFMHV 3 Flute (Short to Long Reach)

	Cutting Diam.	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LRS)	Overall Length	Coatings				
								Uncoated	DLC Coated	Uncoated w/ Thru Coolant Holes	Thru Coolant DLC Coated	
SHORT	6mm	6mm	3	10mm	Sq. End	18mm	51mm	MFMHV-301-06	MFMHV-301-06-DLC	MFMHV-301-06-TC	MFMHV-301-06-DLC-TC	6 mm DIAMETER
	6mm	6mm	3	10mm	0.5mm	18mm	51mm	MFMHV-301-06-050	MFMHV-301-06-050-DLC	MFMHV-301-06-050-TC	MFMHV-301-06-050-DLC-TC	
	6mm	6mm	3	10mm	1mm	18mm	51mm	MFMHV-301-06-100	MFMHV-301-06-100-DLC	MFMHV-301-06-100-TC	MFMHV-301-06-100-DLC-TC	
	6mm	6mm	3	10mm	2mm	18mm	51mm	MFMHV-301-06-200	MFMHV-301-06-200-DLC	MFMHV-301-06-200-TC	MFMHV-301-06-200-DLC-TC	
	6mm	6mm	3	10mm	Ball End	18mm	51mm	MFMHV-301-06-BN	MFMHV-301-06-BN-DLC	MFMHV-301-06-BN-TC	MFMHV-301-06-BN-DLC-TC	
MEDIUM	6mm	6mm	3	10mm	Sq. End	28mm	64mm	MFMHV-302-06	MFMHV-302-06-DLC	MFMHV-302-06-TC	MFMHV-302-06-DLC-TC	6 mm DIAMETER
	6mm	6mm	3	10mm	0.5mm	28mm	64mm	MFMHV-302-06-050	MFMHV-302-06-050-DLC	MFMHV-302-06-050-TC	MFMHV-302-06-050-DLC-TC	
	6mm	6mm	3	10mm	1mm	28mm	64mm	MFMHV-302-06-100	MFMHV-302-06-100-DLC	MFMHV-302-06-100-TC	MFMHV-302-06-100-DLC-TC	
	6mm	6mm	3	10mm	2mm	28mm	64mm	MFMHV-302-06-200	MFMHV-302-06-200-DLC	MFMHV-302-06-200-TC	MFMHV-302-06-200-DLC-TC	
	6mm	6mm	3	10mm	Ball End	28mm	64mm	MFMHV-302-06-BN	MFMHV-302-06-BN-DLC	MFMHV-302-06-BN-TC	MFMHV-302-06-BN-DLC-TC	
LONG	6mm	6mm	3	10mm	Sq. End	40mm	76mm	MFMHV-303-06	MFMHV-303-06-DLC	MFMHV-303-06-TC	MFMHV-303-06-DLC-TC	6 mm DIAMETER
	6mm	6mm	3	10mm	0.5mm	40mm	76mm	MFMHV-303-06-050	MFMHV-303-06-050-DLC	MFMHV-303-06-050-TC	MFMHV-303-06-050-DLC-TC	
	6mm	6mm	3	10mm	1mm	40mm	76mm	MFMHV-303-06-100	MFMHV-303-06-100-DLC	MFMHV-303-06-100-TC	MFMHV-303-06-100-DLC-TC	
	6mm	6mm	3	10mm	2mm	40mm	76mm	MFMHV-303-06-200	MFMHV-303-06-200-DLC	MFMHV-303-06-200-TC	MFMHV-303-06-200-DLC-TC	
	6mm	6mm	3	10mm	Ball End	40mm	76mm	MFMHV-303-06-BN	MFMHV-303-06-BN-DLC	MFMHV-303-06-BN-TC	MFMHV-303-06-BN-DLC-TC	
SHORT	8mm	8mm	3	13mm	Sq. End	19mm	51mm	MFMHV-301-08	MFMHV-301-08-DLC	MFMHV-301-08-TC	MFMHV-301-08-DLC-TC	8 mm DIAMETER
	8mm	8mm	3	13mm	0.5mm	19mm	51mm	MFMHV-301-08-050	MFMHV-301-08-050-DLC	MFMHV-301-08-050-TC	MFMHV-301-08-050-DLC-TC	
	8mm	8mm	3	13mm	1mm	19mm	51mm	MFMHV-301-08-100	MFMHV-301-08-100-DLC	MFMHV-301-08-100-TC	MFMHV-301-08-100-DLC-TC	
	8mm	8mm	3	13mm	2mm	19mm	51mm	MFMHV-301-08-200	MFMHV-301-08-200-DLC	MFMHV-301-08-200-TC	MFMHV-301-08-200-DLC-TC	
	8mm	8mm	3	13mm	3mm	19mm	51mm	MFMHV-301-08-300	MFMHV-301-08-300-DLC	MFMHV-301-08-300-TC	MFMHV-301-08-300-DLC-TC	
	8mm	8mm	3	13mm	Ball End	19mm	51mm	MFMHV-301-08-BN	MFMHV-301-08-BN-DLC	MFMHV-301-08-BN-TC	MFMHV-301-08-BN-DLC-TC	

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

NEW!



Aluminum

MFMHV 3 Flute (Short to Long Reach) – continued



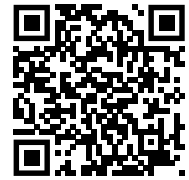
		Cutting Diam.	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Uncoated w/ Thru Coolant Holes	Thru Coolant DLC Coated		
MEDIUM	8 mm	8mm	8mm	3	13mm	Sq. End	27mm	64mm	MFMHV-302-08	MFMHV-302-08-DLC	MFMHV-302-08-TC	MFMHV-302-08-DLC-TC	8 mm DIAMETER	
		8mm	8mm	3	13mm	0.5mm	27mm	64mm	MFMHV-302-08-050	MFMHV-302-08-050-DLC	MFMHV-302-08-050-TC	MFMHV-302-08-050-DLC-TC		
		8mm	8mm	3	13mm	1mm	27mm	64mm	MFMHV-302-08-100	MFMHV-302-08-100-DLC	MFMHV-302-08-100-TC	MFMHV-302-08-100-DLC-TC		
		8mm	8mm	3	13mm	2mm	27mm	64mm	MFMHV-302-08-200	MFMHV-302-08-200-DLC	MFMHV-302-08-200-TC	MFMHV-302-08-200-DLC-TC		
		8mm	8mm	3	13mm	3mm	27mm	64mm	MFMHV-302-08-300	MFMHV-302-08-300-DLC	MFMHV-302-08-300-TC	MFMHV-302-08-300-DLC-TC		
		8mm	8mm	3	13mm	Ball End	27mm	64mm	MFMHV-302-08-BN	MFMHV-302-08-BN-DLC	MFMHV-302-08-BN-TC	MFMHV-302-08-BN-DLC-TC		
LONG	8 mm	8mm	8mm	3	13mm	Sq. End	38mm	76mm	MFMHV-303-08	MFMHV-303-08-DLC	MFMHV-303-08-TC	MFMHV-303-08-DLC-TC	8 mm DIAMETER	
		8mm	8mm	3	13mm	0.5mm	38mm	76mm	MFMHV-303-08-050	MFMHV-303-08-050-DLC	MFMHV-303-08-050-TC	MFMHV-303-08-050-DLC-TC		
		8mm	8mm	3	13mm	1mm	38mm	76mm	MFMHV-303-08-100	MFMHV-303-08-100-DLC	MFMHV-303-08-100-TC	MFMHV-303-08-100-DLC-TC		
		8mm	8mm	3	13mm	2mm	38mm	76mm	MFMHV-303-08-200	MFMHV-303-08-200-DLC	MFMHV-303-08-200-TC	MFMHV-303-08-200-DLC-TC		
		8mm	8mm	3	13mm	3mm	38mm	76mm	MFMHV-303-08-300	MFMHV-303-08-300-DLC	MFMHV-303-08-300-TC	MFMHV-303-08-300-DLC-TC		
		8mm	8mm	3	13mm	Ball End	38mm	76mm	MFMHV-303-08-BN	MFMHV-303-08-BN-DLC	MFMHV-303-08-BN-TC	MFMHV-303-08-BN-DLC-TC		
SHORT	10 mm	10mm	10mm	3	13mm	Sq. End	32mm	75mm	MFMHV-301-10	MFMHV-301-10-DLC	MFMHV-301-10-TC	MFMHV-301-10-DLC-TC	10 mm DIAMETER	
		10mm	10mm	3	13mm	0.5mm	32mm	75mm	MFMHV-301-10-050	MFMHV-301-10-050-DLC	MFMHV-301-10-050-TC	MFMHV-301-10-050-DLC-TC		
		10mm	10mm	3	13mm	1mm	32mm	75mm	MFMHV-301-10-100	MFMHV-301-10-100-DLC	MFMHV-301-10-100-TC	MFMHV-301-10-100-DLC-TC		
		10mm	10mm	3	13mm	2mm	32mm	75mm	MFMHV-301-10-200	MFMHV-301-10-200-DLC	MFMHV-301-10-200-TC	MFMHV-301-10-200-DLC-TC		
		10mm	10mm	3	13mm	3mm	32mm	75mm	MFMHV-301-10-300	MFMHV-301-10-300-DLC	MFMHV-301-10-300-TC	MFMHV-301-10-300-DLC-TC		
		10mm	10mm	3	13mm	4mm	32mm	75mm	MFMHV-301-10-400	MFMHV-301-10-400-DLC	MFMHV-301-10-400-TC	MFMHV-301-10-400-DLC-TC		
		10mm	10mm	3	13mm	Ball End	32mm	75mm	MFMHV-301-10-BN	MFMHV-301-10-BN-DLC	MFMHV-301-10-BN-TC	MFMHV-301-10-BN-DLC-TC		
MEDIUM	10 mm	10mm	10mm	3	13mm	Sq. End	45mm	88mm	MFMHV-302-10	MFMHV-302-10-DLC	MFMHV-302-10-TC	MFMHV-302-10-DLC-TC	10 mm DIAMETER	
		10mm	10mm	3	13mm	0.5mm	45mm	88mm	MFMHV-302-10-050	MFMHV-302-10-050-DLC	MFMHV-302-10-050-TC	MFMHV-302-10-050-DLC-TC		
		10mm	10mm	3	13mm	1mm	45mm	88mm	MFMHV-302-10-100	MFMHV-302-10-100-DLC	MFMHV-302-10-100-TC	MFMHV-302-10-100-DLC-TC		
		10mm	10mm	3	13mm	2mm	45mm	88mm	MFMHV-302-10-200	MFMHV-302-10-200-DLC	MFMHV-302-10-200-TC	MFMHV-302-10-200-DLC-TC		
		10mm	10mm	3	13mm	3mm	45mm	88mm	MFMHV-302-10-300	MFMHV-302-10-300-DLC	MFMHV-302-10-300-TC	MFMHV-302-10-300-DLC-TC		
		10mm	10mm	3	13mm	4mm	45mm	88mm	MFMHV-302-10-400	MFMHV-302-10-400-DLC	MFMHV-302-10-400-TC	MFMHV-302-10-400-DLC-TC		
		10mm	10mm	3	13mm	Ball End	45mm	88mm	MFMHV-302-10-BN	MFMHV-302-10-BN-DLC	MFMHV-302-10-BN-TC	MFMHV-302-10-BN-DLC-TC		
LONG	10 mm	10mm	10mm	3	13mm	Sq. End	57mm	100mm	MFMHV-303-10	MFMHV-303-10-DLC	MFMHV-303-10-TC	MFMHV-303-10-DLC-TC	10 mm DIAMETER	
		10mm	10mm	3	13mm	0.5mm	57mm	100mm	MFMHV-303-10-050	MFMHV-303-10-050-DLC	MFMHV-303-10-050-TC	MFMHV-303-10-050-DLC-TC		
		10mm	10mm	3	13mm	1mm	57mm	100mm	MFMHV-303-10-100	MFMHV-303-10-100-DLC	MFMHV-303-10-100-TC	MFMHV-303-10-100-DLC-TC		
		10mm	10mm	3	13mm	2mm	57mm	100mm	MFMHV-303-10-200	MFMHV-303-10-200-DLC	MFMHV-303-10-200-TC	MFMHV-303-10-200-DLC-TC		
		10mm	10mm	3	13mm	3mm	57mm	100mm	MFMHV-303-10-300	MFMHV-303-10-300-DLC	MFMHV-303-10-300-TC	MFMHV-303-10-300-DLC-TC		
		10mm	10mm	3	13mm	4mm	57mm	100mm	MFMHV-303-10-400	MFMHV-303-10-400-DLC	MFMHV-303-10-400-TC	MFMHV-303-10-400-DLC-TC		
		10mm	10mm	3	13mm	Ball End	57mm	100mm	MFMHV-303-10-BN	MFMHV-303-10-BN-DLC	MFMHV-303-10-BN-TC	MFMHV-303-10-BN-DLC-TC		
SHORT	12 mm	12mm	12mm	3	19mm	Sq. End	32mm	76mm	MFMHV-301-12	MFMHV-301-12-DLC	MFMHV-301-12-TC	MFMHV-301-12-DLC-TC	12 mm DIAMETER	
		12mm	12mm	3	19mm	0.5mm	32mm	76mm	MFMHV-301-12-050	MFMHV-301-12-050-DLC	MFMHV-301-12-050-TC	MFMHV-301-12-050-DLC-TC		
		12mm	12mm	3	19mm	1mm	32mm	76mm	MFMHV-301-12-100	MFMHV-301-12-100-DLC	MFMHV-301-12-100-TC	MFMHV-301-12-100-DLC-TC		
		12mm	12mm	3	19mm	2mm	32mm	76mm	MFMHV-301-12-200	MFMHV-301-12-200-DLC	MFMHV-301-12-200-TC	MFMHV-301-12-200-DLC-TC		
		12mm	12mm	3	19mm	3mm	32mm	76mm	MFMHV-301-12-300	MFMHV-301-12-300-DLC	MFMHV-301-12-300-TC	MFMHV-301-12-300-DLC-TC		
		12mm	12mm	3	19mm	4mm	32mm	76mm	MFMHV-301-12-400	MFMHV-301-12-400-DLC	MFMHV-301-12-400-TC	MFMHV-301-12-400-DLC-TC		
		12mm	12mm	3	19mm	Ball End	32mm	76mm	MFMHV-301-12-BN	MFMHV-301-12-BN-DLC	MFMHV-301-12-BN-TC	MFMHV-301-12-BN-DLC-TC		

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

*Other Reach Lengths available upon request.

MFMHV

3 Flute Ultra-High Velocity Tools for Aluminum



MFMHV 3 Flute (Short to Long Reach) — continued



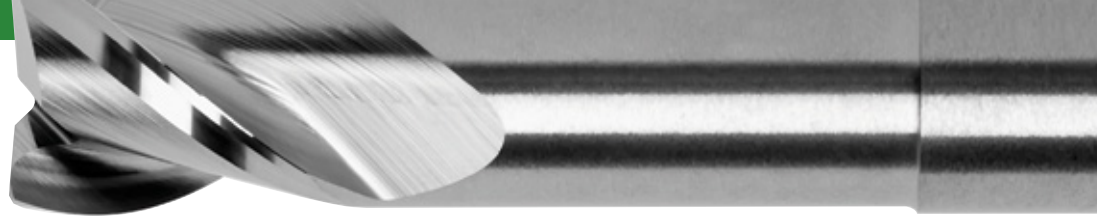
	Cutting Diam.	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (L _{RS})	Overall Length	Uncoated	DLC Coated	Uncoated w/ Thru Coolant Holes	Thru Coolant DLC Coated	
MEDIUM	12mm	12mm	3	19mm	Sq. End	41mm	89mm	MFMHV-302-12	MFMHV-302-12-DLC	MFMHV-302-12-TC	MFMHV-302-12-DLC-TC	12 mm DIAMETER
	12mm	12mm	3	19mm	0.5mm	41mm	89mm	MFMHV-302-12-050	MFMHV-302-12-050-DLC	MFMHV-302-12-050-TC	MFMHV-302-12-050-DLC-TC	
	12mm	12mm	3	19mm	1mm	41mm	89mm	MFMHV-302-12-100	MFMHV-302-12-100-DLC	MFMHV-302-12-100-TC	MFMHV-302-12-100-DLC-TC	
	12mm	12mm	3	19mm	2mm	41mm	89mm	MFMHV-302-12-200	MFMHV-302-12-200-DLC	MFMHV-302-12-200-TC	MFMHV-302-12-200-DLC-TC	
	12mm	12mm	3	19mm	3mm	41mm	89mm	MFMHV-302-12-300	MFMHV-302-12-300-DLC	MFMHV-302-12-300-TC	MFMHV-302-12-300-DLC-TC	
	12mm	12mm	3	19mm	4mm	41mm	89mm	MFMHV-302-12-400	MFMHV-302-12-400-DLC	MFMHV-302-12-400-TC	MFMHV-302-12-400-DLC-TC	
	12mm	12mm	3	19mm	Ball End	41mm	89mm	MFMHV-302-12-BN	MFMHV-302-12-BN-DLC	MFMHV-302-12-BN-TC	MFMHV-302-12-BN-DLC-TC	
LONG	12mm	12mm	3	19mm	Sq. End	54mm	102mm	MFMHV-303-12	MFMHV-303-12-DLC	MFMHV-303-12-TC	MFMHV-303-12-DLC-TC	12 mm DIAMETER
	12mm	12mm	3	19mm	0.5mm	54mm	102mm	MFMHV-303-12-050	MFMHV-303-12-050-DLC	MFMHV-303-12-050-TC	MFMHV-303-12-050-DLC-TC	
	12mm	12mm	3	19mm	1mm	54mm	102mm	MFMHV-303-12-100	MFMHV-303-12-100-DLC	MFMHV-303-12-100-TC	MFMHV-303-12-100-DLC-TC	
	12mm	12mm	3	19mm	2mm	54mm	102mm	MFMHV-303-12-200	MFMHV-303-12-200-DLC	MFMHV-303-12-200-TC	MFMHV-303-12-200-DLC-TC	
	12mm	12mm	3	19mm	3mm	54mm	102mm	MFMHV-303-12-300	MFMHV-303-12-300-DLC	MFMHV-303-12-300-TC	MFMHV-303-12-300-DLC-TC	
	12mm	12mm	3	19mm	4mm	54mm	102mm	MFMHV-303-12-400	MFMHV-303-12-400-DLC	MFMHV-303-12-400-TC	MFMHV-303-12-400-DLC-TC	
	12mm	12mm	3	19mm	Ball End	54mm	102mm	MFMHV-303-12-BN	MFMHV-303-12-BN-DLC	MFMHV-303-12-BN-TC	MFMHV-303-12-BN-DLC-TC	
EXTRA LONG	12mm	12mm	3	19mm	Sq. End	67mm	115mm	MFMHV-304-12	MFMHV-304-12-DLC	MFMHV-304-12-TC	MFMHV-304-12-DLC-TC	12 mm DIAMETER
	12mm	12mm	3	19mm	0.5mm	67mm	115mm	MFMHV-304-12-050	MFMHV-304-12-050-DLC	MFMHV-304-12-050-TC	MFMHV-304-12-050-DLC-TC	
	12mm	12mm	3	19mm	1mm	67mm	115mm	MFMHV-304-12-100	MFMHV-304-12-100-DLC	MFMHV-304-12-100-TC	MFMHV-304-12-100-DLC-TC	
	12mm	12mm	3	19mm	2mm	67mm	115mm	MFMHV-304-12-200	MFMHV-304-12-200-DLC	MFMHV-304-12-200-TC	MFMHV-304-12-200-DLC-TC	
	12mm	12mm	3	19mm	3mm	67mm	115mm	MFMHV-304-12-300	MFMHV-304-12-300-DLC	MFMHV-304-12-300-TC	MFMHV-304-12-300-DLC-TC	
	12mm	12mm	3	19mm	4mm	67mm	115mm	MFMHV-304-12-400	MFMHV-304-12-400-DLC	MFMHV-304-12-400-TC	MFMHV-304-12-400-DLC-TC	
	12mm	12mm	3	19mm	Ball End	67mm	115mm	MFMHV-304-12-BN	MFMHV-304-12-BN-DLC	MFMHV-304-12-BN-TC	MFMHV-304-12-BN-DLC-TC	
SHORT	16mm	16mm	3	22mm	Sq. End	40mm	89mm	MFMHV-301-16	MFMHV-301-16-DLC	MFMHV-301-16-TC	MFMHV-301-16-DLC-TC	16 mm DIAMETER
	16mm	16mm	3	22mm	0.5mm	40mm	89mm	MFMHV-301-16-050	MFMHV-301-16-050-DLC	MFMHV-301-16-050-TC	MFMHV-301-16-050-DLC-TC	
	16mm	16mm	3	22mm	1mm	40mm	89mm	MFMHV-301-16-100	MFMHV-301-16-100-DLC	MFMHV-301-16-100-TC	MFMHV-301-16-100-DLC-TC	
	16mm	16mm	3	22mm	2mm	40mm	89mm	MFMHV-301-16-200	MFMHV-301-16-200-DLC	MFMHV-301-16-200-TC	MFMHV-301-16-200-DLC-TC	
	16mm	16mm	3	22mm	3mm	40mm	89mm	MFMHV-301-16-300	MFMHV-301-16-300-DLC	MFMHV-301-16-300-TC	MFMHV-301-16-300-DLC-TC	
	16mm	16mm	3	22mm	4mm	40mm	89mm	MFMHV-301-16-400	MFMHV-301-16-400-DLC	MFMHV-301-16-400-TC	MFMHV-301-16-400-DLC-TC	
	16mm	16mm	3	22mm	Ball End	40mm	89mm	MFMHV-301-16-BN	MFMHV-301-16-BN-DLC	MFMHV-301-16-BN-TC	MFMHV-301-16-BN-DLC-TC	
MEDIUM	16mm	16mm	3	22mm	Sq. End	52mm	102mm	MFMHV-302-16	MFMHV-302-16-DLC	MFMHV-302-16-TC	MFMHV-302-16-DLC-TC	16 mm DIAMETER
	16mm	16mm	3	22mm	0.5mm	52mm	102mm	MFMHV-302-16-050	MFMHV-302-16-050-DLC	MFMHV-302-16-050-TC	MFMHV-302-16-050-DLC-TC	
	16mm	16mm	3	22mm	1mm	52mm	102mm	MFMHV-302-16-100	MFMHV-302-16-100-DLC	MFMHV-302-16-100-TC	MFMHV-302-16-100-DLC-TC	
	16mm	16mm	3	22mm	2mm	52mm	102mm	MFMHV-302-16-200	MFMHV-302-16-200-DLC	MFMHV-302-16-200-TC	MFMHV-302-16-200-DLC-TC	
	16mm	16mm	3	22mm	3mm	52mm	102mm	MFMHV-302-16-300	MFMHV-302-16-300-DLC	MFMHV-302-16-300-TC	MFMHV-302-16-300-DLC-TC	
	16mm	16mm	3	22mm	4mm	52mm	102mm	MFMHV-302-16-400	MFMHV-302-16-400-DLC	MFMHV-302-16-400-TC	MFMHV-302-16-400-DLC-TC	
	16mm	16mm	3	22mm	Ball End	52mm	102mm	MFMHV-302-16-BN	MFMHV-302-16-BN-DLC	MFMHV-302-16-BN-TC	MFMHV-302-16-BN-DLC-TC	
LONG	16mm	16mm	3	22mm	Sq. End	65mm	115mm	MFMHV-303-16	MFMHV-303-16-DLC	MFMHV-303-16-TC	MFMHV-303-16-DLC-TC	16 mm DIAMETER
	16mm	16mm	3	22mm	0.5mm	65mm	115mm	MFMHV-303-16-050	MFMHV-303-16-050-DLC	MFMHV-303-16-050-TC	MFMHV-303-16-050-DLC-TC	
	16mm	16mm	3	22mm	1mm	65mm	115mm	MFMHV-303-16-100	MFMHV-303-16-100-DLC	MFMHV-303-16-100-TC	MFMHV-303-16-100-DLC-TC	
	16mm	16mm	3	22mm	2mm	65mm	115mm	MFMHV-303-16-200	MFMHV-303-16-200-DLC	MFMHV-303-16-200-TC	MFMHV-303-16-200-DLC-TC	
	16mm	16mm	3	22mm	3mm	65mm	115mm	MFMHV-303-16-300	MFMHV-303-16-300-DLC	MFMHV-303-16-300-TC	MFMHV-303-16-300-DLC-TC	
	16mm	16mm	3	22mm	4mm	65mm	115mm	MFMHV-303-16-400	MFMHV-303-16-400-DLC	MFMHV-303-16-400-TC	MFMHV-303-16-400-DLC-TC	
	16mm	16mm	3	22mm	Ball End	65mm	115mm	MFMHV-303-16-BN	MFMHV-303-16-BN-DLC	MFMHV-303-16-BN-TC	MFMHV-303-16-BN-DLC-TC	

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—

NEW!



Aluminum

MFMHV 3 Flute (Short to Long Reach) — continued



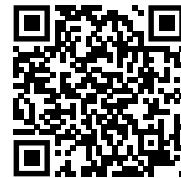
	Cutting Diam.	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Uncoated w/ Thru Coolant Holes	Thru Coolant DLC Coated	
EXTRA LONG	16mm	16mm	3	22mm	Sq. End	78mm	127mm	MFMHV-304-16	MFMHV-304-16-DLC	MFMHV-304-16-TC	MFMHV-304-16-DLC-TC	16 mm DIAMETER
	16mm	16mm	3	22mm	0.5mm	78mm	127mm	MFMHV-304-16-050	MFMHV-304-16-050-DLC	MFMHV-304-16-050-TC	MFMHV-304-16-050-DLC-TC	
	16mm	16mm	3	22mm	1mm	78mm	127mm	MFMHV-304-16-100	MFMHV-304-16-100-DLC	MFMHV-304-16-100-TC	MFMHV-304-16-100-DLC-TC	
	16mm	16mm	3	22mm	2mm	78mm	127mm	MFMHV-304-16-200	MFMHV-304-16-200-DLC	MFMHV-304-16-200-TC	MFMHV-304-16-200-DLC-TC	
	16mm	16mm	3	22mm	3mm	78mm	127mm	MFMHV-304-16-300	MFMHV-304-16-300-DLC	MFMHV-304-16-300-TC	MFMHV-304-16-300-DLC-TC	
	16mm	16mm	3	22mm	4mm	78mm	127mm	MFMHV-304-16-400	MFMHV-304-16-400-DLC	MFMHV-304-16-400-TC	MFMHV-304-16-400-DLC-TC	
	16mm	16mm	3	22mm	Ball End	78mm	127mm	MFMHV-304-16-BN	MFMHV-304-16-BN-DLC	MFMHV-304-16-BN-TC	MFMHV-304-16-BN-DLC-TC	
SHORT	20mm	20mm	3	25mm	Sq. End	54mm	104mm	MFMHV-301-20	MFMHV-301-20-DLC	MFMHV-301-20-TC	MFMHV-301-20-DLC-TC	20 mm DIAMETER
	20mm	20mm	3	25mm	0.5mm	54mm	104mm	MFMHV-301-20-005	MFMHV-301-20-005-DLC	MFMHV-301-20-005-TC	MFMHV-301-20-005-DLC-TC	
	20mm	20mm	3	25mm	1mm	54mm	104mm	MFMHV-301-20-100	MFMHV-301-20-100-DLC	MFMHV-301-20-100-TC	MFMHV-301-20-100-DLC-TC	
	20mm	20mm	3	25mm	2mm	54mm	104mm	MFMHV-301-20-200	MFMHV-301-20-200-DLC	MFMHV-301-20-200-TC	MFMHV-301-20-200-DLC-TC	
	20mm	20mm	3	25mm	3mm	54mm	104mm	MFMHV-301-20-300	MFMHV-301-20-300-DLC	MFMHV-301-20-300-TC	MFMHV-301-20-300-DLC-TC	
	20mm	20mm	3	25mm	4mm	54mm	104mm	MFMHV-301-20-400	MFMHV-301-20-400-DLC	MFMHV-301-20-400-TC	MFMHV-301-20-400-DLC-TC	
	20mm	20mm	3	25mm	Ball End	54mm	104mm	MFMHV-301-20-BN	MFMHV-301-20-BN-DLC	MFMHV-301-20-BN-TC	MFMHV-301-20-BN-DLC-TC	
MEDIUM	20mm	20mm	3	25mm	Sq. End	65mm	115mm	MFMHV-302-20	MFMHV-302-20-DLC	MFMHV-302-20-TC	MFMHV-302-20-DLC-TC	
	20mm	20mm	3	25mm	0.5mm	65mm	115mm	MFMHV-302-20-005	MFMHV-302-20-005-DLC	MFMHV-302-20-005-TC	MFMHV-302-20-005-DLC-TC	
	20mm	20mm	3	25mm	1mm	65mm	115mm	MFMHV-302-20-100	MFMHV-302-20-100-DLC	MFMHV-302-20-100-TC	MFMHV-302-20-100-DLC-TC	
	20mm	20mm	3	25mm	2mm	65mm	115mm	MFMHV-302-20-200	MFMHV-302-20-200-DLC	MFMHV-302-20-200-TC	MFMHV-302-20-200-DLC-TC	
	20mm	20mm	3	25mm	3mm	65mm	115mm	MFMHV-302-20-300	MFMHV-302-20-300-DLC	MFMHV-302-20-300-TC	MFMHV-302-20-300-DLC-TC	
	20mm	20mm	3	25mm	4mm	65mm	115mm	MFMHV-302-20-400	MFMHV-302-20-400-DLC	MFMHV-302-20-400-TC	MFMHV-302-20-400-DLC-TC	
	20mm	20mm	3	25mm	Ball End	65mm	115mm	MFMHV-302-20-BN	MFMHV-302-20-BN-DLC	MFMHV-302-20-BN-TC	MFMHV-302-20-BN-DLC-TC	
LONG	20mm	20mm	3	25mm	Sq. End	78mm	127mm	MFMHV-303-20	MFMHV-303-20-DLC	MFMHV-303-20-TC	MFMHV-303-20-DLC-TC	
	20mm	20mm	3	25mm	0.5mm	78mm	127mm	MFMHV-303-20-005	MFMHV-303-20-005-DLC	MFMHV-303-20-005-TC	MFMHV-303-20-005-DLC-TC	
	20mm	20mm	3	25mm	1mm	78mm	127mm	MFMHV-303-20-100	MFMHV-303-20-100-DLC	MFMHV-303-20-100-TC	MFMHV-303-20-100-DLC-TC	
	20mm	20mm	3	25mm	2mm	78mm	127mm	MFMHV-303-20-200	MFMHV-303-20-200-DLC	MFMHV-303-20-200-TC	MFMHV-303-20-200-DLC-TC	
	20mm	20mm	3	25mm	3mm	78mm	127mm	MFMHV-303-20-300	MFMHV-303-20-300-DLC	MFMHV-303-20-300-TC	MFMHV-303-20-300-DLC-TC	
	20mm	20mm	3	25mm	4mm	78mm	127mm	MFMHV-303-20-400	MFMHV-303-20-400-DLC	MFMHV-303-20-400-TC	MFMHV-303-20-400-DLC-TC	
	20mm	20mm	3	25mm	Ball End	78mm	127mm	MFMHV-303-20-BN	MFMHV-303-20-BN-DLC	MFMHV-303-20-BN-TC	MFMHV-303-20-BN-DLC-TC	
EXTRA LONG	20mm	20mm	3	25mm	Sq. End	92mm	140mm	MFMHV-304-20	MFMHV-304-20-DLC	MFMHV-304-20-TC	MFMHV-304-20-DLC-TC	
	20mm	20mm	3	25mm	0.5mm	92mm	140mm	MFMHV-304-20-005	MFMHV-304-20-005-DLC	MFMHV-304-20-005-TC	MFMHV-304-20-005-DLC-TC	
	20mm	20mm	3	25mm	1mm	92mm	140mm	MFMHV-304-20-100	MFMHV-304-20-100-DLC	MFMHV-304-20-100-TC	MFMHV-304-20-100-DLC-TC	
	20mm	20mm	3	25mm	2mm	92mm	140mm	MFMHV-304-20-200	MFMHV-304-20-200-DLC	MFMHV-304-20-200-TC	MFMHV-304-20-200-DLC-TC	
	20mm	20mm	3	25mm	3mm	92mm	140mm	MFMHV-304-20-300	MFMHV-304-20-300-DLC	MFMHV-304-20-300-TC	MFMHV-304-20-300-DLC-TC	
	20mm	20mm	3	25mm	4mm	92mm	140mm	MFMHV-304-20-400	MFMHV-304-20-400-DLC	MFMHV-304-20-400-TC	MFMHV-304-20-400-DLC-TC	
	20mm	20mm	3	25mm	Ball End	92mm	140mm	MFMHV-304-20-BN	MFMHV-304-20-BN-DLC	MFMHV-304-20-BN-TC	MFMHV-304-20-BN-DLC-TC	
SHORT	25mm	25mm	3	32mm	Sq. End	54mm	102mm	MFMHV-301-25	MFMHV-301-25-DLC	MFMHV-301-25-TC	MFMHV-301-25-DLC-TC	25 mm DIAMETER
	25mm	25mm	3	32mm	0.5mm	54mm	102mm	MFMHV-301-25-050	MFMHV-301-25-050-DLC	MFMHV-301-25-050-TC	MFMHV-301-25-050-DLC-TC	
	25mm	25mm	3	32mm	1mm	54mm	102mm	MFMHV-301-25-100	MFMHV-301-25-100-DLC	MFMHV-301-25-100-TC	MFMHV-301-25-100-DLC-TC	
	25mm	25mm	3	32mm	2mm	54mm	102mm	MFMHV-301-25-200	MFMHV-301-25-200-DLC	MFMHV-301-25-200-TC	MFMHV-301-25-200-DLC-TC	
	25mm	25mm	3	32mm	3mm	54mm	102mm	MFMHV-301-25-300	MFMHV-301-25-300-DLC	MFMHV-301-25-300-TC	MFMHV-301-25-300-DLC-TC	
	25mm	25mm	3	32mm	4mm	54mm	102mm	MFMHV-301-25-400	MFMHV-301-25-400-DLC	MFMHV-301-25-400-TC	MFMHV-301-25-400-DLC-TC	
	25mm	25mm	3	32mm	Ball End	54mm	102mm	MFMHV-301-25-BN	MFMHV-301-25-BN-DLC	MFMHV-301-25-BN-TC	MFMHV-301-25-BN-DLC-TC	

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—

NEW!



MFMHV

3 Flute Ultra-High Velocity Tools for Aluminum

MFMHV 3 Flute (Short to Long Reach) — continued



	Cutting Diam.	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Uncoated w/ Thru Coolant Holes	Thru Coolant DLC Coated	25 mm DIAMETER
MEDIUM	25mm	25mm	3	32mm	Sq. End	65mm	115mm	MFMHV-302-25	MFMHV-302-25-DLC	MFMHV-302-25-TC	MFMHV-302-25-DLC-TC	
	25mm	25mm	3	32mm	0.5mm	65mm	115mm	MFMHV-302-25-050	MFMHV-302-25-050-DLC	MFMHV-302-25-050-TC	MFMHV-302-25-050-DLC-TC	
	25mm	25mm	3	32mm	1mm	65mm	115mm	MFMHV-302-25-100	MFMHV-302-25-100-DLC	MFMHV-302-25-100-TC	MFMHV-302-25-100-DLC-TC	
	25mm	25mm	3	32mm	2mm	65mm	115mm	MFMHV-302-25-200	MFMHV-302-25-200-DLC	MFMHV-302-25-200-TC	MFMHV-302-25-200-DLC-TC	
	25mm	25mm	3	32mm	3mm	65mm	115mm	MFMHV-302-25-300	MFMHV-302-25-300-DLC	MFMHV-302-25-300-TC	MFMHV-302-25-300-DLC-TC	
	25mm	25mm	3	32mm	4mm	65mm	115mm	MFMHV-302-25-400	MFMHV-302-25-400-DLC	MFMHV-302-25-400-TC	MFMHV-302-25-400-DLC-TC	
	25mm	25mm	3	32mm	Ball End	65mm	115mm	MFMHV-302-25-BN	MFMHV-302-25-BN-DLC	MFMHV-302-25-BN-TC	MFMHV-302-25-BN-DLC-TC	
LONG	25mm	25mm	3	32mm	Sq. End	78mm	127mm	MFMHV-303-25	MFMHV-303-25-DLC	MFMHV-303-25-TC	MFMHV-303-25-DLC-TC	
	25mm	25mm	3	32mm	0.5mm	78mm	127mm	MFMHV-303-25-050	MFMHV-303-25-050-DLC	MFMHV-303-25-050-TC	MFMHV-303-25-050-DLC-TC	
	25mm	25mm	3	32mm	1mm	78mm	127mm	MFMHV-303-25-100	MFMHV-303-25-100-DLC	MFMHV-303-25-100-TC	MFMHV-303-25-100-DLC-TC	
	25mm	25mm	3	32mm	2mm	78mm	127mm	MFMHV-303-25-200	MFMHV-303-25-200-DLC	MFMHV-303-25-200-TC	MFMHV-303-25-200-DLC-TC	
	25mm	25mm	3	32mm	3mm	78mm	127mm	MFMHV-303-25-300	MFMHV-303-25-300-DLC	MFMHV-303-25-300-TC	MFMHV-303-25-300-DLC-TC	
	25mm	25mm	3	32mm	4mm	78mm	127mm	MFMHV-303-25-400	MFMHV-303-25-400-DLC	MFMHV-303-25-400-TC	MFMHV-303-25-400-DLC-TC	
	25mm	25mm	3	32mm	Ball End	78mm	127mm	MFMHV-303-25-BN	MFMHV-303-25-BN-DLC	MFMHV-303-25-BN-TC	MFMHV-303-25-BN-DLC-TC	
EXTRA LONG	25mm	25mm	3	32mm	Sq. End	92mm	140mm	MFMHV-304-25	MFMHV-304-25-DLC	MFMHV-304-25-TC	MFMHV-304-25-DLC-TC	
	25mm	25mm	3	32mm	0.5mm	92mm	140mm	MFMHV-304-25-050	MFMHV-304-25-050-DLC	MFMHV-304-25-050-TC	MFMHV-304-25-050-DLC-TC	
	25mm	25mm	3	32mm	1mm	92mm	140mm	MFMHV-304-25-100	MFMHV-304-25-100-DLC	MFMHV-304-25-100-TC	MFMHV-304-25-100-DLC-TC	
	25mm	25mm	3	32mm	2mm	92mm	140mm	MFMHV-304-25-200	MFMHV-304-25-200-DLC	MFMHV-304-25-200-TC	MFMHV-304-25-200-DLC-TC	
	25mm	25mm	3	32mm	3mm	92mm	140mm	MFMHV-304-25-300	MFMHV-304-25-300-DLC	MFMHV-304-25-300-TC	MFMHV-304-25-300-DLC-TC	
	25mm	25mm	3	32mm	4mm	92mm	140mm	MFMHV-304-25-400	MFMHV-304-25-400-DLC	MFMHV-304-25-400-TC	MFMHV-304-25-400-DLC-TC	
	25mm	25mm	3	32mm	Ball End	92mm	140mm	MFMHV-304-25-BN	MFMHV-304-25-BN-DLC	MFMHV-304-25-BN-TC	MFMHV-304-25-BN-DLC-TC	
SUPER LONG	25mm	25mm	3	32mm	Sq. End	104mm	152mm	MFMHV-305-25	MFMHV-305-25-DLC	MFMHV-305-25-TC	MFMHV-305-25-DLC-TC	
	25mm	25mm	3	32mm	0.5mm	104mm	152mm	MFMHV-305-25-050	MFMHV-305-25-050-DLC	MFMHV-305-25-050-TC	MFMHV-305-25-050-DLC-TC	
	25mm	25mm	3	32mm	1mm	104mm	152mm	MFMHV-305-25-100	MFMHV-305-25-100-DLC	MFMHV-305-25-100-TC	MFMHV-305-25-100-DLC-TC	
	25mm	25mm	3	32mm	2mm	104mm	152mm	MFMHV-305-25-200	MFMHV-305-25-200-DLC	MFMHV-305-25-200-TC	MFMHV-305-25-200-DLC-TC	
	25mm	25mm	3	32mm	3mm	104mm	152mm	MFMHV-305-25-300	MFMHV-305-25-300-DLC	MFMHV-305-25-300-TC	MFMHV-305-25-300-DLC-TC	
	25mm	25mm	3	32mm	4mm	104mm	152mm	MFMHV-305-25-400	MFMHV-305-25-400-DLC	MFMHV-305-25-400-TC	MFMHV-305-25-400-DLC-TC	
	25mm	25mm	3	32mm	Ball End	104mm	152mm	MFMHV-305-25-BN	MFMHV-305-25-BN-DLC	MFMHV-305-25-BN-TC	MFMHV-305-25-BN-DLC-TC	

Technical Information: Run tools at the maximum tap tested Recommended RPM

FMHV Technical data:

Diameter	Chip load per tooth	Typical Depth	Recommended RPM	Type of cut
1" Diameter	.008-.015	.300 up to .750	Max Tap Tested RPM Or Max RPM	Slot or profile (stay away from 50% radial step-over)
3/4" Diameter	.006-.012	.200 up to .900		
5/8" Diameter	.005-.011	.100 up to .750		
1/2" Diameter	.004-.010	.100 up to .750		
3/8" Diameter	.003-.006	.100 up to .500		
5/16" Diameter	.002-.005	.100 up to .500		
1/4" Diameter	.002-.004	.100 up to .375		

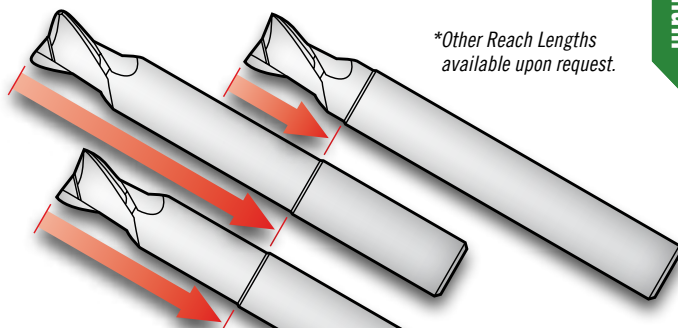
Recommended feed per tooth

CUTTING DIAMETER	Recommended chip load per tooth fz
6	0.051 - 0.095
8	0.076 - 0.143
10	0.076 - 0.143
12	0.102 - 0.254
16	0.127 - 0.254
20	0.152 - 0.305
25	0.203 - 0.381

Due to the large offering of MFMHV series many of these are made to order and non-returnable.

Need a Different Reach?

Any neck length (LBS) available upon request!

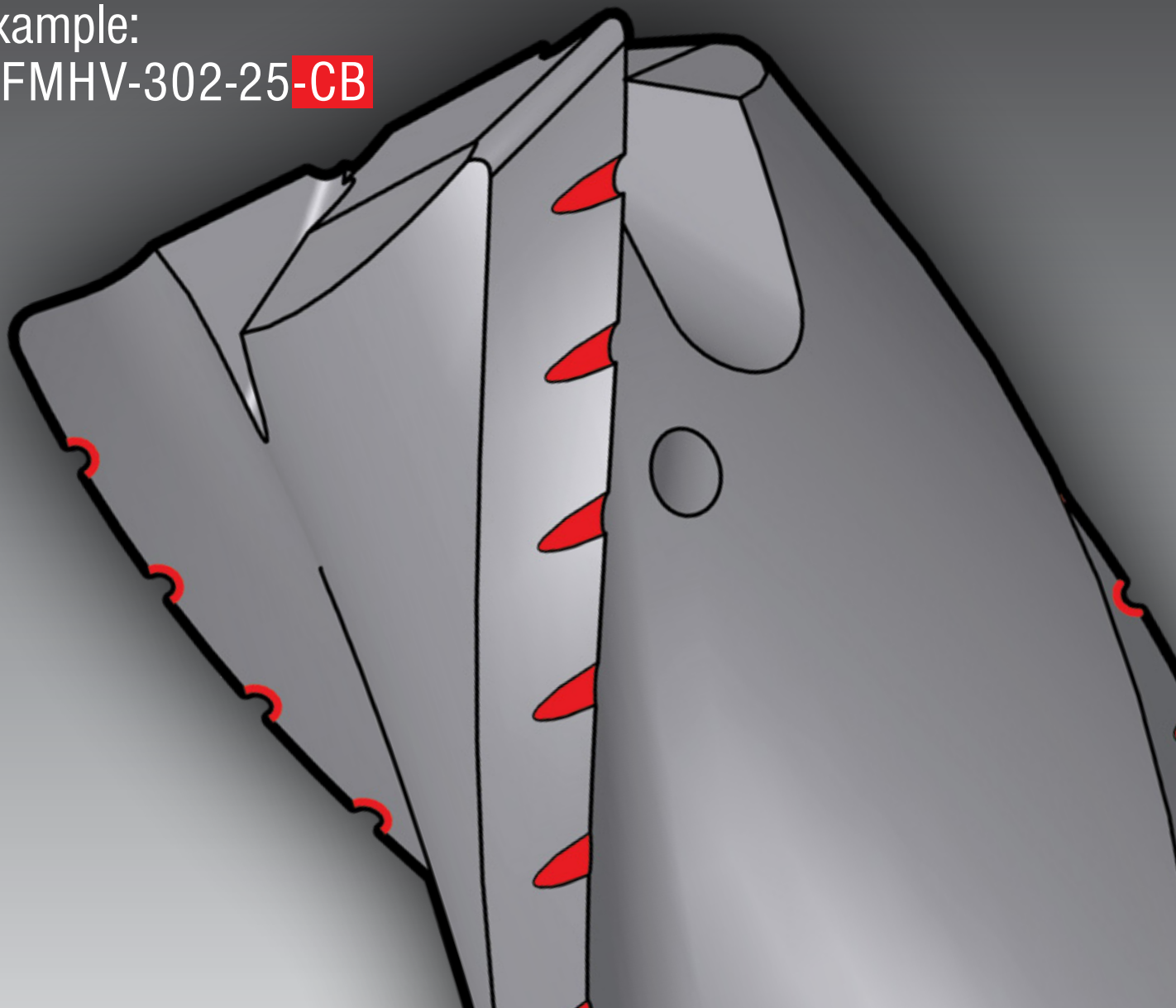


CHIP BREAKERS

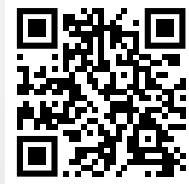
If you need Chip Breakers add “-CB” to the end of any part number to get chip breakers added.

Example:

MFMHV-302-25-**CB**



FM 2 Flute High Performance Tools for Aluminum



Characteristics

- Square End
- Corner Radius
- Ball End
- 2 Flute
- 40° Helix
- Feather Blend
- Necked
- Mirror Edge

Applications

- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- 3-D
- Roughing
- Semi-Finishing
- Finishing
- Wet

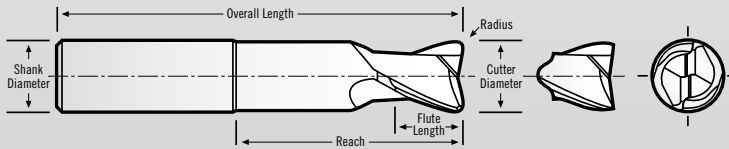
Materials

- Aluminum
- Copper
- Magnesium
- BRASS

Coatings

- Diamond-Like Carbon (DLC)

FM Series comes with **Mirror Edge!** for Chatter Reduction



FM Series Tolerances:

Cutting Dia. = $-.0007/-0.0015$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+.060/-0.000$
 OAL = $+/- .060$

Eliminate Tool Pull Out!
 ALL Tools h4 Shank Tolerance up to 150% more gripping force
Tightest in the Industry!

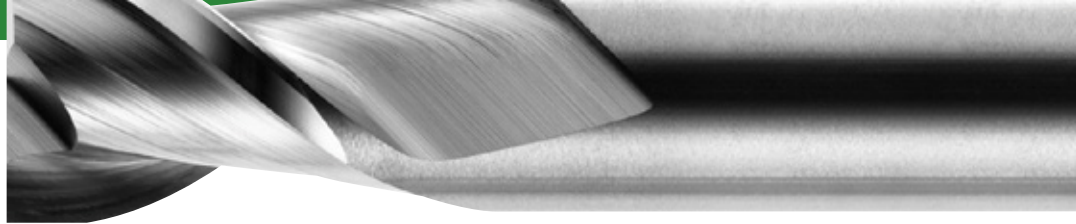


FM 2 Flute (Short to Long Reach)



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
SHORT	1/4"	1/4"	1/4"	Sq. End	5/8"	3"	FM-201-08	FM-201-08-DLC	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	5/8"	3"	FM-201-08-030	FM-201-08-030-DLC	
	1/4"	1/4"	1/4"	0.06"	5/8"	3"	FM-201-08-060	FM-201-08-060-DLC	
	1/4"	1/4"	1/4"	0.09"	5/8"	3"	FM-201-08-090	FM-201-08-090-DLC	
	1/4"	1/4"	1/4"	Ball End	5/8"	3"	FM-201-08-BN	FM-201-08-BN-DLC	
MEDIUM	1/4"	1/4"	1/4"	Sq. End	7/8"	3"	FM-202-08	FM-202-08-DLC	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	7/8"	3"	FM-202-08-030	FM-202-08-030-DLC	
	1/4"	1/4"	1/4"	0.06"	7/8"	3"	FM-202-08-060	FM-202-08-060-DLC	
	1/4"	1/4"	1/4"	0.09"	7/8"	3"	FM-202-08-090	FM-202-08-090-DLC	
	1/4"	1/4"	1/4"	Ball End	7/8"	3"	FM-202-08-BN	FM-202-08-BN-DLC	
LONG	1/4"	1/4"	1/4"	Sq. End	1-1/16"	3"	FM-204-08	FM-204-08-DLC	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	1-1/16"	3"	FM-204-08-030	FM-204-08-030-DLC	
	1/4"	1/4"	1/4"	0.06"	1-1/16"	3"	FM-204-08-060	FM-204-08-060-DLC	
	1/4"	1/4"	1/4"	0.09"	1-1/16"	3"	FM-204-08-090	FM-204-08-090-DLC	
	1/4"	1/4"	1/4"	Ball End	1-1/16"	3"	FM-204-08-BN	FM-204-08-BN-DLC	
EXTRA LONG	1/4"	1/4"	1/4"	Sq. End	1-1/2"	3"	FM-205-08	FM-205-08-DLC	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	1-1/2"	3"	FM-205-08-030	FM-205-08-030-DLC	
	1/4"	1/4"	1/4"	0.06"	1-1/2"	3"	FM-205-08-060	FM-205-08-060-DLC	
	1/4"	1/4"	1/4"	0.09"	1-1/2"	3"	FM-205-08-090	FM-205-08-090-DLC	
	1/4"	1/4"	1/4"	Ball End	1-1/2"	3"	FM-205-08-BN	FM-205-08-BN-DLC	
SHORT	5/16"	5/16"	5/16"	Sq. End	7/8"	3-1/8"	FM-201-10	FM-201-10-DLC	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	7/8"	3-1/8"	FM-201-10-030	FM-201-10-030-DLC	
	5/16"	5/16"	5/16"	0.06"	7/8"	3-1/8"	FM-201-10-060	FM-201-10-060-DLC	
	5/16"	5/16"	5/16"	0.09"	7/8"	3-1/8"	FM-201-10-090	FM-201-10-090-DLC	
	5/16"	5/16"	5/16"	0.12"	7/8"	3-1/8"	FM-201-10-120	FM-201-10-120-DLC	
	5/16"	5/16"	5/16"	Ball End	7/8"	3-1/8"	FM-201-10-BN	FM-201-10-BN-DLC	
MEDIUM	5/16"	5/16"	5/16"	Sq. End	1-3/32"	3-1/8"	FM-202-10	FM-202-10-DLC	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	1-3/32"	3-1/8"	FM-202-10-030	FM-202-10-030-DLC	
	5/16"	5/16"	5/16"	0.06"	1-3/32"	3-1/8"	FM-202-10-060	FM-202-10-060-DLC	
	5/16"	5/16"	5/16"	0.09"	1-3/32"	3-1/8"	FM-202-10-090	FM-202-10-090-DLC	
	5/16"	5/16"	5/16"	0.12"	1-3/32"	3-1/8"	FM-202-10-120	FM-202-10-120-DLC	
	5/16"	5/16"	5/16"	Ball End	1-3/32"	3-1/8"	FM-202-10-BN	FM-202-10-BN-DLC	

*Other Reach Lengths available upon request.



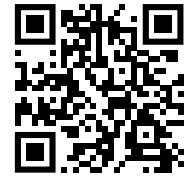
FM 2 Flute (Short to Long Reach) – continued



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
LONG	5/16"	5/16"	5/16"	Sq. End	1-5/16"	3-1/8"	FM-204-10	FM-204-10-DLC	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	1-5/16"	3-1/8"	FM-204-10-030	FM-204-10-030-DLC	
	5/16"	5/16"	5/16"	0.06"	1-5/16"	3-1/8"	FM-204-10-060	FM-204-10-060-DLC	
	5/16"	5/16"	5/16"	0.09"	1-5/16"	3-1/8"	FM-204-10-090	FM-204-10-090-DLC	
	5/16"	5/16"	5/16"	0.12"	1-5/16"	3-1/8"	FM-204-10-120	FM-204-10-120-DLC	
	5/16"	5/16"	5/16"	Ball End	1-5/16"	3-1/8"	FM-204-10-BN	FM-204-10-BN-DLC	
EXTRA LONG	5/16"	5/16"	5/16"	Sq. End	1-5/8"	3-1/8"	FM-205-10	FM-205-10-DLC	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	1-5/8"	3-1/8"	FM-205-10-030	FM-205-10-030-DLC	
	5/16"	5/16"	5/16"	0.06"	1-5/8"	3-1/8"	FM-205-10-060	FM-205-10-060-DLC	
	5/16"	5/16"	5/16"	0.09"	1-5/8"	3-1/8"	FM-205-10-090	FM-205-10-090-DLC	
	5/16"	5/16"	5/16"	0.12"	1-5/8"	3-1/8"	FM-205-10-120	FM-205-10-120-DLC	
	5/16"	5/16"	5/16"	Ball End	1-5/8"	3-1/8"	FM-205-10-BN	FM-205-10-BN-DLC	
SHORT	3/8"	3/8"	3/8"	Sq. End	1"	4"	FM-201-12	FM-201-12-DLC	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	1"	4"	FM-201-12-030	FM-201-12-030-DLC	
	3/8"	3/8"	3/8"	0.06"	1"	4"	FM-201-12-060	FM-201-12-060-DLC	
	3/8"	3/8"	3/8"	0.09"	1"	4"	FM-201-12-090	FM-201-12-090-DLC	
	3/8"	3/8"	3/8"	0.12"	1"	4"	FM-201-12-120	FM-201-12-120-DLC	
	3/8"	3/8"	3/8"	Ball End	1"	4"	FM-201-12-BN	FM-201-12-BN-DLC	
MEDIUM	3/8"	3/8"	3/8"	Sq. End	1-1/4"	4"	FM-202-12	FM-202-12-DLC	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	1-1/4"	4"	FM-202-12-030	FM-202-12-030-DLC	
	3/8"	3/8"	3/8"	0.06"	1-1/4"	4"	FM-202-12-060	FM-202-12-060-DLC	
	3/8"	3/8"	3/8"	0.09"	1-1/4"	4"	FM-202-12-090	FM-202-12-090-DLC	
	3/8"	3/8"	3/8"	0.12"	1-1/4"	4"	FM-202-12-120	FM-202-12-120-DLC	
	3/8"	3/8"	3/8"	Ball End	1-1/4"	4"	FM-202-12-BN	FM-202-12-BN-DLC	
LONG	3/8"	3/8"	3/8"	Sq. End	1-9/16"	4"	FM-204-12	FM-204-12-DLC	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	1-9/16"	4"	FM-204-12-030	FM-204-12-030-DLC	
	3/8"	3/8"	3/8"	0.06"	1-9/16"	4"	FM-204-12-060	FM-204-12-060-DLC	
	3/8"	3/8"	3/8"	0.09"	1-9/16"	4"	FM-204-12-090	FM-204-12-090-DLC	
	3/8"	3/8"	3/8"	0.12"	1-9/16"	4"	FM-204-12-120	FM-204-12-120-DLC	
	3/8"	3/8"	3/8"	Ball End	1-9/16"	4"	FM-204-12-BN	FM-204-12-BN-DLC	
EXTRA LONG	3/8"	3/8"	3/8"	Sq. End	2-1/8"	4"	FM-205-12	FM-205-12-DLC	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	2-1/8"	4"	FM-205-12-030	FM-205-12-030-DLC	
	3/8"	3/8"	3/8"	0.06"	2-1/8"	4"	FM-205-12-060	FM-205-12-060-DLC	
	3/8"	3/8"	3/8"	0.09"	2-1/8"	4"	FM-205-12-090	FM-205-12-090-DLC	
	3/8"	3/8"	3/8"	0.12"	2-1/8"	4"	FM-205-12-120	FM-205-12-120-DLC	
	3/8"	3/8"	3/8"	Ball End	2-1/8"	4"	FM-205-12-BN	FM-205-12-BN-DLC	
SHORT	1/2"	1/2"	1/2"	Sq. End	1-1/4"	5"	FM-201-16	FM-201-16-DLC	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	1-1/4"	5"	FM-201-16-030	FM-201-16-030-DLC	
	1/2"	1/2"	1/2"	0.06"	1-1/4"	5"	FM-201-16-060	FM-201-16-060-DLC	
	1/2"	1/2"	1/2"	0.09"	1-1/4"	5"	FM-201-16-090	FM-201-16-090-DLC	
	1/2"	1/2"	1/2"	0.12"	1-1/4"	5"	FM-201-16-120	FM-201-16-120-DLC	
	1/2"	1/2"	1/2"	Ball End	1-1/4"	5"	FM-201-16-BN	FM-201-16-BN-DLC	
MEDIUM	1/2"	1/2"	1/2"	Sq. End	1-5/8"	5"	FM-202-16	FM-202-16-DLC	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	1-5/8"	5"	FM-202-16-030	FM-202-16-030-DLC	
	1/2"	1/2"	1/2"	0.06"	1-5/8"	5"	FM-202-16-060	FM-202-16-060-DLC	
	1/2"	1/2"	1/2"	0.09"	1-5/8"	5"	FM-202-16-090	FM-202-16-090-DLC	
	1/2"	1/2"	1/2"	0.12"	1-5/8"	5"	FM-202-16-120	FM-202-16-120-DLC	
	1/2"	1/2"	1/2"	Ball End	1-5/8"	5"	FM-202-16-BN	FM-202-16-BN-DLC	
LONG	1/2"	1/2"	1/2"	Sq. End	2-1/8"	5"	FM-204-16	FM-204-16-DLC	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	2-1/8"	5"	FM-204-16-030	FM-204-16-030-DLC	
	1/2"	1/2"	1/2"	0.06"	2-1/8"	5"	FM-204-16-060	FM-204-16-060-DLC	
	1/2"	1/2"	1/2"	0.09"	2-1/8"	5"	FM-204-16-090	FM-204-16-090-DLC	
	1/2"	1/2"	1/2"	0.12"	2-1/8"	5"	FM-204-16-120	FM-204-16-120-DLC	
	1/2"	1/2"	1/2"	Ball End	2-1/8"	5"	FM-204-16-BN	FM-204-16-BN-DLC	

*Other Reach Lengths available upon request.

FM 2 Flute High Performance Tools for Aluminum

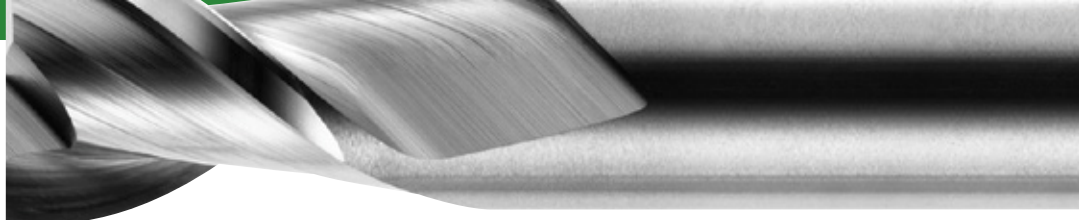


FM 2 Flute (Short to Long Reach) — continued



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
EXTRA LONG	1/2"	1/2"	1/2"	Sq. End	2-5/8"	5"	FM-205-16	FM-205-16-DLC	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	2-5/8"	5"	FM-205-16-030	FM-205-16-030-DLC	
	1/2"	1/2"	1/2"	0.06"	2-5/8"	5"	FM-205-16-060	FM-205-16-060-DLC	
	1/2"	1/2"	1/2"	0.09"	2-5/8"	5"	FM-205-16-090	FM-205-16-090-DLC	
	1/2"	1/2"	1/2"	0.12"	2-5/8"	5"	FM-205-16-120	FM-205-16-120-DLC	
	1/2"	1/2"	1/2"	Ball End	2-5/8"	5"	FM-205-16-BN	FM-205-16-BN-DLC	
SHORT	5/8"	5/8"	5/8"	Sq. End	1-1/2"	6"	FM-201-20	FM-201-20-DLC	5/8" DIAMETER
	5/8"	5/8"	5/8"	0.03"	1-1/2"	6"	FM-201-20-030	FM-201-20-030-DLC	
	5/8"	5/8"	5/8"	0.06"	1-1/2"	6"	FM-201-20-060	FM-201-20-060-DLC	
	5/8"	5/8"	5/8"	0.09"	1-1/2"	6"	FM-201-20-090	FM-201-20-090-DLC	
	5/8"	5/8"	5/8"	0.12"	1-1/2"	6"	FM-201-20-120	FM-201-20-120-DLC	
	5/8"	5/8"	5/8"	Ball End	1-1/2"	6"	FM-201-20-BN	FM-201-20-BN-DLC	
MEDIUM	5/8"	5/8"	5/8"	Sq. End	2-1/16"	6"	FM-202-20	FM-202-20-DLC	
	5/8"	5/8"	5/8"	0.03"	2-1/16"	6"	FM-202-20-030	FM-202-20-030-DLC	
	5/8"	5/8"	5/8"	0.06"	2-1/16"	6"	FM-202-20-060	FM-202-20-060-DLC	
	5/8"	5/8"	5/8"	0.09"	2-1/16"	6"	FM-202-20-090	FM-202-20-090-DLC	
	5/8"	5/8"	5/8"	0.12"	2-1/16"	6"	FM-202-20-120	FM-202-20-120-DLC	
	5/8"	5/8"	5/8"	Ball End	2-1/16"	6"	FM-202-20-BN	FM-202-20-BN-DLC	
LONG	5/8"	5/8"	5/8"	Sq. End	2-5/8"	6"	FM-204-20	FM-204-20-DLC	
	5/8"	5/8"	5/8"	0.03"	2-5/8"	6"	FM-204-20-030	FM-204-20-030-DLC	
	5/8"	5/8"	5/8"	0.06"	2-5/8"	6"	FM-204-20-060	FM-204-20-060-DLC	
	5/8"	5/8"	5/8"	0.09"	2-5/8"	6"	FM-204-20-090	FM-204-20-090-DLC	
	5/8"	5/8"	5/8"	0.12"	2-5/8"	6"	FM-204-20-120	FM-204-20-120-DLC	
	5/8"	5/8"	5/8"	Ball End	2-5/8"	6"	FM-204-20-BN	FM-204-20-BN-DLC	
EXTRA LONG	5/8"	5/8"	5/8"	Sq. End	3-1/8"	6"	FM-205-20	FM-205-20-DLC	
	5/8"	5/8"	5/8"	0.03"	3-1/8"	6"	FM-205-20-030	FM-205-20-030-DLC	
	5/8"	5/8"	5/8"	0.06"	3-1/8"	6"	FM-205-20-060	FM-205-20-060-DLC	
	5/8"	5/8"	5/8"	0.09"	3-1/8"	6"	FM-205-20-090	FM-205-20-090-DLC	
	5/8"	5/8"	5/8"	0.12"	3-1/8"	6"	FM-205-20-120	FM-205-20-120-DLC	
	5/8"	5/8"	5/8"	Ball End	3-1/8"	6"	FM-205-20-BN	FM-205-20-BN-DLC	
SHORT	3/4"	3/4"	3/4"	Sq. End	2"	6"	FM-201-24	FM-201-24-DLC	3/4" DIAMETER
	3/4"	3/4"	3/4"	0.03"	2"	6"	FM-201-24-030	FM-201-24-030-DLC	
	3/4"	3/4"	3/4"	0.06"	2"	6"	FM-201-24-060	FM-201-24-060-DLC	
	3/4"	3/4"	3/4"	0.09"	2"	6"	FM-201-24-090	FM-201-24-090-DLC	
	3/4"	3/4"	3/4"	0.12"	2"	6"	FM-201-24-120	FM-201-24-120-DLC	
	3/4"	3/4"	3/4"	Ball End	2"	6"	FM-201-24-BN	FM-201-24-BN-DLC	
MEDIUM	3/4"	3/4"	3/4"	Sq. End	2-9/16"	6"	FM-202-24	FM-202-24-DLC	
	3/4"	3/4"	3/4"	0.03"	2-9/16"	6"	FM-202-24-030	FM-202-24-030-DLC	
	3/4"	3/4"	3/4"	0.06"	2-9/16"	6"	FM-202-24-060	FM-202-24-060-DLC	
	3/4"	3/4"	3/4"	0.09"	2-9/16"	6"	FM-202-24-090	FM-202-24-090-DLC	
	3/4"	3/4"	3/4"	0.12"	2-9/16"	6"	FM-202-24-120	FM-202-24-120-DLC	
	3/4"	3/4"	3/4"	Ball End	2-9/16"	6"	FM-202-24-BN	FM-202-24-BN-DLC	
LONG	3/4"	3/4"	3/4"	Sq. End	3-1/8"	6"	FM-204-24	FM-204-24-DLC	
	3/4"	3/4"	3/4"	0.03"	3-1/8"	6"	FM-204-24-030	FM-204-24-030-DLC	
	3/4"	3/4"	3/4"	0.06"	3-1/8"	6"	FM-204-24-060	FM-204-24-060-DLC	
	3/4"	3/4"	3/4"	0.09"	3-1/8"	6"	FM-204-24-090	FM-204-24-090-DLC	
	3/4"	3/4"	3/4"	0.12"	3-1/8"	6"	FM-204-24-120	FM-204-24-120-DLC	
	3/4"	3/4"	3/4"	Ball End	3-1/8"	6"	FM-204-24-BN	FM-204-24-BN-DLC	
EXTRA LONG	3/4"	3/4"	3/4"	Sq. End	3-3/4"	6"	FM-205-24	FM-205-24-DLC	
	3/4"	3/4"	3/4"	0.03"	3-3/4"	6"	FM-205-24-030	FM-205-24-030-DLC	
	3/4"	3/4"	3/4"	0.06"	3-3/4"	6"	FM-205-24-060	FM-205-24-060-DLC	
	3/4"	3/4"	3/4"	0.09"	3-3/4"	6"	FM-205-24-090	FM-205-24-090-DLC	
	3/4"	3/4"	3/4"	0.12"	3-3/4"	6"	FM-205-24-120	FM-205-24-120-DLC	
	3/4"	3/4"	3/4"	Ball End	3-3/4"	6"	FM-205-24-BN	FM-205-24-BN-DLC	

*Other Reach Lengths available upon request.



FM 2 Flute (Short to Long Reach) – continued



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
SHORT	1"	1"	1"	Sq. End	2"	6"	FM-201-32	FM-201-32-DLC	1" DIAMETER
	1"	1"	1"	0.03"	2"	6"	FM-201-32-030	FM-201-32-030-DLC	
	1"	1"	1"	0.06"	2"	6"	FM-201-32-060	FM-201-32-060-DLC	
	1"	1"	1"	0.09"	2"	6"	FM-201-32-090	FM-201-32-090-DLC	
	1"	1"	1"	0.12"	2"	6"	FM-201-32-120	FM-201-32-120-DLC	
	1"	1"	1"	Ball End	2"	6"	FM-201-32-BN	FM-201-32-BN-DLC	
MEDIUM	1"	1"	1"	Sq. End	3"	6"	FM-202-32	FM-202-32-DLC	
	1"	1"	1"	0.03"	3"	6"	FM-202-32-030	FM-202-32-030-DLC	
	1"	1"	1"	0.06"	3"	6"	FM-202-32-060	FM-202-32-060-DLC	
	1"	1"	1"	0.09"	3"	6"	FM-202-32-090	FM-202-32-090-DLC	
	1"	1"	1"	0.12"	3"	6"	FM-202-32-120	FM-202-32-120-DLC	
	1"	1"	1"	Ball End	3"	6"	FM-202-32-BN	FM-202-32-BN-DLC	
LONG	1"	1"	1"	Sq. End	3-1/2"	6"	FM-203-32	FM-203-32-DLC	
	1"	1"	1"	0.03"	3-1/2"	6"	FM-203-32-030	FM-203-32-030-DLC	
	1"	1"	1"	0.06"	3-1/2"	6"	FM-203-32-060	FM-203-32-060-DLC	
	1"	1"	1"	0.09"	3-1/2"	6"	FM-203-32-090	FM-203-32-090-DLC	
	1"	1"	1"	0.12"	3-1/2"	6"	FM-203-32-120	FM-203-32-120-DLC	
	1"	1"	1"	Ball End	3-1/2"	6"	FM-203-32-BN	FM-203-32-BN-DLC	
EXTRA LONG	1"	1"	1"	Sq. End	4"	6"	FM-204-32	FM-204-32-DLC	
	1"	1"	1"	0.03"	4"	6"	FM-204-32-030	FM-204-32-030-DLC	
	1"	1"	1"	0.06"	4"	6"	FM-204-32-060	FM-204-32-060-DLC	
	1"	1"	1"	0.09"	4"	6"	FM-204-32-090	FM-204-32-090-DLC	
	1"	1"	1"	0.12"	4"	6"	FM-204-32-120	FM-204-32-120-DLC	
	1"	1"	1"	Ball End	4"	6"	FM-204-32-BN	FM-204-32-BN-DLC	

*Other Reach Lengths available upon request.

Need a Different Reach?

Any neck length available at same price!

Eliminate Tool Pull Out!
 ALL Tools h4 Shank Tolerance
 up to 150% more gripping force
Tightest in the Industry!

FM SERIES SPEEDS & FEEDS

Tool Diameter	Typical Z-Depth	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
		RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
1/4"	0.1500	Max	0.0040	Max	0.0035	Max	0.0040	Max	0.0040
5/16"	0.1500	Max	0.0050	Max	0.0044	Max	0.0050	Max	0.0050
3/8"	3/16"	Max	0.0060	Max	0.0053	Max	0.0060	Max	0.0060
1/2"	0.2000	Max	0.0080	Max	0.0070	Max	0.0080	Max	0.0080
5/8"	0.2000	Max	0.0100	Max	0.0088	Max	0.0100	Max	0.0100
3/4"	1/4"	Max	0.0120	Max	0.0105	Max	0.0120	Max	0.0120
1	1/4"	Max	0.0160	Max	0.0140	Max	0.0160	Max	0.0160

Z-Depth of cut per pass should be deeper than the corner radius to help reduce chatter

FM 3 Flute High Performance Tools for Aluminum



Characteristics

- Square End
- Corner Radius
- Ball End
- 3 Flute
- 40° Helix
- Feather Blend
- Necked
- Mirror Edge

Applications

- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Wet

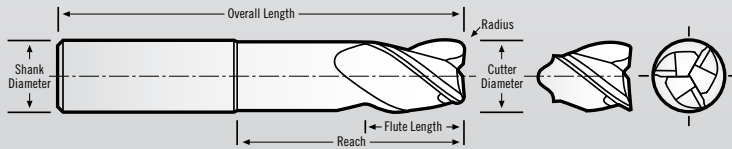
Materials

- Aluminum
- Copper
- Magnesium
- BRASS

Coatings

- Diamond-Like Carbon (DLC)

FM Series comes with Mirror Edge!
for Chatter Reduction



FM Series Tolerances:
 Cutting Dia. = $-.0007/-0.0015$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+.060/-0.000$
 OAL = ± 0.060

Eliminate Tool Pull Out!
ALL Tools h4 Shank Tolerance up to 150% more gripping force
Tightest in the Industry!



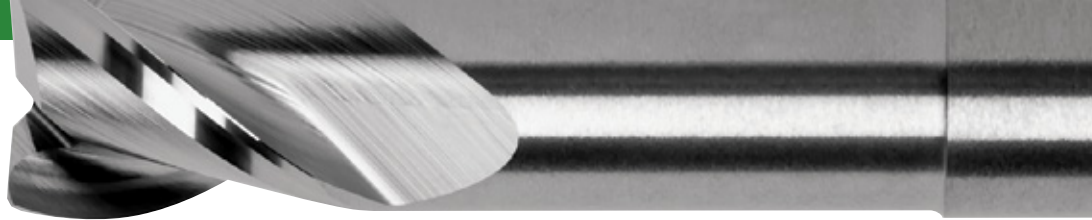
FM 3 Flute (Short to Long Reach)



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
SHORT	1/4"	1/4"	1/4"	Sq. End	5/8"	3"	FM-301-08	FM-301-08-DLC	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	5/8"	3"	FM-301-08-030	FM-301-08-030-DLC	
	1/4"	1/4"	1/4"	0.06"	5/8"	3"	FM-301-08-060	FM-301-08-060-DLC	
	1/4"	1/4"	1/4"	0.09"	5/8"	3"	FM-301-08-090	FM-301-08-090-DLC	
	1/4"	1/4"	1/4"	Ball End	5/8"	3"	FM-301-08-BN	FM-301-08-BN-DLC	
MEDIUM	1/4"	1/4"	1/4"	Sq. End	7/8"	3"	FM-302-08	FM-302-08-DLC	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	7/8"	3"	FM-302-08-030	FM-302-08-030-DLC	
	1/4"	1/4"	1/4"	0.06"	7/8"	3"	FM-302-08-060	FM-302-08-060-DLC	
	1/4"	1/4"	1/4"	0.09"	7/8"	3"	FM-302-08-090	FM-302-08-090-DLC	
	1/4"	1/4"	1/4"	Ball End	7/8"	3"	FM-302-08-BN	FM-302-08-BN-DLC	
LONG	1/4"	1/4"	1/4"	Sq. End	1-1/16"	3"	FM-304-08	FM-304-08-DLC	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	1-1/16"	3"	FM-304-08-030	FM-304-08-030-DLC	
	1/4"	1/4"	1/4"	0.06"	1-1/16"	3"	FM-304-08-060	FM-304-08-060-DLC	
	1/4"	1/4"	1/4"	0.09"	1-1/16"	3"	FM-304-08-090	FM-304-08-090-DLC	
	1/4"	1/4"	1/4"	Ball End	1-1/16"	3"	FM-304-08-BN	FM-304-08-BN-DLC	
EXTRA LONG	1/4"	1/4"	1/4"	Sq. End	1-1/2"	3"	FM-305-08	FM-305-08-DLC	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	1-1/2"	3"	FM-305-08-030	FM-305-08-030-DLC	
	1/4"	1/4"	1/4"	0.06"	1-1/2"	3"	FM-305-08-060	FM-305-08-060-DLC	
	1/4"	1/4"	1/4"	0.09"	1-1/2"	3"	FM-305-08-090	FM-305-08-090-DLC	
	1/4"	1/4"	1/4"	Ball End	1-1/2"	3"	FM-305-08-BN	FM-305-08-BN-DLC	
SHORT	5/16"	5/16"	5/16"	Sq. End	7/8"	3-1/8"	FM-301-10	FM-301-10-DLC	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	7/8"	3-1/8"	FM-301-10-030	FM-301-10-030-DLC	
	5/16"	5/16"	5/16"	0.06"	7/8"	3-1/8"	FM-301-10-060	FM-301-10-060-DLC	
	5/16"	5/16"	5/16"	0.09"	7/8"	3-1/8"	FM-301-10-090	FM-301-10-090-DLC	
	5/16"	5/16"	5/16"	0.12"	7/8"	3-1/8"	FM-301-10-120	FM-301-10-120-DLC	
	5/16"	5/16"	5/16"	Ball End	7/8"	3-1/8"	FM-301-10-BN	FM-301-10-BN-DLC	
	5/16"	5/16"	5/16"	Sq. End	1-3/32"	3-1/8"	FM-302-10	FM-302-10-DLC	
	5/16"	5/16"	5/16"	0.03"	1-3/32"	3-1/8"	FM-302-10-030	FM-302-10-030-DLC	
	5/16"	5/16"	5/16"	0.06"	1-3/32"	3-1/8"	FM-302-10-060	FM-302-10-060-DLC	
	5/16"	5/16"	5/16"	0.09"	1-3/32"	3-1/8"	FM-302-10-090	FM-302-10-090-DLC	
MEDIUM	5/16"	5/16"	5/16"	0.12"	1-3/32"	3-1/8"	FM-302-10-120	FM-302-10-120-DLC	5/16" DIAMETER
	5/16"	5/16"	5/16"	Ball End	1-3/32"	3-1/8"	FM-302-10-BN	FM-302-10-BN-DLC	

*Other Reach Lengths available upon request.

NEW!



Aluminum

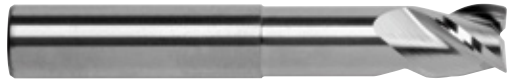
FM 3 Flute (Short to Long Reach) – continued



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
LONG	5/16"	5/16"	5/16"	Sq. End	1-5/16"	3-1/8"	FM-304-10	FM-304-10-DLC	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	1-5/16"	3-1/8"	FM-304-10-030	FM-304-10-030-DLC	
	5/16"	5/16"	5/16"	0.06"	1-5/16"	3-1/8"	FM-304-10-060	FM-304-10-060-DLC	
	5/16"	5/16"	5/16"	0.09"	1-5/16"	3-1/8"	FM-304-10-090	FM-304-10-090-DLC	
	5/16"	5/16"	5/16"	0.12"	1-5/16"	3-1/8"	FM-304-10-120	FM-304-10-120-DLC	
	5/16"	5/16"	5/16"	Ball End	1-5/16"	3-1/8"	FM-304-10-BN	FM-304-10-BN-DLC	
EXTRA LONG	5/16"	5/16"	5/16"	Sq. End	1-5/8"	3-1/8"	FM-305-10	FM-305-10-DLC	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	1-5/8"	3-1/8"	FM-305-10-030	FM-305-10-030-DLC	
	5/16"	5/16"	5/16"	0.06"	1-5/8"	3-1/8"	FM-305-10-060	FM-305-10-060-DLC	
	5/16"	5/16"	5/16"	0.09"	1-5/8"	3-1/8"	FM-305-10-090	FM-305-10-090-DLC	
	5/16"	5/16"	5/16"	0.12"	1-5/8"	3-1/8"	FM-305-10-120	FM-305-10-120-DLC	
	5/16"	5/16"	5/16"	Ball End	1-5/8"	3-1/8"	FM-305-10-BN	FM-305-10-BN-DLC	
SHORT	3/8"	3/8"	3/8"	Sq. End	1"	4"	FM-301-12	FM-301-12-DLC	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	1"	4"	FM-301-12-030	FM-301-12-030-DLC	
	3/8"	3/8"	3/8"	0.06"	1"	4"	FM-301-12-060	FM-301-12-060-DLC	
	3/8"	3/8"	3/8"	0.09"	1"	4"	FM-301-12-090	FM-301-12-090-DLC	
	3/8"	3/8"	3/8"	0.12"	1"	4"	FM-301-12-120	FM-301-12-120-DLC	
	3/8"	3/8"	3/8"	Ball End	1"	4"	FM-301-12-BN	FM-301-12-BN-DLC	
MEDIUM	3/8"	3/8"	3/8"	Sq. End	1-1/4"	4"	FM-302-12	FM-302-12-DLC	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	1-1/4"	4"	FM-302-12-030	FM-302-12-030-DLC	
	3/8"	3/8"	3/8"	0.06"	1-1/4"	4"	FM-302-12-060	FM-302-12-060-DLC	
	3/8"	3/8"	3/8"	0.09"	1-1/4"	4"	FM-302-12-090	FM-302-12-090-DLC	
	3/8"	3/8"	3/8"	0.12"	1-1/4"	4"	FM-302-12-120	FM-302-12-120-DLC	
	3/8"	3/8"	3/8"	Ball End	1-1/4"	4"	FM-302-12-BN	FM-302-12-BN-DLC	
LONG	3/8"	3/8"	3/8"	Sq. End	1-9/16"	4"	FM-304-12	FM-304-12-DLC	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	1-9/16"	4"	FM-304-12-030	FM-304-12-030-DLC	
	3/8"	3/8"	3/8"	0.06"	1-9/16"	4"	FM-304-12-060	FM-304-12-060-DLC	
	3/8"	3/8"	3/8"	0.09"	1-9/16"	4"	FM-304-12-090	FM-304-12-090-DLC	
	3/8"	3/8"	3/8"	0.12"	1-9/16"	4"	FM-304-12-120	FM-304-12-120-DLC	
	3/8"	3/8"	3/8"	Ball End	1-9/16"	4"	FM-304-12-BN	FM-304-12-BN-DLC	
EXTRA LONG	3/8"	3/8"	3/8"	Sq. End	2-1/8"	4"	FM-305-12	FM-305-12-DLC	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	2-1/8"	4"	FM-305-12-030	FM-305-12-030-DLC	
	3/8"	3/8"	3/8"	0.06"	2-1/8"	4"	FM-305-12-060	FM-305-12-060-DLC	
	3/8"	3/8"	3/8"	0.09"	2-1/8"	4"	FM-305-12-090	FM-305-12-090-DLC	
	3/8"	3/8"	3/8"	0.12"	2-1/8"	4"	FM-305-12-120	FM-305-12-120-DLC	
	3/8"	3/8"	3/8"	Ball End	2-1/8"	4"	FM-305-12-BN	FM-305-12-BN-DLC	
SHORT	1/2"	1/2"	1/2"	Sq. End	1-1/4"	5"	FM-301-16	FM-301-16-DLC	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	1-1/4"	5"	FM-301-16-030	FM-301-16-030-DLC	
	1/2"	1/2"	1/2"	0.06"	1-1/4"	5"	FM-301-16-060	FM-301-16-060-DLC	
	1/2"	1/2"	1/2"	0.09"	1-1/4"	5"	FM-301-16-090	FM-301-16-090-DLC	
	1/2"	1/2"	1/2"	0.12"	1-1/4"	5"	FM-301-16-120	FM-301-16-120-DLC	
	1/2"	1/2"	1/2"	Ball End	1-1/4"	5"	FM-301-16-BN	FM-301-16-BN-DLC	
MEDIUM	1/2"	1/2"	1/2"	Sq. End	1-5/8"	5"	FM-302-16	FM-302-16-DLC	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	1-5/8"	5"	FM-302-16-030	FM-302-16-030-DLC	
	1/2"	1/2"	1/2"	0.06"	1-5/8"	5"	FM-302-16-060	FM-302-16-060-DLC	
	1/2"	1/2"	1/2"	0.09"	1-5/8"	5"	FM-302-16-090	FM-302-16-090-DLC	
	1/2"	1/2"	1/2"	0.12"	1-5/8"	5"	FM-302-16-120	FM-302-16-120-DLC	
	1/2"	1/2"	1/2"	Ball End	1-5/8"	5"	FM-302-16-BN	FM-302-16-BN-DLC	
LONG	1/2"	1/2"	1/2"	Sq. End	2-1/8"	5"	FM-304-16	FM-304-16-DLC	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	2-1/8"	5"	FM-304-16-030	FM-304-16-030-DLC	
	1/2"	1/2"	1/2"	0.06"	2-1/8"	5"	FM-304-16-060	FM-304-16-060-DLC	
	1/2"	1/2"	1/2"	0.09"	2-1/8"	5"	FM-304-16-090	FM-304-16-090-DLC	
	1/2"	1/2"	1/2"	0.12"	2-1/8"	5"	FM-304-16-120	FM-304-16-120-DLC	
	1/2"	1/2"	1/2"	Ball End	2-1/8"	5"	FM-304-16-BN	FM-304-16-BN-DLC	

*Other Reach Lengths available upon request.

FM 3 Flute High Performance Tools for Aluminum

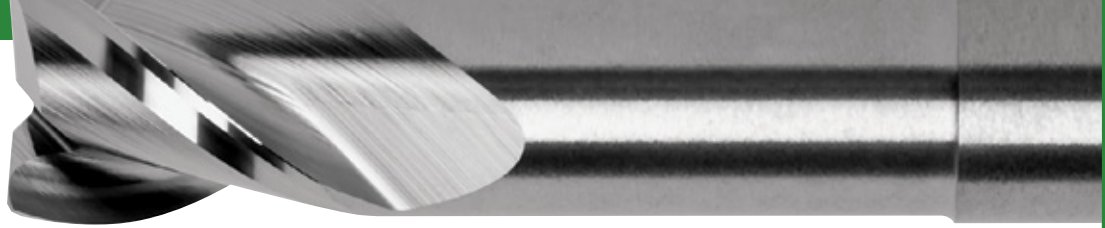


**Eliminate
Tool Pull Out!**
ALL Tools h4 Shank Tolerance
up to 150% more gripping force
**Tightest in the
Industry!**

FM 3 Flute (Short to Long Reach) — continued

	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number Coated	
EXTRA LONG	1/2"	1/2"	1/2"	Sq. End	2-5/8"	5"	FM-305-16	FM-305-16-DLC	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03	2-5/8"	5"	FM-305-16-030	FM-305-16-030-DLC	
	1/2"	1/2"	1/2"	0.06	2-5/8"	5"	FM-305-16-060	FM-305-16-060-DLC	
	1/2"	1/2"	1/2"	0.09	2-5/8"	5"	FM-305-16-090	FM-305-16-090-DLC	
	1/2"	1/2"	1/2"	0.12	2-5/8"	5"	FM-305-16-120	FM-305-16-120-DLC	
	1/2"	1/2"	1/2"	Ball End	2-5/8"	5"	FM-305-16-BN	FM-305-16-BN-DLC	
SHORT	5/8"	5/8"	5/8"	Sq. End	1-1/2"	6"	FM-301-20	FM-301-20-DLC	5/8" DIAMETER
	5/8"	5/8"	5/8"	0.03	1-1/2"	6"	FM-301-20-030	FM-301-20-030-DLC	
	5/8"	5/8"	5/8"	0.06	1-1/2"	6"	FM-301-20-060	FM-301-20-060-DLC	
	5/8"	5/8"	5/8"	0.09	1-1/2"	6"	FM-301-20-090	FM-301-20-090-DLC	
	5/8"	5/8"	5/8"	0.12	1-1/2"	6"	FM-301-20-120	FM-301-20-120-DLC	
	5/8"	5/8"	5/8"	Ball End	1-1/2"	6"	FM-301-20-BN	FM-301-20-BN-DLC	
MEDIUM	5/8"	5/8"	5/8"	Sq. End	2-1/16"	6"	FM-302-20	FM-302-20-DLC	
	5/8"	5/8"	5/8"	0.03	2-1/16"	6"	FM-302-20-030	FM-302-20-030-DLC	
	5/8"	5/8"	5/8"	0.06	2-1/16"	6"	FM-302-20-060	FM-302-20-060-DLC	
	5/8"	5/8"	5/8"	0.09	2-1/16"	6"	FM-302-20-090	FM-302-20-090-DLC	
	5/8"	5/8"	5/8"	0.12	2-1/16"	6"	FM-302-20-120	FM-302-20-120-DLC	
	5/8"	5/8"	5/8"	Ball End	2-1/16"	6"	FM-302-20-BN	FM-302-20-BN-DLC	
LONG	5/8"	5/8"	5/8"	Sq. End	2-5/8"	6"	FM-304-20	FM-304-20-DLC	
	5/8"	5/8"	5/8"	0.03	2-5/8"	6"	FM-304-20-030	FM-304-20-030-DLC	
	5/8"	5/8"	5/8"	0.06	2-5/8"	6"	FM-304-20-060	FM-304-20-060-DLC	
	5/8"	5/8"	5/8"	0.09	2-5/8"	6"	FM-304-20-090	FM-304-20-090-DLC	
	5/8"	5/8"	5/8"	0.12	2-5/8"	6"	FM-304-20-120	FM-304-20-120-DLC	
	5/8"	5/8"	5/8"	Ball End	2-5/8"	6"	FM-304-20-BN	FM-304-20-BN-DLC	
EXTRA LONG	5/8"	5/8"	5/8"	Sq. End	3-1/8"	6"	FM-305-20	FM-305-20-DLC	
	5/8"	5/8"	5/8"	0.03	3-1/8"	6"	FM-305-20-030	FM-305-20-030-DLC	
	5/8"	5/8"	5/8"	0.06	3-1/8"	6"	FM-305-20-060	FM-305-20-060-DLC	
	5/8"	5/8"	5/8"	0.09	3-1/8"	6"	FM-305-20-090	FM-305-20-090-DLC	
	5/8"	5/8"	5/8"	0.12	3-1/8"	6"	FM-305-20-120	FM-305-20-120-DLC	
	5/8"	5/8"	5/8"	Ball End	3-1/8"	6"	FM-305-20-BN	FM-305-20-BN-DLC	
SHORT	3/4"	3/4"	3/4"	Sq. End	2"	6"	FM-301-24	FM-301-24-DLC	3/4" DIAMETER
	3/4"	3/4"	3/4"	0.03	2"	6"	FM-301-24-030	FM-301-24-030-DLC	
	3/4"	3/4"	3/4"	0.06	2"	6"	FM-301-24-060	FM-301-24-060-DLC	
	3/4"	3/4"	3/4"	0.09	2"	6"	FM-301-24-090	FM-301-24-090-DLC	
	3/4"	3/4"	3/4"	0.12	2"	6"	FM-301-24-120	FM-301-24-120-DLC	
	3/4"	3/4"	3/4"	Ball End	2"	6"	FM-301-24-BN	FM-301-24-BN-DLC	
MEDIUM	3/4"	3/4"	3/4"	Sq. End	2-9/16"	6"	FM-302-24	FM-302-24-DLC	
	3/4"	3/4"	3/4"	0.03	2-9/16"	6"	FM-302-24-030	FM-302-24-030-DLC	
	3/4"	3/4"	3/4"	0.06	2-9/16"	6"	FM-302-24-060	FM-302-24-060-DLC	
	3/4"	3/4"	3/4"	0.09	2-9/16"	6"	FM-302-24-090	FM-302-24-090-DLC	
	3/4"	3/4"	3/4"	0.12	2-9/16"	6"	FM-302-24-120	FM-302-24-120-DLC	
	3/4"	3/4"	3/4"	Ball End	2-9/16"	6"	FM-302-24-BN	FM-302-24-BN-DLC	
LONG	3/4"	3/4"	3/4"	Sq. End	3-1/8"	6"	FM-304-24	FM-304-24-DLC	
	3/4"	3/4"	3/4"	0.03	3-1/8"	6"	FM-304-24-030	FM-304-24-030-DLC	
	3/4"	3/4"	3/4"	0.06	3-1/8"	6"	FM-304-24-060	FM-304-24-060-DLC	
	3/4"	3/4"	3/4"	0.09	3-1/8"	6"	FM-304-24-090	FM-304-24-090-DLC	
	3/4"	3/4"	3/4"	0.12	3-1/8"	6"	FM-304-24-120	FM-304-24-120-DLC	
	3/4"	3/4"	3/4"	Ball End	3-1/8"	6"	FM-304-24-BN	FM-304-24-BN-DLC	
EXTRA LONG	3/4"	3/4"	3/4"	Sq. End	3-3/4"	6"	FM-305-24	FM-305-24-DLC	
	3/4"	3/4"	3/4"	0.03	3-3/4"	6"	FM-305-24-030	FM-305-24-030-DLC	
	3/4"	3/4"	3/4"	0.06	3-3/4"	6"	FM-305-24-060	FM-305-24-060-DLC	
	3/4"	3/4"	3/4"	0.09	3-3/4"	6"	FM-305-24-090	FM-305-24-090-DLC	
	3/4"	3/4"	3/4"	0.12	3-3/4"	6"	FM-305-24-120	FM-305-24-120-DLC	
	3/4"	3/4"	3/4"	Ball End	3-3/4"	6"	FM-305-24-BN	FM-304-24-BN-DLC	

*Other Reach Lengths available upon request.



FM 3 Flute (Short to Long Reach) – continued



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
SHORT	1"	1"	1"	Sq. End	2"	6"	FM-301-32	FM-301-32-DLC	1" DIAMETER
	1"	1"	1"	0.03"	2"	6"	FM-301-32-030	FM-301-32-030-DLC	
	1"	1"	1"	0.06"	2"	6"	FM-301-32-060	FM-301-32-060-DLC	
	1"	1"	1"	0.09"	2"	6"	FM-301-32-090	FM-301-32-090-DLC	
	1"	1"	1"	0.12"	2"	6"	FM-301-32-120	FM-301-32-120-DLC	
	1"	1"	1"	Ball End	2"	6"	FM-301-32-BN	FM-301-32-BN-DLC	
MEDIUM	1"	1"	1"	Sq. End	3"	6"	FM-302-32	FM-302-32-DLC	
	1"	1"	1"	0.03"	3"	6"	FM-302-32-030	FM-302-32-030-DLC	
	1"	1"	1"	0.06"	3"	6"	FM-302-32-060	FM-302-32-060-DLC	
	1"	1"	1"	0.09"	3"	6"	FM-302-32-090	FM-302-32-090-DLC	
	1"	1"	1"	0.12"	3"	6"	FM-302-32-120	FM-302-32-120-DLC	
	1"	1"	1"	Ball End	3"	6"	FM-302-32-BN	FM-302-32-BN-DLC	
LONG	1"	1"	1"	Sq. End	3-1/2"	6"	FM-303-32	FM-303-32-DLC	
	1"	1"	1"	0.03"	3-1/2"	6"	FM-303-32-030	FM-303-32-030-DLC	
	1"	1"	1"	0.06"	3-1/2"	6"	FM-303-32-060	FM-303-32-060-DLC	
	1"	1"	1"	0.09"	3-1/2"	6"	FM-303-32-090	FM-303-32-090-DLC	
	1"	1"	1"	0.12"	3-1/2"	6"	FM-303-32-120	FM-303-32-120-DLC	
	1"	1"	1"	Ball End	3-1/2"	6"	FM-303-32-BN	FM-303-32-BN-DLC	
EXTRA LONG	1"	1"	1"	Sq. End	4"	6"	FM-304-32	FM-304-32-DLC	
	1"	1"	1"	0.03"	4"	6"	FM-304-32-030	FM-304-32-030-DLC	
	1"	1"	1"	0.06"	4"	6"	FM-304-32-060	FM-304-32-060-DLC	
	1"	1"	1"	0.09"	4"	6"	FM-304-32-090	FM-304-32-090-DLC	
	1"	1"	1"	0.12"	4"	6"	FM-304-32-120	FM-304-32-120-DLC	
	1"	1"	1"	Ball End	4"	6"	FM-304-32-BN	FM-304-32-BN-DLC	

*Other Reach Lengths available upon request.

Need a Different Reach?

Any neck length available at same price!

FM SERIES SPEEDS & FEEDS

Tool Diameter	Typical Z-Depth	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
		RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
1/4"	0.1500	Max	0.0040	Max	0.0035	Max	0.0040	Max	0.0040
5/16"	0.1500	Max	0.0050	Max	0.0044	Max	0.0050	Max	0.0050
3/8"	3/16"	Max	0.0060	Max	0.0053	Max	0.0060	Max	0.0060
1/2"	0.2000	Max	0.0080	Max	0.0070	Max	0.0080	Max	0.0080
5/8"	0.2000	Max	0.0100	Max	0.0088	Max	0.0100	Max	0.0100
3/4"	1/4"	Max	0.0120	Max	0.0105	Max	0.0120	Max	0.0120
1	1/4"	Max	0.0160	Max	0.0140	Max	0.0160	Max	0.0160

Z-Depth of cut per pass should be deeper than the corner radius to help reduce chatter

MFM Metric 2 Flute High Performance Tools for Aluminum

Characteristics

- Corner Radius
- 2 Flute
- 40° Helix
- Feather Blend
- Necked
- Mirror Edge

Applications

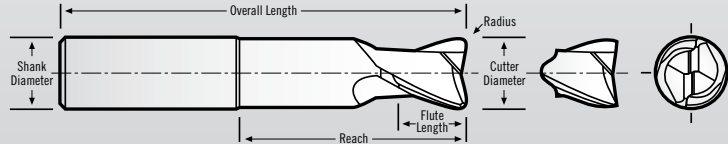
- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- 3-D
- Roughing
- Semi-Finishing
- Finishing
- Wet

Materials

- Aluminum
- Copper
- Magnesium
- BRASS

Coatings

- Diamond-Like Carbon (DLC)



MFM Series comes with Mirror Edge!
for Chatter Reduction

Eliminate Tool Pull Out!
ALL Tools h4 Shank Tolerance up to 150% more gripping force
Tightest in the Industry!

MFM Series Tolerances:

Cutting Dia. = -0.018/-0.038 mm
 Shank Dia. = -0.002/-0.005 mm
 Flute Length (<10D) = +0.750/-0.000 mm
 (>10D) = +1.500/-0.000 mm
 OAL = +/- 10 mm

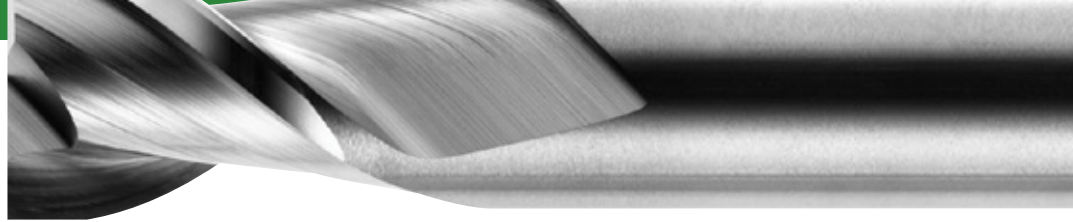


MFM 2 Flute Metric (Short to Long Reach) METRIC



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
S	6mm	6mm	7mm	Sq. End	12mm	75mm	MFM-201-06	MFM-201-06-DLC	6 mm DIAMETER
	6mm	6mm	7mm	0.5mm	12mm	75mm	MFM-201-06-050	MFM-201-06-050-DLC	
	6mm	6mm	7mm	1.0mm	12mm	75mm	MFM-201-06-100	MFM-201-06-100-DLC	
	6mm	6mm	7mm	Ball End	12mm	75mm	MFM-201-06-BN	MFM-201-06-BN-DLC	
M	6mm	6mm	7mm	Sq. End	18mm	75mm	MFM-202-06	MFM-202-06-DLC	
	6mm	6mm	7mm	0.5mm	18mm	75mm	MFM-202-06-050	MFM-202-06-050-DLC	
	6mm	6mm	7mm	1.0mm	18mm	75mm	MFM-202-06-100	MFM-202-06-100-DLC	
L	6mm	6mm	7mm	Ball End	18mm	75mm	MFM-202-06-BN	MFM-202-06-BN-DLC	
	6mm	6mm	7mm	Sq. End	24mm	75mm	MFM-203-06	MFM-203-06-DLC	
	6mm	6mm	7mm	0.5mm	24mm	75mm	MFM-203-06-050	MFM-203-06-050-DLC	
XL	6mm	6mm	7mm	1.0mm	24mm	75mm	MFM-203-06-100	MFM-203-06-100-DLC	
	6mm	6mm	7mm	Ball End	24mm	75mm	MFM-203-06-BN	MFM-203-06-BN-DLC	
	6mm	6mm	7mm	Sq. End	30mm	75mm	MFM-204-06	MFM-204-06-DLC	
SHORT	6mm	6mm	7mm	0.5mm	30mm	75mm	MFM-204-06-050	MFM-204-06-050-DLC	
	6mm	6mm	7mm	1.0mm	30mm	75mm	MFM-204-06-100	MFM-204-06-100-DLC	
	6mm	6mm	7mm	Ball End	30mm	75mm	MFM-204-06-BN	MFM-204-06-BN-DLC	
MED	8mm	8mm	9mm	Sq. End	16mm	80mm	MFM-201-08	MFM-201-08-DLC	8 mm DIAMETER
	8mm	8mm	9mm	1.0mm	16mm	80mm	MFM-201-08-100	MFM-201-08-100-DLC	
	8mm	8mm	9mm	2.0mm	16mm	80mm	MFM-201-08-200	MFM-201-08-200-DLC	
	8mm	8mm	9mm	2.5mm	16mm	80mm	MFM-201-08-250	MFM-201-08-250-DLC	
	8mm	8mm	9mm	Ball End	16mm	80mm	MFM-201-08-BN	MFM-201-08-BN-DLC	
LONG	8mm	8mm	9mm	Sq. End	24mm	80mm	MFM-202-08	MFM-202-08-DLC	
	8mm	8mm	9mm	1.0mm	24mm	80mm	MFM-202-08-100	MFM-202-08-100-DLC	
	8mm	8mm	9mm	2.0mm	24mm	80mm	MFM-202-08-200	MFM-202-08-200-DLC	
	8mm	8mm	9mm	2.5mm	24mm	80mm	MFM-202-08-250	MFM-202-08-250-DLC	
	8mm	8mm	9mm	Ball End	24mm	80mm	MFM-202-08-BN	MFM-202-08-BN-DLC	
X LONG	8mm	8mm	9mm	Sq. End	32mm	80mm	MFM-203-08	MFM-203-08-DLC	
	8mm	8mm	9mm	1.0mm	32mm	80mm	MFM-203-08-100	MFM-203-08-100-DLC	
	8mm	8mm	9mm	2.0mm	32mm	80mm	MFM-203-08-200	MFM-203-08-200-DLC	
	8mm	8mm	9mm	2.5mm	32mm	80mm	MFM-203-08-250	MFM-203-08-250-DLC	
	8mm	8mm	9mm	Ball End	32mm	80mm	MFM-203-08-BN	MFM-203-08-BN-DLC	
X LONG	8mm	8mm	9mm	Sq. End	40mm	80mm	MFM-204-08	MFM-204-08-DLC	
	8mm	8mm	9mm	1.0mm	40mm	80mm	MFM-204-08-100	MFM-204-08-100-DLC	
	8mm	8mm	9mm	2.0mm	40mm	80mm	MFM-204-08-200	MFM-204-08-200-DLC	
	8mm	8mm	9mm	2.5mm	40mm	80mm	MFM-204-08-250	MFM-204-08-250-DLC	
	8mm	8mm	9mm	Ball End	40mm	80mm	MFM-204-08-BN	MFM-204-08-BN-DLC	

*Other Reach Lengths available upon request.



MFM 2 Flute Metric (Short to Long Reach) **METRIC** – continued



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
S	10mm	10mm	11mm	Sq. End	20mm	100mm	MFM-201-10	MFM-201-10-DLC	10 mm DIAMETER
	10mm	10mm	11mm	1.5mm	20mm	100mm	MFM-201-10-150	MFM-201-10-150-DLC	
	10mm	10mm	11mm	2.5mm	20mm	100mm	MFM-201-10-250	MFM-201-10-250-DLC	
	10mm	10mm	11mm	Ball End	20mm	100mm	MFM-201-10-BN	MFM-201-10-BN-DLC	
M	10mm	10mm	11mm	Sq. End	30mm	100mm	MFM-202-10	MFM-202-10-DLC	
	10mm	10mm	11mm	1.5mm	30mm	100mm	MFM-202-10-150	MFM-202-10-150-DLC	
	10mm	10mm	11mm	2.5mm	30mm	100mm	MFM-202-10-250	MFM-202-10-250-DLC	
	10mm	10mm	11mm	Ball End	30mm	100mm	MFM-202-10-BN	MFM-202-10-BN-DLC	
L	10mm	10mm	11mm	Sq. End	40mm	100mm	MFM-203-10	MFM-203-10-DLC	
	10mm	10mm	11mm	1.5mm	40mm	100mm	MFM-203-10-150	MFM-203-10-150-DLC	
	10mm	10mm	11mm	2.5mm	40mm	100mm	MFM-203-10-250	MFM-203-10-250-DLC	
	10mm	10mm	11mm	Ball End	40mm	100mm	MFM-203-10-BN	MFM-203-10-BN-DLC	
XL	10mm	10mm	11mm	Sq. End	50mm	100mm	MFM-204-10	MFM-204-10-DLC	
	10mm	10mm	11mm	1.5mm	50mm	100mm	MFM-204-10-150	MFM-204-10-150-DLC	
	10mm	10mm	11mm	2.5mm	50mm	100mm	MFM-204-10-250	MFM-204-10-250-DLC	
	10mm	10mm	11mm	Ball End	50mm	100mm	MFM-204-10-BN	MFM-204-10-BN-DLC	
S	12mm	12mm	13mm	Sq. End	24mm	110mm	MFM-201-12	MFM-201-12-DLC	12 mm DIAMETER
	12mm	12mm	13mm	1.5mm	24mm	110mm	MFM-201-12-150	MFM-201-12-150-DLC	
	12mm	12mm	13mm	2.5mm	24mm	110mm	MFM-201-12-250	MFM-201-12-250-DLC	
	12mm	12mm	13mm	4.0mm	24mm	110mm	MFM-201-12-400	MFM-201-12-400-DLC	
	12mm	12mm	13mm	Ball End	24mm	110mm	MFM-201-12-BN	MFM-201-12-BN-DLC	
M	12mm	12mm	13mm	Sq. End	36mm	110mm	MFM-202-12	MFM-202-12-DLC	
	12mm	12mm	13mm	1.5mm	36mm	110mm	MFM-202-12-150	MFM-202-12-150-DLC	
	12mm	12mm	13mm	2.5mm	36mm	110mm	MFM-202-12-250	MFM-202-12-250-DLC	
	12mm	12mm	13mm	4.0mm	36mm	110mm	MFM-202-12-400	MFM-202-12-400-DLC	
	12mm	12mm	13mm	Ball End	36mm	110mm	MFM-202-12-BN	MFM-202-12-BN-DLC	
L	12mm	12mm	13mm	Sq. End	48mm	110mm	MFM-203-12	MFM-203-12-DLC	
	12mm	12mm	13mm	1.5mm	48mm	110mm	MFM-203-12-150	MFM-203-12-150-DLC	
	12mm	12mm	13mm	2.5mm	48mm	110mm	MFM-203-12-250	MFM-203-12-250-DLC	
	12mm	12mm	13mm	4.0mm	48mm	110mm	MFM-203-12-400	MFM-203-12-400-DLC	
	12mm	12mm	13mm	Ball End	48mm	110mm	MFM-203-12-BN	MFM-203-12-BN-DLC	
XL	12mm	12mm	13mm	Sq. End	60mm	110mm	MFM-204-12	MFM-204-12-DLC	
	12mm	12mm	13mm	1.5mm	60mm	110mm	MFM-204-12-150	MFM-204-12-150-DLC	
	12mm	12mm	13mm	2.5mm	60mm	110mm	MFM-204-12-250	MFM-204-12-250-DLC	
	12mm	12mm	13mm	4.0mm	60mm	110mm	MFM-204-12-400	MFM-204-12-400-DLC	
	12mm	12mm	13mm	Ball End	60mm	110mm	MFM-204-12-BN	MFM-204-12-BN-DLC	
SHORT	16mm	16mm	17mm	Sq. End	32mm	130mm	MFM-201-16	MFM-201-16-DLC	16 mm DIAMETER
	16mm	16mm	17mm	2.0mm	32mm	130mm	MFM-201-16-200	MFM-201-16-200-DLC	
	16mm	16mm	17mm	2.5mm	32mm	130mm	MFM-201-16-250	MFM-201-16-250-DLC	
	16mm	16mm	17mm	3.0mm	32mm	130mm	MFM-201-16-300	MFM-201-16-300-DLC	
	16mm	16mm	17mm	4.0mm	32mm	130mm	MFM-201-16-400	MFM-201-16-400-DLC	
16mm	16mm	17mm	Ball End	32mm	130mm	MFM-201-16-BN	MFM-201-16-BN-DLC		
MEDIUM	16mm	16mm	17mm	Sq. End	48mm	130mm	MFM-202-16	MFM-202-16-DLC	
	16mm	16mm	17mm	2.0mm	48mm	130mm	MFM-202-16-200	MFM-202-16-200-DLC	
	16mm	16mm	17mm	2.5mm	48mm	130mm	MFM-202-16-250	MFM-202-16-250-DLC	
	16mm	16mm	17mm	3.0mm	48mm	130mm	MFM-202-16-300	MFM-202-16-300-DLC	
	16mm	16mm	17mm	4.0mm	48mm	130mm	MFM-202-16-400	MFM-202-16-400-DLC	
16mm	16mm	17mm	Ball End	48mm	130mm	MFM-202-16-BN	MFM-202-16-BN-DLC		
LONG	16mm	16mm	17mm	Sq. End	64mm	130mm	MFM-203-16	MFM-203-16-DLC	
	16mm	16mm	17mm	2.0mm	64mm	130mm	MFM-203-16-200	MFM-203-16-200-DLC	
	16mm	16mm	17mm	2.5mm	64mm	130mm	MFM-203-16-250	MFM-203-16-250-DLC	
	16mm	16mm	17mm	3.0mm	64mm	130mm	MFM-203-16-300	MFM-203-16-300-DLC	
	16mm	16mm	17mm	4.0mm	64mm	130mm	MFM-203-16-400	MFM-203-16-400-DLC	
16mm	16mm	17mm	Ball End	64mm	130mm	MFM-203-16-BN	MFM-203-16-BN-DLC		

*Other Reach Lengths available upon request.

MFM Metric 2 Flute High Performance Tools for Aluminum



MFM 2 Flute Metric (Short to Long Reach) **METRIC** — continued



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
X LONG	16mm	16mm	17mm	Sq. End	80mm	130mm	MFM-204-16	MFM-204-16-DLC	16 mm DIAMETER
	16mm	16mm	17mm	2.0mm	80mm	130mm	MFM-204-16-200	MFM-204-16-200-DLC	
	16mm	16mm	17mm	2.5mm	80mm	130mm	MFM-204-16-250	MFM-204-16-250-DLC	
	16mm	16mm	17mm	3.0mm	80mm	130mm	MFM-204-16-300	MFM-204-16-300-DLC	
	16mm	16mm	17mm	4.0mm	80mm	130mm	MFM-204-16-400	MFM-204-16-400-DLC	
	16mm	16mm	17mm	Ball End	80mm	130mm	MFM-204-16-BN	MFM-204-16-BN-DLC	
SHORT	20mm	20mm	21mm	Sq. End	40mm	150mm	MFM-201-20	MFM-201-20-DLC	20 mm DIAMETER
	20mm	20mm	21mm	2.0mm	40mm	150mm	MFM-201-20-200	MFM-201-20-200-DLC	
	20mm	20mm	21mm	2.5mm	40mm	150mm	MFM-201-20-250	MFM-201-20-250-DLC	
	20mm	20mm	21mm	3.0mm	40mm	150mm	MFM-201-20-300	MFM-201-20-300-DLC	
	20mm	20mm	21mm	4.0mm	40mm	150mm	MFM-201-20-400	MFM-201-20-400-DLC	
	20mm	20mm	21mm	Ball End	40mm	150mm	MFM-201-20-BN	MFM-201-20-BN-DLC	
MEDIUM	20mm	20mm	21mm	Sq. End	60mm	150mm	MFM-202-20	MFM-202-20-DLC	20 mm DIAMETER
	20mm	20mm	21mm	2.0mm	60mm	150mm	MFM-202-20-200	MFM-202-20-200-DLC	
	20mm	20mm	21mm	2.5mm	60mm	150mm	MFM-202-20-250	MFM-202-20-250-DLC	
	20mm	20mm	21mm	3.0mm	60mm	150mm	MFM-202-20-300	MFM-202-20-300-DLC	
	20mm	20mm	21mm	4.0mm	60mm	150mm	MFM-202-20-400	MFM-202-20-400-DLC	
	20mm	20mm	21mm	Ball End	60mm	150mm	MFM-202-20-BN	MFM-202-20-BN-DLC	
LONG	20mm	20mm	21mm	Sq. End	80mm	150mm	MFM-203-20	MFM-203-20-DLC	20 mm DIAMETER
	20mm	20mm	21mm	2.0mm	80mm	150mm	MFM-203-20-200	MFM-203-20-200-DLC	
	20mm	20mm	21mm	2.5mm	80mm	150mm	MFM-203-20-250	MFM-203-20-250-DLC	
	20mm	20mm	21mm	3.0mm	80mm	150mm	MFM-203-20-300	MFM-203-20-300-DLC	
	20mm	20mm	21mm	4.0mm	80mm	150mm	MFM-203-20-400	MFM-203-20-400-DLC	
	20mm	20mm	21mm	Ball End	80mm	150mm	MFM-203-20-BN	MFM-203-20-BN-DLC	
X LONG	20mm	20mm	21mm	Sq. End	100mm	150mm	MFM-204-20	MFM-204-20-DLC	20 mm DIAMETER
	20mm	20mm	21mm	2.0mm	100mm	150mm	MFM-204-20-200	MFM-204-20-200-DLC	
	20mm	20mm	21mm	2.5mm	100mm	150mm	MFM-204-20-250	MFM-204-20-250-DLC	
	20mm	20mm	21mm	3.0mm	100mm	150mm	MFM-204-20-300	MFM-204-20-300-DLC	
	20mm	20mm	21mm	4.0mm	100mm	150mm	MFM-204-20-400	MFM-204-20-400-DLC	
	20mm	20mm	21mm	Ball End	100mm	150mm	MFM-204-20-BN	MFM-204-20-BN-DLC	
S	25mm	25mm	26mm	Sq. End	50mm	165mm	MFM-201-25	MFM-201-25-DLC	25 mm DIAMETER
	25mm	25mm	26mm	2.5mm	50mm	165mm	MFM-201-25-250	MFM-201-25-250-DLC	
	25mm	25mm	26mm	4.0mm	50mm	165mm	MFM-201-25-400	MFM-201-25-400-DLC	
	25mm	25mm	26mm	Ball End	50mm	165mm	MFM-201-25-BN	MFM-201-25-BN-DLC	
M	25mm	25mm	26mm	Sq. End	75mm	165mm	MFM-202-25	MFM-202-25-DLC	25 mm DIAMETER
	25mm	25mm	26mm	2.5mm	75mm	165mm	MFM-202-25-250	MFM-202-25-250-DLC	
	25mm	25mm	26mm	4.0mm	75mm	165mm	MFM-202-25-400	MFM-202-25-400-DLC	
	25mm	25mm	26mm	Ball End	75mm	165mm	MFM-202-25-BN	MFM-202-25-BN-DLC	
XL	25mm	25mm	26mm	Sq. End	100mm	165mm	MFM-204-25	MFM-204-25-DLC	25 mm DIAMETER
	25mm	25mm	26mm	2.5mm	100mm	165mm	MFM-204-25-250	MFM-204-25-250-DLC	
	25mm	25mm	26mm	4.0mm	100mm	165mm	MFM-204-25-400	MFM-204-25-400-DLC	
	25mm	25mm	26mm	Ball End	100mm	165mm	MFM-204-25-BN	MFM-204-25-BN-DLC	

MFM SERIES SPEEDS & FEEDS

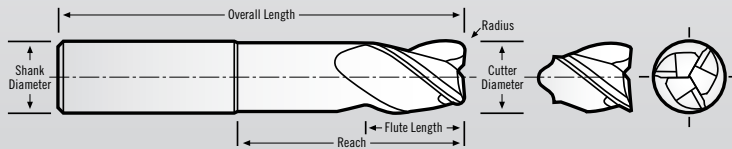
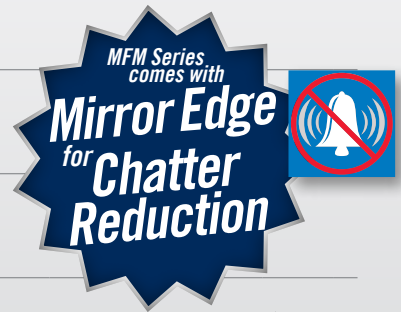
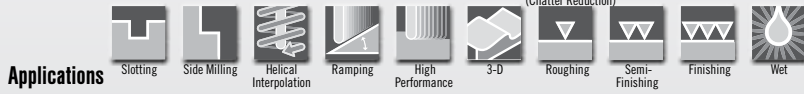
Tool Diameter	Typical Z-Depth	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
		RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
6mm	4mm	Max	0.096mm	Max	0.084mm	Max	0.096mm	Max	0.096mm
8mm	4mm	Max	0.128mm	Max	0.112mm	Max	0.128mm	Max	0.128mm
10mm	5mm	Max	0.16mm	Max	0.14mm	Max	0.16mm	Max	0.16mm
12mm	5mm	Max	0.192mm	Max	0.168mm	Max	0.192mm	Max	0.192mm
16mm	5mm	Max	0.256mm	Max	0.224mm	Max	0.256mm	Max	0.256mm
20mm	6.5mm	Max	0.32mm	Max	0.28mm	Max	0.32mm	Max	0.32mm
25mm	6.5mm	Max	0.4mm	Max	0.35mm	Max	0.4mm	Max	0.4mm

Z-Depth of cut per pass should be deeper than the corner radius to help reduce chatter

Metric 3 Flute High Performance Tools for Aluminum

MFM

Aluminum



MFM Series Tolerances:
 Cutting Dia. = $-0,018/-0,038$ mm
 Shank Dia. = $-0,002/-0,005$ mm
 Flute Length (<10D) = $+0,750/-,000$ mm
 (>10D) = $+1,500/-,000$ mm
 OAL = $+/- 1,000$ mm



MFM 3 Flute Metric (Short to Long Reach)

	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated		
S	6mm	6mm	7mm	Sq. End	12mm	75mm	MFM-301-06	MFM-301-06-DLC	6 mm DIAMETER	
	6mm	6mm	7mm	0.5mm	12mm	75mm	MFM-301-06-050	MFM-301-06-050-DLC		
	6mm	6mm	7mm	1.0mm	12mm	75mm	MFM-301-06-100	MFM-301-06-100-DLC		
	6mm	6mm	7mm	Ball End	12mm	75mm	MFM-301-06-BN	MFM-301-06-BN-DLC		
M	6mm	6mm	7mm	Sq. End	18mm	75mm	MFM-302-06	MFM-302-06-DLC		
	6mm	6mm	7mm	0.5mm	18mm	75mm	MFM-302-06-050	MFM-302-06-050-DLC		
	6mm	6mm	7mm	1.0mm	18mm	75mm	MFM-302-06-100	MFM-302-06-100-DLC		
L	6mm	6mm	7mm	Ball End	18mm	75mm	MFM-302-06-BN	MFM-302-06-BN-DLC		
	6mm	6mm	7mm	Sq. End	24mm	75mm	MFM-303-06	MFM-303-06-DLC		
	6mm	6mm	7mm	0.5mm	24mm	75mm	MFM-303-06-050	MFM-303-06-050-DLC		
XL	6mm	6mm	7mm	1.0mm	24mm	75mm	MFM-303-06-100	MFM-303-06-100-DLC		
	6mm	6mm	7mm	Ball End	24mm	75mm	MFM-303-06-BN	MFM-303-06-BN-DLC		
	6mm	6mm	7mm	Sq. End	30mm	75mm	MFM-304-06	MFM-304-06-DLC		
	6mm	6mm	7mm	0.5mm	30mm	75mm	MFM-304-06-050	MFM-304-06-050-DLC		
SHORT	6mm	6mm	7mm	1.0mm	30mm	75mm	MFM-304-06-100	MFM-304-06-100-DLC		8 mm DIAMETER
	6mm	6mm	7mm	Ball End	30mm	75mm	MFM-304-06-BN	MFM-304-06-BN-DLC		
	8mm	8mm	9mm	Sq. End	16mm	80mm	MFM-301-08	MFM-301-08-DLC		
	8mm	8mm	9mm	1.0mm	16mm	80mm	MFM-301-08-100	MFM-301-08-100-DLC		
MED	8mm	8mm	9mm	2.0mm	16mm	80mm	MFM-301-08-200	MFM-301-08-200-DLC		
	8mm	8mm	9mm	2.5mm	16mm	80mm	MFM-301-08-250	MFM-301-08-250-DLC		
	8mm	8mm	9mm	Ball End	16mm	80mm	MFM-301-08-BN	MFM-301-08-BN-DLC		
	8mm	8mm	9mm	Sq. End	24mm	80mm	MFM-302-08	MFM-302-08-DLC		
LONG	8mm	8mm	9mm	1.0mm	24mm	80mm	MFM-302-08-100	MFM-302-08-100-DLC		
	8mm	8mm	9mm	2.0mm	24mm	80mm	MFM-302-08-200	MFM-302-08-200-DLC		
	8mm	8mm	9mm	2.5mm	24mm	80mm	MFM-302-08-250	MFM-302-08-250-DLC		
	8mm	8mm	9mm	Ball End	24mm	80mm	MFM-302-08-BN	MFM-302-08-BN-DLC		
LONG	8mm	8mm	9mm	Sq. End	32mm	80mm	MFM-303-08	MFM-303-08-DLC		
	8mm	8mm	9mm	1.0mm	32mm	80mm	MFM-303-08-100	MFM-303-08-100-DLC		
	8mm	8mm	9mm	2.0mm	32mm	80mm	MFM-303-08-200	MFM-303-08-200-DLC		
	8mm	8mm	9mm	2.5mm	32mm	80mm	MFM-303-08-250	MFM-303-08-250-DLC		
	8mm	8mm	9mm	Ball End	32mm	80mm	MFM-303-08-BN	MFM-303-08-BN-DLC		

*Other Reach Lengths available upon request.

MFM Metric 3 Flute High Performance Tools for Aluminum

MFM 3 Flute (Short to Long Reach) — continued



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
X LONG	8mm	8mm	9mm	Sq. End	40mm	80mm	MFM-304-08	MFM-304-08-DLC	8 mm DIAMETER
	8mm	8mm	9mm	1.0mm	40mm	80mm	MFM-304-08-100	MFM-304-08-100-DLC	
	8mm	8mm	9mm	2.0mm	40mm	80mm	MFM-304-08-200	MFM-304-08-200-DLC	
	8mm	8mm	9mm	2.5mm	40mm	80mm	MFM-304-08-250	MFM-304-08-250-DLC	
	8mm	8mm	9mm	Ball End	40mm	80mm	MFM-304-08-BN	MFM-304-08-BN-DLC	
S	10mm	10mm	11mm	Sq. End	20mm	100mm	MFM-301-10	MFM-301-10-DLC	10 mm DIAMETER
	10mm	10mm	11mm	1.5mm	20mm	100mm	MFM-301-10-150	MFM-301-10-150-DLC	
	10mm	10mm	11mm	2.5mm	20mm	100mm	MFM-301-10-250	MFM-301-10-250-DLC	
	10mm	10mm	11mm	Ball End	20mm	100mm	MFM-301-10-BN	MFM-301-10-BN-DLC	
M	10mm	10mm	11mm	Sq. End	30mm	100mm	MFM-302-10	MFM-302-10-DLC	10 mm DIAMETER
	10mm	10mm	11mm	1.5mm	30mm	100mm	MFM-302-10-150	MFM-302-10-150-DLC	
	10mm	10mm	11mm	2.5mm	30mm	100mm	MFM-302-10-250	MFM-302-10-250-DLC	
	10mm	10mm	11mm	Ball End	30mm	100mm	MFM-302-10-BN	MFM-302-10-BN-DLC	
L	10mm	10mm	11mm	Sq. End	40mm	100mm	MFM-303-10	MFM-303-10-DLC	10 mm DIAMETER
	10mm	10mm	11mm	1.5mm	40mm	100mm	MFM-303-10-150	MFM-303-10-150-DLC	
	10mm	10mm	11mm	2.5mm	40mm	100mm	MFM-303-10-250	MFM-303-10-250-DLC	
	10mm	10mm	11mm	Ball End	40mm	100mm	MFM-303-10-BN	MFM-303-10-BN-DLC	
XL	10mm	10mm	11mm	Sq. End	50mm	100mm	MFM-304-10	MFM-304-10-DLC	10 mm DIAMETER
	10mm	10mm	11mm	1.5mm	50mm	100mm	MFM-304-10-150	MFM-304-10-150-DLC	
	10mm	10mm	11mm	2.5mm	50mm	100mm	MFM-304-10-250	MFM-304-10-250-DLC	
	10mm	10mm	11mm	Ball End	50mm	100mm	MFM-304-10-BN	MFM-304-10-BN-DLC	
S	12mm	12mm	13mm	Sq. End	24mm	110mm	MFM-301-12	MFM-301-12-DLC	12 mm DIAMETER
	12mm	12mm	13mm	1.5mm	24mm	110mm	MFM-301-12-150	MFM-301-12-150-DLC	
	12mm	12mm	13mm	2.5mm	24mm	110mm	MFM-301-12-250	MFM-301-12-250-DLC	
	12mm	12mm	13mm	4.0mm	24mm	110mm	MFM-301-12-400	MFM-301-12-400-DLC	
	12mm	12mm	13mm	Ball End	24mm	110mm	MFM-301-12-BN	MFM-301-12-BN-DLC	
M	12mm	12mm	13mm	Sq. End	36mm	110mm	MFM-302-12	MFM-302-12-DLC	12 mm DIAMETER
	12mm	12mm	13mm	1.5mm	36mm	110mm	MFM-302-12-150	MFM-302-12-150-DLC	
	12mm	12mm	13mm	2.5mm	36mm	110mm	MFM-302-12-250	MFM-302-12-250-DLC	
	12mm	12mm	13mm	4.0mm	36mm	110mm	MFM-302-12-400	MFM-302-12-400-DLC	
	12mm	12mm	13mm	Ball End	36mm	110mm	MFM-302-12-BN	MFM-302-12-BN-DLC	
L	12mm	12mm	13mm	Sq. End	48mm	110mm	MFM-303-12	MFM-303-12-DLC	12 mm DIAMETER
	12mm	12mm	13mm	1.5mm	48mm	110mm	MFM-303-12-150	MFM-303-12-150-DLC	
	12mm	12mm	13mm	2.5mm	48mm	110mm	MFM-303-12-250	MFM-303-12-250-DLC	
	12mm	12mm	13mm	4.0mm	48mm	110mm	MFM-303-12-400	MFM-303-12-400-DLC	
	12mm	12mm	13mm	Ball End	48mm	110mm	MFM-303-12-BN	MFM-303-12-BN-DLC	
XL	12mm	12mm	13mm	Sq. End	60mm	110mm	MFM-304-12	MFM-304-12-DLC	12 mm DIAMETER
	12mm	12mm	13mm	1.5mm	60mm	110mm	MFM-304-12-150	MFM-304-12-150-DLC	
	12mm	12mm	13mm	2.5mm	60mm	110mm	MFM-304-12-250	MFM-304-12-250-DLC	
	12mm	12mm	13mm	4.0mm	60mm	110mm	MFM-304-12-400	MFM-304-12-400-DLC	
	12mm	12mm	13mm	Ball End	60mm	110mm	MFM-304-12-BN	MFM-304-12-BN-DLC	
SHORT	16mm	16mm	17mm	Sq. End	32mm	130mm	MFM-301-16	MFM-301-16-DLC	16 mm DIAMETER
	16mm	16mm	17mm	2.0mm	32mm	130mm	MFM-301-16-200	MFM-301-16-200-DLC	
	16mm	16mm	17mm	2.5mm	32mm	130mm	MFM-301-16-250	MFM-301-16-250-DLC	
	16mm	16mm	17mm	3.0mm	32mm	130mm	MFM-301-16-300	MFM-301-16-300-DLC	
	16mm	16mm	17mm	4.0mm	32mm	130mm	MFM-301-16-400	MFM-301-16-400-DLC	
	16mm	16mm	17mm	Ball End	32mm	130mm	MFM-301-16-BN	MFM-301-16-BN-DLC	
MEDIUM	16mm	16mm	17mm	Sq. End	48mm	130mm	MFM-302-16	MFM-302-16-DLC	16 mm DIAMETER
	16mm	16mm	17mm	2.0mm	48mm	130mm	MFM-302-16-200	MFM-302-16-200-DLC	
	16mm	16mm	17mm	2.5mm	48mm	130mm	MFM-302-16-250	MFM-302-16-250-DLC	
	16mm	16mm	17mm	3.0mm	48mm	130mm	MFM-302-16-300	MFM-302-16-300-DLC	
	16mm	16mm	17mm	4.0mm	48mm	130mm	MFM-302-16-400	MFM-302-16-400-DLC	
	16mm	16mm	17mm	Ball End	48mm	130mm	MFM-302-16-BN	MFM-302-16-BN-DLC	
LONG	16mm	16mm	17mm	Sq. End	64mm	130mm	MFM-303-16	MFM-303-16-DLC	16 mm DIAMETER
	16mm	16mm	17mm	2.0mm	64mm	130mm	MFM-303-16-200	MFM-303-16-200-DLC	
	16mm	16mm	17mm	2.5mm	64mm	130mm	MFM-303-16-250	MFM-303-16-250-DLC	

*Other Reach Lengths available upon request.



MFM 3 Flute (Short to Long Reach) — continued



	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated	
LONG	16mm	16mm	17mm	3.0mm	64mm	130mm	MFM-303-16-300	MFM-303-16-300-DLC	16 mm DIAMETER
	16mm	16mm	17mm	4.0mm	64mm	130mm	MFM-303-16-400	MFM-303-16-400-DLC	
	16mm	16mm	17mm	Ball End	64mm	130mm	MFM-303-16-BN	MFM-303-16-BN-DLC	
X LONG	16mm	16mm	17mm	Sq. End	80mm	130mm	MFM-304-16	MFM-304-16-DLC	16 mm DIAMETER
	16mm	16mm	17mm	2.0mm	80mm	130mm	MFM-304-16-200	MFM-304-16-200-DLC	
	16mm	16mm	17mm	2.5mm	80mm	130mm	MFM-304-16-250	MFM-304-16-250-DLC	
	16mm	16mm	17mm	3.0mm	80mm	130mm	MFM-304-16-300	MFM-304-16-300-DLC	
	16mm	16mm	17mm	4.0mm	80mm	130mm	MFM-304-16-400	MFM-304-16-400-DLC	
	16mm	16mm	17mm	Ball End	80mm	130mm	MFM-304-16-BN	MFM-304-16-BN-DLC	
SHORT	20mm	20mm	21mm	Sq. End	40mm	150mm	MFM-301-20	MFM-301-20-DLC	20 mm DIAMETER
	20mm	20mm	21mm	2.0mm	40mm	150mm	MFM-301-20-200	MFM-301-20-200-DLC	
	20mm	20mm	21mm	2.5mm	40mm	150mm	MFM-301-20-250	MFM-301-20-250-DLC	
	20mm	20mm	21mm	3.0mm	40mm	150mm	MFM-301-20-300	MFM-301-20-300-DLC	
	20mm	20mm	21mm	4.0mm	40mm	150mm	MFM-301-20-400	MFM-301-20-400-DLC	
	20mm	20mm	21mm	Ball End	40mm	150mm	MFM-301-20-BN	MFM-301-20-BN-DLC	
MEDIUM	20mm	20mm	21mm	Sq. End	60mm	150mm	MFM-302-20	MFM-302-20-DLC	20 mm DIAMETER
	20mm	20mm	21mm	2.0mm	60mm	150mm	MFM-302-20-200	MFM-302-20-200-DLC	
	20mm	20mm	21mm	2.5mm	60mm	150mm	MFM-302-20-250	MFM-302-20-250-DLC	
	20mm	20mm	21mm	3.0mm	60mm	150mm	MFM-302-20-300	MFM-302-20-300-DLC	
	20mm	20mm	21mm	4.0mm	60mm	150mm	MFM-302-20-400	MFM-302-20-400-DLC	
	20mm	20mm	21mm	Ball End	60mm	150mm	MFM-302-20-BN	MFM-302-20-BN-DLC	
LONG	20mm	20mm	21mm	Sq. End	80mm	150mm	MFM-303-20	MFM-303-20-DLC	20 mm DIAMETER
	20mm	20mm	21mm	2.0mm	80mm	150mm	MFM-303-20-200	MFM-303-20-200-DLC	
	20mm	20mm	21mm	2.5mm	80mm	150mm	MFM-303-20-250	MFM-303-20-250-DLC	
	20mm	20mm	21mm	3.0mm	80mm	150mm	MFM-303-20-300	MFM-303-20-300-DLC	
	20mm	20mm	21mm	4.0mm	80mm	150mm	MFM-303-20-400	MFM-303-20-400-DLC	
	20mm	20mm	21mm	Ball End	80mm	150mm	MFM-303-20-BN	MFM-303-20-BN-DLC	
X LONG	20mm	20mm	21mm	Sq. End	100mm	150mm	MFM-304-20	MFM-304-20-DLC	20 mm DIAMETER
	20mm	20mm	21mm	2.0mm	100mm	150mm	MFM-304-20-200	MFM-304-20-200-DLC	
	20mm	20mm	21mm	2.5mm	100mm	150mm	MFM-304-20-250	MFM-304-20-250-DLC	
	20mm	20mm	21mm	3.0mm	100mm	150mm	MFM-304-20-300	MFM-304-20-300-DLC	
	20mm	20mm	21mm	4.0mm	100mm	150mm	MFM-304-20-400	MFM-304-20-400-DLC	
	20mm	20mm	21mm	Ball End	100mm	150mm	MFM-304-20-BN	MFM-304-20-BN-DLC	
S	25mm	25mm	26mm	Sq. End	50mm	165mm	MFM-301-25	MFM-301-25-DLC	25 mm DIAMETER
	25mm	25mm	26mm	2.5mm	50mm	165mm	MFM-301-25-250	MFM-301-25-250-DLC	
	25mm	25mm	26mm	4.0mm	50mm	165mm	MFM-301-25-400	MFM-301-25-400-DLC	
	25mm	25mm	26mm	Ball End	50mm	165mm	MFM-301-25-BN	MFM-301-25-BN-DLC	
M	25mm	25mm	26mm	Sq. End	75mm	165mm	MFM-302-25	MFM-302-25-DLC	25 mm DIAMETER
	25mm	25mm	26mm	2.5mm	75mm	165mm	MFM-302-25-250	MFM-302-25-250-DLC	
	25mm	25mm	26mm	4.0mm	75mm	165mm	MFM-302-25-400	MFM-302-25-400-DLC	
	25mm	25mm	26mm	Ball End	75mm	165mm	MFM-302-25-BN	MFM-302-25-BN-DLC	
XL	25mm	25mm	26mm	Sq. End	100mm	165mm	MFM-304-25	MFM-304-25-DLC	25 mm DIAMETER
	25mm	25mm	26mm	2.5mm	100mm	165mm	MFM-304-25-250	MFM-304-25-250-DLC	
	25mm	25mm	26mm	4.0mm	100mm	165mm	MFM-304-25-400	MFM-304-25-400-DLC	
	25mm	25mm	26mm	Ball End	100mm	165mm	MFM-304-25-BN	MFM-304-25-BN-DLC	

*Other Reach Lengths available upon request.

MFM SERIES SPEEDS & FEEDS

Tool Diameter	Typical Z-Depth	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
		RPM	Chip Load per Tooth	RPM	Chip Load per Tooth	RPM	Chip Load per Tooth	RPM	Chip Load per Tooth
6mm	4mm	Max	0,096mm	Max	0,084mm	Max	0,096mm	Max	0,096mm
8mm	4mm	Max	0,128mm	Max	0,112mm	Max	0,128mm	Max	0,128mm
10mm	5mm	Max	0,16mm	Max	0,14mm	Max	0,16mm	Max	0,16mm
12mm	5mm	Max	0,192mm	Max	0,168mm	Max	0,192mm	Max	0,192mm
16mm	5mm	Max	0,256mm	Max	0,224mm	Max	0,256mm	Max	0,256mm
20mm	6.5mm	Max	0,32mm	Max	0,28mm	Max	0,32mm	Max	0,32mm
25mm	6.5mm	Max	0,4mm	Max	0,35mm	Max	0,4mm	Max	0,4mm

Z-Depth of cut per pass should be deeper than the corner radius to help reduce chatter

S1/MS1 C-2 Grade Carbide End Mills

Characteristics

- Square End
- 2 Flute
- 3 Flute
- 4 Flute
- 30° Helix

Applications

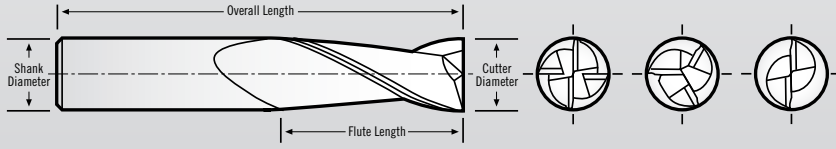
- Slotting
- Side Milling
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Aluminum
- Copper
- Magnesium
- Plastics
- Composites
- BRASS

Coatings

- Diamond-Like Carbon (DLC)



S1 Tolerances

Cutting Dia. (1/16" to 1/4") = +.000/-0.002
 (9/32" to 3/4") = +.000/-0.003
 Shank Dia. = -.0001/-0.0002
 Flute Length (1/16" to 5/16") = +.030/-0.000
 (3/8" to 3/4") = +.060/-0.000
 OAL = ±.060

MS1 Tolerances

Cutting Dia. = +.000/-0.075mm
 Shank Dia. = -.002/-0.005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm



Slotting Side Milling Helical Interpolation

S1-201 2 Flute C-2 Grade Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/8"	1/8"	1-1/2"	S1-201-02	S1-201-02-DLC
3/32"	1/8"	3/16"	1-1/2"	S1-201-03	S1-201-03-DLC
1/8"	1/8"	1/4"	1-1/2"	S1-201-04	S1-201-04-DLC
3/16"	3/16"	3/8"	2"	S1-201-06	S1-201-06-DLC
1/4"	1/4"	1/2"	2"	S1-201-08	S1-201-08-DLC
5/16"	5/16"	1/2"	2-1/2"	S1-201-10	S1-201-10-DLC
3/8"	3/8"	5/8"	2-1/2"	S1-201-12	S1-201-12-DLC
7/16"	7/16"	5/8"	2-3/4"	S1-201-14	S1-201-14-DLC
1/2"	1/2"	5/8"	3"	S1-201-16	S1-201-16-DLC
5/8"	5/8"	7/8"	3-1/2"	S1-201-20	S1-201-20-DLC
3/4"	3/4"	1"	4"	S1-201-24	S1-201-24-DLC

Available with
Wiper Flats
 See Page 17

Available with
45° Chamfer
 See Page 17



MS1-201 Metric 2 Flute C-2 Grade Stub Length **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
2mm	3mm	5mm	38mm	MS1-201-02	MS1-201-02-DLC
3mm	3mm	6mm	38mm	MS1-201-03	MS1-201-03-DLC
4mm	4mm	8mm	50mm	MS1-201-04	MS1-201-04-DLC
5mm	5mm	8mm	50mm	MS1-201-05	MS1-201-05-DLC
6mm	6mm	8mm	50mm	MS1-201-06	MS1-201-06-DLC
8mm	8mm	12mm	58mm	MS1-201-08	MS1-201-08-DLC
10mm	10mm	14mm	66mm	MS1-201-10	MS1-201-10-DLC
12mm	12mm	16mm	73mm	MS1-201-12	MS1-201-12-DLC
16mm	16mm	20mm	82mm	MS1-201-16	MS1-201-16-DLC
20mm	20mm	25mm	92mm	MS1-201-20	MS1-201-20-DLC

Available with
Coolant Grooves
 See Page 16



Side Milling

S1-301 3 Flute C-2 Grade Stub Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/8"	1/8"	1-1/2"	S1-301-02	S1-301-02-DLC
3/32"	1/8"	3/16"	1-1/2"	S1-301-03	S1-301-03-DLC
1/8"	1/8"	1/4"	1-1/2"	S1-301-04	S1-301-04-DLC
3/16"	3/16"	3/8"	2"	S1-301-06	S1-301-06-DLC
1/4"	1/4"	1/2"	2"	S1-301-08	S1-301-08-DLC
5/16"	5/16"	1/2"	2-1/2"	S1-301-10	S1-301-10-DLC
3/8"	3/8"	5/8"	2-1/2"	S1-301-12	S1-301-12-DLC
7/16"	7/16"	5/8"	2-3/4"	S1-301-14	S1-301-14-DLC
1/2"	1/2"	5/8"	3"	S1-301-16	S1-301-16-DLC



Side Milling

S1-401 4 Flute C-2 Grade Stub Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/8"	1/8"	1-1/2"	S1-401-02	S1-401-02-DLC
3/32"	1/8"	3/16"	1-1/2"	S1-401-03	S1-401-03-DLC
1/8"	1/8"	1/4"	1-1/2"	S1-401-04	S1-401-04-DLC
3/16"	3/16"	3/8"	2"	S1-401-06	S1-401-06-DLC
1/4"	1/4"	1/2"	2"	S1-401-08	S1-401-08-DLC
5/16"	5/16"	1/2"	2-1/2"	S1-401-10	S1-401-10-DLC
3/8"	3/8"	5/8"	2-1/2"	S1-401-12	S1-401-12-DLC
7/16"	7/16"	5/8"	2-3/4"	S1-401-14	S1-401-14-DLC
1/2"	1/2"	5/8"	3"	S1-401-16	S1-401-16-DLC
5/8"	5/8"	7/8"	3-1/2"	S1-401-20	S1-401-20-DLC
3/4"	3/4"	1"	4"	S1-401-24	S1-401-24-DLC

Available with
Flats
 Eliminate Slippage in the Tool Holder!

Page 18

C1/MC1 C-2 Grade Carbide End Mills

Characteristics

- Square End
- 2 Flute
- 3 Flute
- 4 Flute
- 30° Helix

Applications

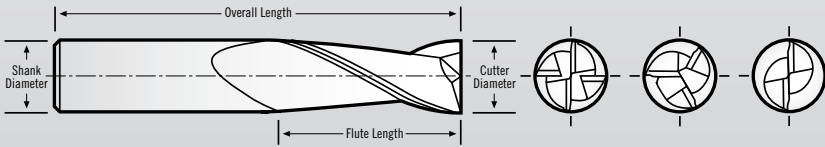
- Slotting
- Side Milling
- Conventional
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Aluminum
- Copper
- Magnesium
- Plastics
- Composites
- BRASS

Coatings

- Diamond-Like Carbon (DLC)



C1 Tolerances

Cutting Dia. (1/16" to 1/4") = +.000/- .002
 (9/32" to 3/4") = +.000/- .002
 Shank Dia. = -.0001/- .0002
 Flute length (1/16" to 5/16") = +.030/- .000
 (3/8" to 3/4") = +.060/- .000
 OAL = ±.060

MC1 Tolerances

Cutting Dia. = +.000/- .075mm
 Shank Dia. = -.002/- .005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm



Slotting Side Milling Helical Interpolation



C1-201 2 Flute C-2 Grade Standard Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/8"	3/16"	1-1/2"	C1-201-02	C1-201-02-DLC
3/32"	1/8"	3/8"	1-1/2"	C1-201-03	C1-201-03-DLC
1/8"	1/8"	1/2"	1-1/2"	C1-201-04	C1-201-04-DLC
5/32"	3/16"	9/16"	2"	C1-201-05	C1-201-05-DLC
3/16"	3/16"	5/8"	2"	C1-201-06	C1-201-06-DLC
7/32"	1/4"	5/8"	2-1/2"	C1-201-07	C1-201-07-DLC
1/4"	1/4"	3/4"	2-1/2"	C1-201-08	C1-201-08-DLC
9/32"	5/16"	3/4"	2-1/2"	C1-201-09	C1-201-09-DLC
5/16"	5/16"	13/16"	2-1/2"	C1-201-10	C1-201-10-DLC
3/8"	3/8"	7/8"	2-1/2"	C1-201-12	C1-201-12-DLC
7/16"	7/16"	1"	2-3/4"	C1-201-14	C1-201-14-DLC
1/2"	1/2"	1"	3"	C1-201-16	C1-201-16-DLC
9/16"	9/16"	1-1/4"	3-1/2"	C1-201-18	C1-201-18-DLC
5/8"	5/8"	1-1/4"	3-1/2"	C1-201-20	C1-201-20-DLC
3/4"	3/4"	1-1/2"	4"	C1-201-24	C1-201-24-DLC



MC1-201 Metric 2 Flute C-2 Grade Standard Length **METRIC**



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number	Tool Number DLC Coated
2mm	3mm	8mm	38mm	MC1-201-02	MC1-201-02-DLC
3mm	3mm	12mm	38mm	MC1-201-03	MC1-201-03-DLC
4mm	4mm	12mm	50mm	MC1-201-04	MC1-201-04-DLC
5mm	5mm	14mm	50mm	MC1-201-05	MC1-201-05-DLC
6mm	6mm	14mm	57mm	MC1-201-06	MC1-201-06-DLC
8mm	8mm	16mm	63mm	MC1-201-08	MC1-201-08-DLC
10mm	10mm	20mm	72mm	MC1-201-10	MC1-201-10-DLC
12mm	12mm	25mm	83mm	MC1-201-12	MC1-201-12-DLC
16mm	16mm	32mm	92mm	MC1-201-16	MC1-201-16-DLC
20mm	20mm	38mm	104mm	MC1-201-20	MC1-201-20-DLC
25mm	25mm	38mm	104mm	MC1-201-25	MC1-201-25-DLC



Side Milling



C1-301 3 Flute C-2 Grade Standard Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/8"	3/16"	1-1/2"	C1-301-02	C1-301-02-DLC
3/32"	1/8"	3/8"	1-1/2"	C1-301-03	C1-301-03-DLC
1/8"	1/8"	1/2"	1-1/2"	C1-301-04	C1-301-04-DLC
5/32"	3/16"	9/16"	2"	C1-301-05	C1-301-05-DLC
3/16"	3/16"	5/8"	2"	C1-301-06	C1-301-06-DLC
7/32"	1/4"	5/8"	2-1/2"	C1-301-07	C1-301-07-DLC
1/4"	1/4"	3/4"	2-1/2"	C1-301-08	C1-301-08-DLC
9/32"	5/16"	3/4"	2-1/2"	C1-301-09	C1-301-09-DLC
5/16"	5/16"	13/16"	2-1/2"	C1-301-10	C1-301-10-DLC
3/8"	3/8"	7/8"	2-1/2"	C1-301-12	C1-301-12-DLC
7/16"	7/16"	1"	2-3/4"	C1-301-14	C1-301-14-DLC
1/2"	1/2"	1"	3"	C1-301-16	C1-301-16-DLC
9/16"	9/16"	1-1/4"	3-1/2"	C1-301-18	C1-301-18-DLC
5/8"	5/8"	1-1/4"	3-1/2"	C1-301-20	C1-301-20-DLC
3/4"	3/4"	1-1/2"	4"	C1-301-24	C1-301-24-DLC



MC1-301 Metric 3 Flute C-2 Grade Standard Length METRIC



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number	Tool Number DLC Coated
2mm	3mm	8mm	38mm	MC1-301-02	MC1-301-02-DLC
3mm	3mm	12mm	38mm	MC1-301-03	MC1-301-03-DLC
4mm	4mm	12mm	50mm	MC1-301-04	MC1-301-04-DLC
5mm	5mm	14mm	50mm	MC1-301-05	MC1-301-05-DLC
6mm	6mm	14mm	57mm	MC1-301-06	MC1-301-06-DLC
8mm	8mm	16mm	63mm	MC1-301-08	MC1-301-08-DLC
10mm	10mm	20mm	72mm	MC1-301-10	MC1-301-10-DLC
12mm	12mm	25mm	83mm	MC1-301-12	MC1-301-12-DLC
16mm	16mm	32mm	92mm	MC1-301-16	MC1-301-16-DLC
20mm	20mm	38mm	104mm	MC1-301-20	MC1-301-20-DLC
25mm	25mm	38mm	104mm	MC1-301-25	MC1-301-25-DLC



Side Milling



C1-401 4 Flute C-2 Grade Standard Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/8"	3/16"	1-1/2"	C1-401-02	C1-401-02-DLC
3/32"	1/8"	3/8"	1-1/2"	C1-401-03	C1-401-03-DLC
1/8"	1/8"	1/2"	1-1/2"	C1-401-04	C1-401-04-DLC
5/32"	3/16"	9/16"	2"	C1-401-05	C1-401-05-DLC
3/16"	3/16"	5/8"	2"	C1-401-06	C1-401-06-DLC
7/32"	1/4"	5/8"	2-1/2"	C1-401-07	C1-401-07-DLC
1/4"	1/4"	3/4"	2-1/2"	C1-401-08	C1-401-08-DLC
9/32"	5/16"	3/4"	2-1/2"	C1-401-09	C1-401-09-DLC
5/16"	5/16"	13/16"	2-1/2"	C1-401-10	C1-401-10-DLC
3/8"	3/8"	7/8"	2-1/2"	C1-401-12	C1-401-12-DLC
7/16"	7/16"	1"	2-3/4"	C1-401-14	C1-401-14-DLC
1/2"	1/2"	1"	3"	C1-401-16	C1-401-16-DLC
9/16"	9/16"	1-1/4"	3-1/2"	C1-401-18	C1-401-18-DLC
5/8"	5/8"	1-1/4"	3-1/2"	C1-401-20	C1-401-20-DLC
3/4"	3/4"	1-1/2"	4"	C1-401-24	C1-401-24-DLC

PM/MPM/PMD Tuffy Grade Carbide Router Bits

Characteristics

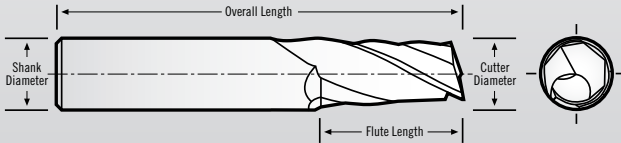
- Square End
- 1 Flute
- Polished

Applications

- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Aluminum
- Plastics
- Wood



PM/PMD Series Tolerances	MPM Tolerances
Cutting Dia. = +0.000/-0.002	Cutting Dia. = +.000/-0.075mm
Shank Dia. = -0.0001/-0.0002	Shank Dia. = -.002/-0.005mm
Flute Length = +0.060/-0.000	Flute Length = +0.500/+1.500mm
OAL = ±0.060	OAL = ±10mm

- 1 Flute
- Polished
- UP Shear

PM Upshear 1 Flute Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/8"	1/2"	2"	PM-104-04
1/8"	1/4"	1/2"	2"	PM-108-04
3/16"	3/16"	5/8"	2"	PM-106-06
3/16"	1/4"	5/8"	2"	PM-108-06
3/16"	1/4"	1-1/4"	3"	PM-108-06L
1/4"	1/4"	3/4"	2"	PM-108-08
1/4"	1/4"	1-1/2"	3"	PM-108-08L
3/8"	3/8"	1-1/4"	3"	PM-112-12
1/2"	1/2"	1-1/2"	4"	PM-116-16

- 1 Flute
- Polished
- Shear DN

PMD Downshear 1 Flute Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/4"	1/2"	2"	PMD-108-04
3/16"	1/4"	5/8"	2"	PMD-108-06
1/4"	1/4"	3/4"	2"	PMD-108-08

- 1 Flute
- Polished
- UP Shear

MPM Upshear 1 Flute Tuffy Grade METRIC

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
4mm	3mm	12mm	50mm	MPM-104-04
6mm	4mm	12mm	50mm	MPM-106-04
6mm	6mm	14mm	50mm	MPM-106-05
6mm	6mm	14mm	57mm	MPM-106-06
8mm	8mm	22mm	63mm	MPM-108-08
10mm	10mm	25mm	72mm	MPM-110-10
12mm	12mm	25mm	83mm	MPM-112-12

NEW

Polished

Best Tool for Gummy/Soft Aluminum

Reduces Material Sticking to Tool

Router for Aluminum Aircraft Skins

WU1/WD1

Aluminum

Characteristics

- Square End
- 3 Flute
- 10° Helix

Applications

- Slotting
- Side Milling
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

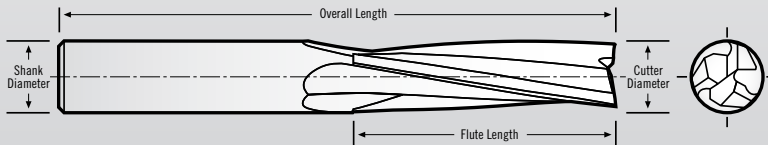
Materials

- Aluminum
- Copper
- Magnesium
- Plastics

Available with

Chatter Reduction with Mirror Edge!

See Page 16



WU1/WD1 Tolerances

Cutting Dia. = .001/- .002
 Shank Dia. = -.0001/- .0002
 Flute Length (<5/16") = +.020/+ .030
 (>5/16") = +.030/+ .060
 OAL = ±.060



WU1-310 Upshear 3 Flute Standard Length (10° Helix)

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/2"	1/2"	1-3/4"	4"	WU1-310-16
5/8"	5/8"	2"	4-5/8"	WU1-310-20
3/4"	3/4"	2-1/2"	5"	WU1-310-24



WD1-310 Downshear 3 Flute Standard Length (10° Helix)

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/2"	1/2"	1-3/4"	4"	WD1-310-16
5/8"	5/8"	2"	4-5/8"	WD1-310-20
3/4"	3/4"	2-1/2"	5"	WD1-310-24

AIC/INS High Shear & Polished Insert Face Mill



Characteristics

- Square End
- 1 Flute
- 2 Flute
- 3 Flute
- 4 Flute
- 5 Flute
- Polished
- Thru Coolant Holes

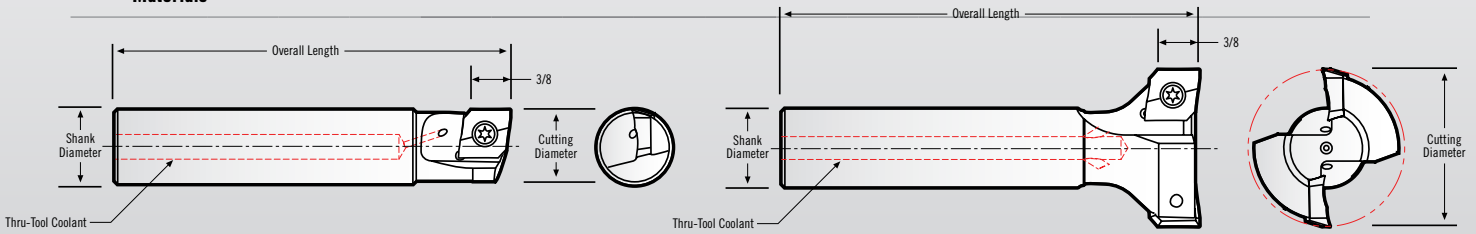
Applications

- Side Milling
- Ramping
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

NEW!

Materials

- Aluminum
- Plastics
- Wood
- Copper
- Magnesium
- BRASS



FACEMILL BODY High Shear & Polished Face Mill

Cutting Diameter	Shank Diameter	Overall Length	# of Flutes	Max Ramp Angle	Part Number
1"	3/4"	4"	1	8°	AIC-101-32
1"	3/4"	6"	1	8°	AIC-102-32
1-1/4"	3/4"	4"	2	8°	AIC-201-1250
1-1/4"	1"	4"	2	8°	AIC-201-1250-1
1-1/4"	1"	6"	2	8°	AIC-202-1250
1-1/2"	3/4"	4"	2	5°	AIC-201-1500
1-1/2"	1"	4-1/2"	2	5°	AIC-202-1500
1-1/2"	1-1/4"	7"	2	5°	AIC-203-1500
2"	3/4"	4-1/2"	3	4°	AIC-301-2000
2"	1"	5"	3	4°	AIC-302-2000
2"	1-1/4"	7"	3	4°	AIC-303-2000
3"	3/4"	5"	4	None	AIC-402-3000
3"	1"	5"	4	None	AIC-402-3000-1
3"	1-1/4"	5"	4	None	AIC-402-3000-2
4"	1-1/4"	5"	4	None	AIC-401-4000
4-1/2"	1-1/4"	5-1/2"	5	None	AIC-501-4500

INSERT OPTIONS

CORNER RADIUS/CHAMFER

Corner Radius	Uncoated	DLC Coated
0.01	INS-AL-010	INS-AL-010-DLC
0.03	INS-AL-030	INS-AL-030-DLC
0.06	INS-AL-060	INS-AL-060-DLC
0.09	INS-AL-090	INS-AL-090-DLC
0.12	INS-AL-120	INS-AL-120-DLC
0.015 x 45° chamfer	INS-AL-015-45	INS-AL-015-45-DLC

INSERT SCREWS AND WRENCH

Feature	Part Number
3.5mm T15 screw	AIC-350-SCR
T15 Wrench	AIC-T15-WRCH

Face Mill bodies do not come with inserts.
Inserts must be purchased separately.

SPEED AND FEED INFO:

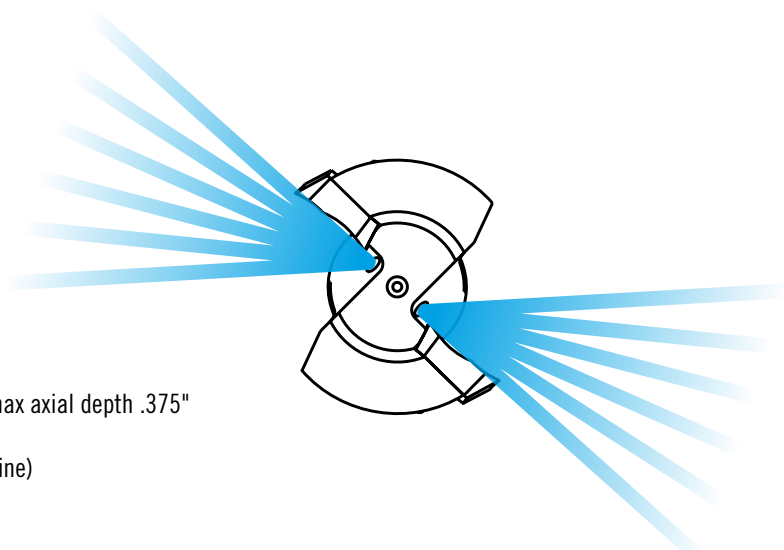
10,000 Max RPM

Roughing: .010-.017 Chipload per tooth

Finishing .001-.0025 Chipload per tooth

Typical roughing axial depth .150" (be careful not to max out machine) max axial depth .375"

Typical radial stepover 75% of diameter (be careful not to max out machine)





RJ

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FBD 2 Flute Flat Bottom Drills for Aluminum



Characteristics

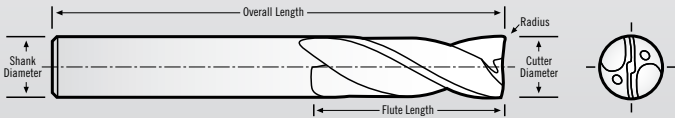
- Corner Radius
- 2 Flute

Applications

- Intersecting Holes
- Shoulder Drilling
- Angled Holes
- Guide Holes

Materials

- Aluminum
- Plastics
- Wood



FBD Series Tolerances
 Cutting Dia. = +0.000/-0.001"
 Shank Dia. = -0.0001/-0.0002"
 Flute Length = +0.060/-0.000"
 OAL = ±0.060"



NEW!

180° Tip

FBD-201 2 Flute 2x Diameter Flat Bottom Drills

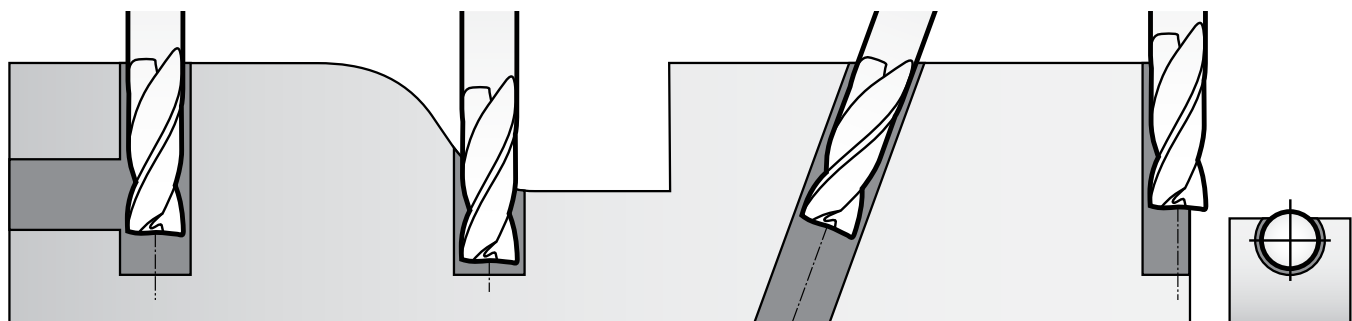
Cutting Diameter	Shank Diameter	Flute Length	Max Hole depth	Corner Radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated
1/8"	1/8"	3/8"	1/4"	0.005	1-1/2"	FBD-201-04	FBD-201-04-DLC	FBD-201-04-TC	FBD-201-04-TC-DLC
3/16"	3/16"	9/16"	3/8"	0.01	2-1/2"	FBD-201-06	FBD-201-06-DLC	FBD-201-06-TC	FBD-201-06-TC-DLC
1/4"	1/4"	3/4"	1/2"	0.01	2-1/2"	FBD-201-08	FBD-201-08-DLC	FBD-201-08-TC	FBD-201-08-TC-DLC
5/16"	5/16"	15/16"	5/8"	0.02	2-1/2"	FBD-201-10	FBD-201-10-DLC	FBD-201-10-TC	FBD-201-10-TC-DLC
3/8"	3/8"	1-1/8"	3/4"	0.02	3"	FBD-201-12	FBD-201-12-DLC	FBD-201-12-TC	FBD-201-12-TC-DLC
1/2"	1/2"	1-1/2"	1"	0.02	3-1/2"	FBD-201-16	FBD-201-16-DLC	FBD-201-16-TC	FBD-201-16-TC-DLC



NEW!

FBD-202 2 Flute 5x Diameter Flat Bottom Drills

Cutting Diameter	Shank Diameter	Flute Length	Max Hole depth	Corner Radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated
1/8"	1/8"	3/4"	5/8"	0.005	2"	FBD-202-04	FBD-202-04-DLC	FBD-202-04-TC	FBD-202-04-TC-DLC
3/16"	3/16"	1-1/8"	15/16"	0.01	2-1/2"	FBD-202-06	FBD-202-06-DLC	FBD-202-06-TC	FBD-202-06-TC-DLC
1/4"	1/4"	1-1/2"	1-1/4"	0.01	3"	FBD-202-08	FBD-202-08-DLC	FBD-202-08-TC	FBD-202-08-TC-DLC
5/16"	5/16"	1-7/8"	1-9/16"	0.02	3-1/2"	FBD-202-10	FBD-202-10-DLC	FBD-202-10-TC	FBD-202-10-TC-DLC
3/8"	3/8"	2-1/4"	1-7/8"	0.02	4"	FBD-202-12	FBD-202-12-DLC	FBD-202-12-TC	FBD-202-12-TC-DLC
1/2"	1/2"	3"	2-1/2"	0.02	5"	FBD-202-16	FBD-202-16-DLC	FBD-202-16-TC	FBD-202-16-TC-DLC



Burr-Free Intersecting Holes

Shoulder Drilling

Drilling Angled Holes

Creating a Guide Hole

2 Flute Flat Bottom Drills for Aluminum **FBD**

Use maximum RPM if it exceeds your machines RPM

Guide hole recommended if you get chatter. Pecking in small depths might help. Always start holes with short 2X drill first.

*Adjust inch per revolution to 50% when on angled surfaces is 30 degrees or less.

*Adjust inch per revolution to 30% of recommended when on an angled or curved surface is greater than 30 degrees or when the cutter is not fully encapsulated and only drilling a partial hole

** Adjust RPM to 70% of recommended RPM when on an angled or curved surface is greater than 30 degrees or when the cutter is not fully encapsulated and only drilling a partial hole

When using FBD-202 (5x) use FBD-201(2x) to start the hole to reduce walking.

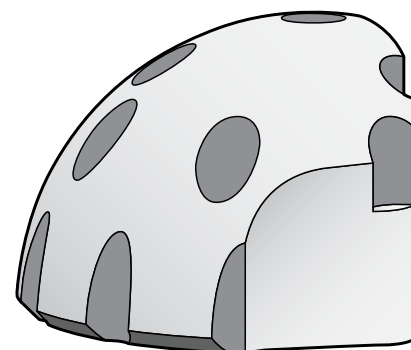
Thru coolant holes recommended on FBD-202 (5x) deep holes

If chip packing is a problem thru coolant holes are recommended. Pecking may help if you do not have thru coolant.

Aluminum and similar materials			
Tool Diameter	FBD-201(2x) (SFM 500-1000) RPM**	FBD-202(5x) (SFM 250-500) RPM**	Inch per Revolution*
1/8	15280 - 30560	7640 - 15280	.0016-.0032
3/16	10187 - 20373	5093 - 10187	.0024-.0048
1/4	7640 - 15280	3820 - 7640	.0032-.006
5/16	6112 - 12224	3056 - 6112	.004-.008
3/8	5093 - 10187	2547 - 5093	.0048-.0098
1/2	3820 - 7640	1910 - 3820	.0065-.013

Drilling Curved Material

If drilling on flat surfaces and the drill walks spot drill first to reduce the amount of surface contact when starting the hole. The longer a drill is, the higher the chance that it will walk.



Aluminum Tools in Other Sections

SB / B 201/203
MSB / MB 201/203

2 Flute Ball End
(See Multiple Applications)



156

C8
201/203/301/303

2 & 3 Flute on 1/4" Shank
(See Multiple Applications)



151

NR / MNR
204/303/404

2, 3 and 4 Flute
(See Multiple Applications)



160

PCD
203 Routers

2 Flute PCD Diamond
(See Composites & Plastics)



109

PCD-BN
201 Routers

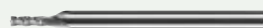
2 Flute PCD Diamond, Ball End
(See Composites & Plastics)



109

MINIATURES

(See Miniatures Applications)



132

SAWS

(See Saws Applications)



170

Tools for TITANIUM, STEEL & HIGH-TEMP ALLOYS



Titanium Machining at 75 ipm!

Scan this code to:

- See How to Cut Titanium at 75 ipm
- Watch Videos
- See How to High-Speed Machine Steel
- And More...

Featured Tools:

NS Series – Machine Steel with Ease!

Page 78



Variable Helix
Offset Fluting

- **500% Increase** in Metal Removal Rates
- **Reduced Cycle Time** from 45 minutes to 9 minutes
- **Speeds and Feeds up to 5X** Those of Traditional Steel Cutting Tools
- Available in **Inch and Metric Sizes**



XG Series – The Highest Performing Tool in Steel, Stainless & Other Difficult Alloys

Page 80



114–800
Linear
Inches*

13 Manufacturers
US and Europe

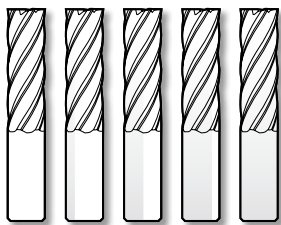
2300
Linear
Inches*

RJ
XG-Series

*304 SS
Slotting &
Profiling
400sfm
24ipm

XF Series – Best Tool for High-Speed Machining

Page 83



6Al4V Titanium Flap Trac
for Airplane Wing

Other High-Performance Tools

VS.



6Al4V Titanium Flap Trac
for Airplane Wing









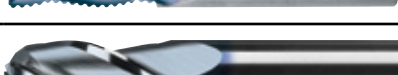
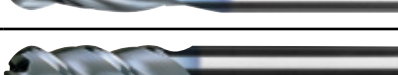



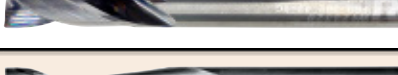



RJ XF-Series

RJ
XF-Series

**15X
LIFE!**

of Comparable
Tools!



NS / MNS 401/402/403	4 Flute Tuffy Grade			Variable Helix	78
XG / MXG 400/402	4 Flute Tuffy Grade	NEW SIZES!		Variable Helix	80
XG / MXG 500/502	5 Flute Tuffy Grade	NEW SIZES!		Variable Helix	81
XG-BN / MXG-BN 402	4 Flute Tuffy Grade, Ball End	NEW SIZES!		Variable Helix	82
XF / MXF 602/802	6 and 8 Flute Tuffy Grade				83
ST / MST 341/343	3 Flute Super Tuffy Grade				86
STR / MSTR 301/303	3 Flute Super Tuffy Grade				88
STR / MSTR 401/404	4 Flute Super Tuffy Grade				90
B / MB 300/330	3 Flute Tuffy Grade				92
B / MB 440	4 Flute Tuffy Grade				93
ST / MST 360/646/630	3 and 6 Flute Super Tuffy Grade				94
ST / MST 430/434	3 and 6 Flute Super Tuffy Grade				96
FBD 201/202	Flat Bottom Drills for Aluminum 3x and 5x Lengths	NEW!			98
TS / MTS 201/301/401	2, 3 and 4 Flute (See Multiple Applications)				152
TR 303/404/606	3, 4 and 6 Flute (See Multiple Applications)				154
MINIATURES	(See Miniatures Applications)				132
SAWS	(See Saws Applications)				170

NS/MNS Tuffy Grade Carbide End Mills



Characteristics

- Square End
- 4 Flute
- Variable Helix
- Flats

Applications

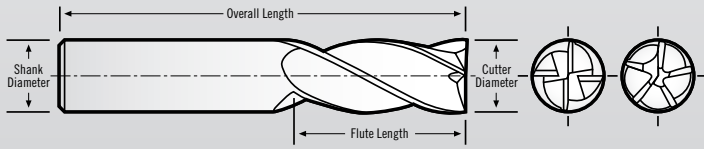
- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet

Materials

- Cast Iron
- Steel
- 40 HRC Hardness

Coatings

- Aluminum
- Titan. Nitride

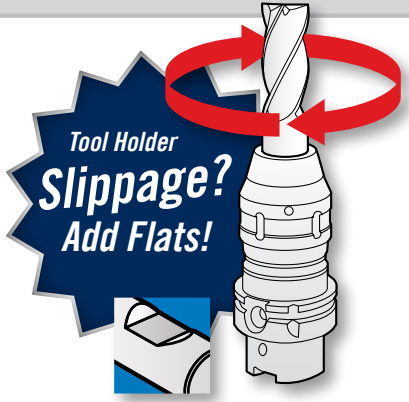


NS Tolerances
 Cutting Dia. = $-.001/-0.002$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+0.060/-0.000$
 OAL = $+/-0.060$

MNS Tolerances
 Cutting Dia. = $-0.025/-0.050$ mm
 Shank Dia. = $-0.002/-0.005$ mm
 Flute Length = $+0.50/+1.50$ mm
 OAL = $+/-1$ mm



Add Flats for High Torque Cuts!



NS-401 4 Flute Stub Length

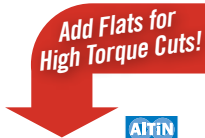
Cutting Diameter	Shank Diameter	Flute Length	Chamfer	Overall Length	AITiN	
					Tool number Flats, AITiN Coated	Tool number No Flats, AITiN Coated
3/16"	3/16"	3/8"	0.008	2-1/2"	NS-401-06-FL	NS-401-06
1/4"	1/4"	1/2"	0.008	2-1/2"	NS-401-08-FL	NS-401-08
5/16"	5/16"	1/2"	0.01	2-1/2"	NS-401-10-FL	NS-401-10
3/8"	3/8"	5/8"	0.01	2-1/2"	NS-401-12-FL	NS-401-12
1/2"	1/2"	3/4"	0.01	3"	NS-401-16-FL	NS-401-16
5/8"	5/8"	7/8"	0.015	3-1/2"	NS-401-20-FL	NS-401-20
3/4"	3/4"	1"	0.015	4"	NS-401-24-FL	NS-401-24
1"	1"	1"	0.02	5"	NS-401-32-FL	NS-401-32

NS-402 4 Flute Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Chamfer	Overall Length	AITiN	
					Tool number Flats, AITiN Coated	Tool number No Flats, AITiN Coated
3/16"	3/16"	5/8"	0.008	2-1/2"	NS-402-06-FL	NS-402-06
1/4"	1/4"	3/4"	0.008	2-1/2"	NS-402-08-FL	NS-402-08
5/16"	5/16"	7/8"	0.01	2-1/2"	NS-402-10-FL	NS-402-10
3/8"	3/8"	1"	0.01	2-1/2"	NS-402-12-FL	NS-402-12
1/2"	1/2"	1-1/8"	0.01	3"	NS-402-16-FL	NS-402-16
5/8"	5/8"	1-1/4"	0.015	3-1/2"	NS-402-20-FL	NS-402-20
3/4"	3/4"	1-1/2"	0.015	4"	NS-402-24-FL	NS-402-24
1"	1"	1-3/4"	0.02	5"	NS-402-32-FL	NS-402-32

NS-403 4 Flute Long Length

Cutting Diameter	Shank Diameter	Flute Length	Chamfer	Overall Length	AITiN	
					Tool number Flats, AITiN Coated	Tool number No Flats, AITiN Coated
3/16"	3/16"	7/8"	0.008	2-1/2"	NS-403-06-FL	NS-403-06
1/4"	1/4"	1"	0.008	2-1/2"	NS-403-08-FL	NS-403-08
5/16"	5/16"	1-1/8"	0.01	2-1/2"	NS-403-10-FL	NS-403-10
3/8"	3/8"	1-1/4"	0.01	3"	NS-403-12-FL	NS-403-12
1/2"	1/2"	1-1/2"	0.01	4"	NS-403-16-FL	NS-403-16
5/8"	5/8"	1-3/4"	0.015	4"	NS-403-20-FL	NS-403-20
3/4"	3/4"	2"	0.015	5"	NS-403-24-FL	NS-403-24
1"	1"	2-1/2"	0.02	6"	NS-403-32-FL	NS-403-32



MNS-402 4 Flute Standard Length **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Chamfer	Overall Length	Tool Number w/Flats, AITIN Coated	Tool Number No Flats, AITIN Coated
4mm	4mm	14mm	0.2mm	58mm		MNS-402-04
5mm	5mm	14mm	0.2mm	58mm		MNS-402-05
6mm	6mm	16mm	0.2mm	58mm	MNS-402-06-FL	MNS-402-06
8mm	8mm	22mm	0.25mm	64mm	MNS-402-08-FL	MNS-402-08
10mm	10mm	25mm	0.25mm	73mm	MNS-402-10-FL	MNS-402-10
12mm	12mm	30mm	0.35mm	84mm	MNS-402-12-FL	MNS-402-12
16mm	16mm	35mm	0.35mm	93mm	MNS-402-16-FL	MNS-402-16
20mm	20mm	42mm	0.5mm	105mm	MNS-402-20-FL	MNS-402-20
25mm	25mm	45mm	0.5mm	121mm	MNS-402-25-FL	MNS-402-25

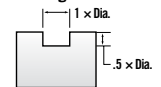
NS SERIES SPEEDS & FEEDS

Material	Surface Footage	3/16"		1/4"		5/16"		3/8"		1/2"		5/8"		3/4"		1	
		RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min
CAST IRON																	
Ductile	400	8149	20	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
Gray	525	10696	42	8022	42	6418	51	5348	58	4011	64	3209	58	2674	51	2006	45
STEEL																	
1018/1020	500	10187	32	7640	32	6112	39	5093	44	3820	49	3056	44	2547	39	1910	34
4130	400	8149	20	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
4140	400	8149	20	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
4340	415	8455	21	6341	21	5073	25	4227	29	3171	32	2536	29	2114	25	1585	22
TOOL STEEL (ANNEALED)																	
A2	400	8149	17	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
D2	360	7334	16	5501	16	4401	19	3667	22	2750	24	2200	22	1834	19	1375	17
H13	400	8149	17	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
P20	400	8149	23	6112	23	4890	28	4075	31	3056	35	2445	31	2037	28	1528	24

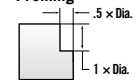
Speeds and feeds are based on applications with very rigid machine tools, toolholders, and fixturing. Speeds and feeds will vary dramatically depending on the application. Extreme forces can be generated and can cause damage, if not appropriate for the cutting conditions.

Helical interpolation or ramping should be used to enter pockets. For the highest material removal rates and longest tool life profile milling is preferred over slotting. (See diagrams below)

Slotting



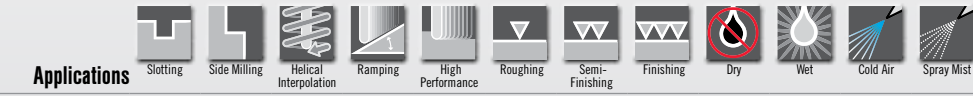
Profiling



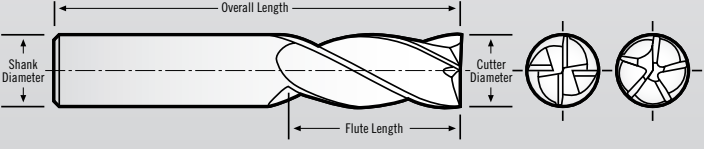
MNS SERIES SPEEDS & FEEDS **METRIC**

Material	Surface Meters/min	6mm		8mm		10mm		12mm		16mm		20mm		25mm	
		RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min
CAST IRON															
Ductile	400	6475	505	4851	505	3881	621	3234	699	2426	776	1941	699	1552	543
Gray	525	8498	1060	6367	1060	5094	1304	4245	1467	3184	1630	2547	1467	2038	1141
STEEL															
1018/1020	500	8093	807	6064	807	4851	994	4043	1118	3032	1242	2426	1118	1941	869
4130	400	6475	505	4851	505	3881	621	3234	699	2426	776	1941	699	1552	543
4140	400	6475	505	4851	505	3881	621	3234	699	2426	776	1941	699	1552	543
4340	415	6717	523	5033	523	4027	644	3356	725	2517	805	2013	725	1611	564
TOOL STEEL (ANNEALED)															
A2	400	6475	444	4851	444	3881	546	3234	615	2426	683	1941	615	1552	478
D2	360	5827	400	4366	400	3493	492	2911	553	2183	615	1747	553	1397	430
H13	400	6475	444	4851	444	3881	546	3234	615	2426	683	1941	615	1552	478
P20	400	6475	575	4851	575	3881	708	3234	796	2426	885	1941	796	1552	619

XG/MXG Tuffy Grade Carbide End Mills



NEW! SMALLER SIZES



XG Tolerances
 Cutting Dia. = $-.001/-0.002$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+0.060/-0.000$
 OAL = $+/-0.060$

MXG Tolerances
 Cutting Dia. = $-.025/-0.050$ mm
 Shank Dia. = $-.002/-0.005$ mm
 Flute Length = $+0.50/+1.50$ mm
 OAL = $+/-1$ mm



Add Flats for High Torque Cuts!

XG-400 4 Flute Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	AITIN	
					Tool Number Flats, AITIN Coated	Tool Number No Flats, AITIN Coated
1/16"	1/8"	3/32"	.004	1-1/2"	XG-400-02-FL	XG-400-02
3/32"	1/8"	5/32"	.005	1-1/2"	XG-400-03-FL	XG-400-03
1/8"	1/8"	3/16"	.006	1-1/2"	XG-400-04-FL	XG-400-04
3/16"	3/16"	5/16"	.008	2"	XG-400-06-FL	XG-400-06
1/4"	1/4"	3/8"	.017-.019	2-1/2"	XG-400-08-FL	XG-400-08
5/16"	5/16"	7/16"	.020-.022	2-1/2"	XG-400-10-FL	XG-400-10
3/8"	3/8"	1/2"	.023-.025	2-1/2"	XG-400-12-FL	XG-400-12
1/2"	1/2"	5/8"	.025-.027	3"	XG-400-16-FL	XG-400-16
5/8"	5/8"	3/4"	.027-.029	3-1/2"	XG-400-20-FL	XG-400-20
3/4"	3/4"	1"	.028-.030	4"	XG-400-24-FL	XG-400-24
1"	1"	1-1/8"	.028-.030	5"	XG-400-32-FL	XG-400-32



Eliminate Tool Pull Out!
 1/4"-5/16" h5 Shank Tolerance
 3/8"-1 h4 Shank Tolerance
Tightest in the Industry!

XG-402 4 Flute Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	AITIN	
					Tool Number Flats, AITIN Coated	Tool Number No Flats, AITIN Coated
1/16"	1/8"	3/16"	.004	1-1/2"	XG-402-02-FL	XG-402-02
3/32"	1/8"	9/32"	.005	1-1/2"	XG-402-03-FL	XG-402-03
1/8"	1/8"	3/8"	.006	1-1/2"	XG-402-04-FL	XG-402-04
3/16"	3/16"	5/8"	.008	2-1/2"	XG-402-06-FL	XG-402-06
1/4"	1/4"	3/4"	.017-.019	2-1/2"	XG-402-08-FL	XG-402-08
5/16"	5/16"	13/16"	.020-.022	2-1/2"	XG-402-10-FL	XG-402-10
3/8"	3/8"	7/8"	.023-.025	2-1/2"	XG-402-12-FL	XG-402-12
1/2"	1/2"	1"	.025-.027	3"	XG-402-16-FL	XG-402-16
5/8"	5/8"	1-1/4"	.027-.029	3-1/2"	XG-402-20-FL	XG-402-20
3/4"	3/4"	1-1/2"	.028-.030	4"	XG-402-24-FL	XG-402-24
1"	1"	2"	.028-.030	5"	XG-402-32-FL	XG-402-32

Different Corner Radii Available

Add -CR and desired corner radius size

Example:
 XG-400-12-**CR.050**
 for a .050" corner radius

MXG-402 Metric 4 Flute Standard Length **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	AITIN	
					Tool Number Flats, AITIN Coated	Tool Number No Flats, AITIN Coated
6mm	6mm	14mm	.50-.55mm	57mm	MXG-402-06-FL	MXG-402-06
8mm	8mm	16mm	.55-.60mm	63mm	MXG-402-08-FL	MXG-402-08
10mm	10mm	20mm	.60-.65mm	72mm	MXG-402-10-FL	MXG-402-10
12mm	12mm	25mm	.65-.70mm	83mm	MXG-402-12-FL	MXG-402-12
16mm	16mm	32mm	.70-.75mm	92mm	MXG-402-16-FL	MXG-402-16
20mm	20mm	38mm	.90-1.0mm	104mm	MXG-402-20-FL	MXG-402-20



NOTE: Metric tools do not have flats.



Add Flats for High Torque Cuts!

XG-500 5 Flute Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AITiN Coated	Tool Number No Flats, AITiN Coated
1/16"	1/8"	3/32"	0.004	1-1/2"	XG-500-02-FL	XG-500-02
3/32"	1/8"	5/32"	0.005	1-1/2"	XG-500-03-FL	XG-500-03
1/8"	1/8"	3/16"	0.006	1-1/2"	XG-500-04-FL	XG-500-04
3/16"	3/16"	5/16"	0.008	2"	XG-500-06-FL	XG-500-06
1/4"	1/4"	3/8"	.017-.019	2-1/2"	XG-500-08-FL	XG-500-08
5/16"	5/16"	7/16"	.020-.022	2-1/2"	XG-500-10-FL	XG-500-10
3/8"	3/8"	1/2"	.023-.025	2-1/2"	XG-500-12-FL	XG-500-12
1/2"	1/2"	5/8"	.025-.027	3"	XG-500-16-FL	XG-500-16
5/8"	5/8"	3/4"	.027-.029	3-1/2"	XG-500-20-FL	XG-500-20
3/4"	3/4"	1"	.028-.030	4"	XG-500-24-FL	XG-500-24
1"	1"	1-1/8"	.028-.030	5"	XG-500-32-FL	XG-500-32



XG-502 5 Flute Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AITiN Coated	Tool Number No Flats, AITiN Coated
1/16"	1/8"	3/16"	0.004	1-1/2"	XG-502-02-FL	XG-502-02
3/32"	1/8"	9/32"	0.005	1-1/2"	XG-502-03-FL	XG-502-03
1/8"	1/8"	3/8"	0.006	1-1/2"	XG-502-04-FL	XG-502-04
3/16"	3/16"	5/8"	0.008	2-1/2"	XG-502-06-FL	XG-502-06
1/4"	1/4"	3/4"	.017-.019	2-1/2"	XG-502-08-FL	XG-502-08
5/16"	5/16"	13/16"	.020-.022	2-1/2"	XG-502-10-FL	XG-502-10
3/8"	3/8"	7/8"	.023-.025	2-1/2"	XG-502-12-FL	XG-502-12
1/2"	1/2"	1"	.025-.027	3"	XG-502-16-FL	XG-502-16
5/8"	5/8"	1-1/4"	.027-.029	3-1/2"	XG-502-20-FL	XG-502-20
3/4"	3/4"	1-1/2"	.028-.030	4"	XG-502-24-FL	XG-502-24
1"	1"	2"	.028-.030	5"	XG-502-32-FL	XG-502-32

Different Corner Radii Available

Add -CR and desired corner radius size

Example:
XG-400-12-**CR.050**
for a .050" corner radius

MXG-502 Metric 5 Flute Standard Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AITiN Coated	Tool Number No Flats, AITiN Coated
6mm	6mm	14mm	.50-.55mm	57mm	MXG-502-06-FL	MXG-502-06
8mm	8mm	16mm	.55-.60mm	63mm	MXG-502-08-FL	MXG-502-08
10mm	10mm	20mm	.60-.65mm	72mm	MXG-502-10-FL	MXG-502-10
12mm	12mm	25mm	.65-.70mm	83mm	MXG-502-12-FL	MXG-502-12
16mm	16mm	32mm	.70-.75mm	92mm	MXG-502-16-FL	MXG-502-16
20mm	20mm	38mm	.90-1.0mm	104mm	MXG-502-20-FL	MXG-502-20



NOTE: Metric tools do not have flats.

Need Reach?

See End Mill Modifications (page 17)

Tool Holder Slippage?

Add Flats! Use shrink fit or equivalent gripping force. If not, use flats.

XG/MXG Tuffy Grade Carbide End Mills

Characteristics

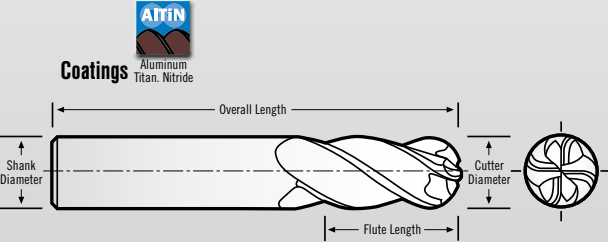
- Ball End
- 4 Flute
- Variable Helix
- Flats

Applications

- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Ti (Titanium)
- Cast Iron
- Steel
- Stainless Steel
- SUPER Alloys
- 40 HRC Hardness



XG-BN Tolerances

Cutting Dia. = $-.001/-0.002$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+.060/-0.000$
 OAL = $+/-0.060$

MXG-BN Tolerances

Cutting Dia. = $-.025/-0.050$ mm
 Shank Dia. = $-.002/-0.005$ mm
 Flute Length = $+0.50/+1.50$ mm
 OAL = $+/-1$ mm



NEW SIZES!



XG-402BN 4 Flute Ball End Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	AITiN Coated	
					Tool Number Flats, AITiN Coated	Tool Number No Flats, AITiN Coated
1/16"	1/8"	3/16"	.0312	1-1/2"	XG-402-02-BN-FL	XG-402-02-BN
3/32"	1/8"	9/32"	.0469	1-1/2"	XG-402-03-BN-FL	XG-402-03-BN
1/8"	1/8"	3/8"	.0625	1-1/2"	XG-402-04-BN-FL	XG-402-04-BN
3/16"	3/16"	5/8"	.0937	2-1/2"	XG-402-06-BN-FL	XG-402-06-BN
1/4"	1/4"	3/4"	.1250	2-1/2"	XG-402-08-BN-FL	XG-402-08-BN
5/16"	5/16"	13/16"	.1563	2-1/2"	XG-402-10-BN-FL	XG-402-10-BN
3/8"	3/8"	7/8"	.1875	2-1/2"	XG-402-12-BN-FL	XG-402-12-BN
1/2"	1/2"	1"	.2500	3"	XG-402-16-BN-FL	XG-402-16-BN
5/8"	5/8"	1-1/4"	.3125	3-1/2"	XG-402-20-BN-FL	XG-402-20-BN
3/4"	3/4"	1-1/2"	.3750	4"	XG-402-24-BN-FL	XG-402-24-BN
1"	1"	2"	.5000	5"	XG-402-32-BN-FL	XG-402-32-BN

Add Flats for High Torque Cuts!



MXG-402BN Metric 4 Flute Ball End Standard Length

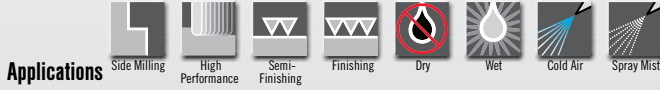
METRIC

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	AITiN Coated	
					Tool Number Flats, AITiN Coated	Tool Number No Flats, AITiN Coated
6mm	6mm	14mm	3mm	57mm	MXG-402-06-BN-FL	MXG-402-06-BN
8mm	8mm	16mm	4mm	63mm	MXG-402-08-BN-FL	MXG-402-08-BN
10mm	10mm	20mm	5mm	72mm	MXG-402-10-BN-FL	MXG-402-10-BN
12mm	12mm	25mm	6mm	83mm	MXG-402-12-BN-FL	MXG-402-12-BN
16mm	16mm	32mm	8mm	92mm	MXG-402-16-BN-FL	MXG-402-16-BN
20mm	20mm	38mm	10mm	104mm	MXG-402-20-BN-FL	MXG-402-20-BN

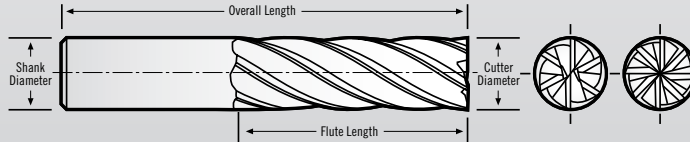
Add Flats for High Torque Cuts!

NOTE: Metric tools do not have flats.

Tuffy Grade Carbide End Mills **XF/MXF**



Eliminate Tool Pull Out!
h4 Shank Tolerance
Anti-pullout Shank Technology
Tightest in the Industry!



XF Tolerances

Cutting Dia. = $-.001/-0.002$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+0.060/-0.000$
 OAL = $+/-0.060$

MXF Tolerances

Cutting Dia. = $-.025/-0.050$ mm
 Shank Dia. = $-.002/-0.005$ mm
 Flute Length = $+0.500/+1.500$ mm
 OAL = ± 10 mm



XF-602/802 6/8 Flute Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	AITiN	
					Tool Number Flats, AITiN Coated	Tool Number No Flats, AITiN Coated
3/8"	3/8"	7/8"	0.030	2-1/2"	XF-602-12-030-FL	XF-602-12-030
3/8"	3/8"	7/8"	0.060	2-1/2"	XF-602-12-060-FL	XF-602-12-060
3/8"	3/8"	7/8"	0.090	2-1/2"	XF-602-12-090-FL	XF-602-12-090
1/2"	1/2"	1"	0.030	3"	XF-602-16-030-FL	XF-602-16-030
1/2"	1/2"	1"	0.060	3"	XF-602-16-060-FL	XF-602-16-060
1/2"	1/2"	1"	0.090	3"	XF-602-16-090-FL	XF-602-16-090
1/2"	1/2"	1"	0.120	3"	XF-602-16-120-FL	XF-602-16-120
5/8"	5/8"	1-1/4"	0.030	3-1/2"	XF-602-20-030-FL	XF-602-20-030
5/8"	5/8"	1-1/4"	0.060	3-1/2"	XF-602-20-060-FL	XF-602-20-060
5/8"	5/8"	1-1/4"	0.090	3-1/2"	XF-602-20-090-FL	XF-602-20-090
5/8"	5/8"	1-1/4"	0.120	3-1/2"	XF-602-20-120-FL	XF-602-20-120
3/4"	3/4"	1-1/2"	0.060	4"	XF-802-24-060-FL	XF-802-24-060
3/4"	3/4"	1-1/2"	0.090	4"	XF-802-24-090-FL	XF-802-24-090
3/4"	3/4"	1-1/2"	0.120	4"	XF-802-24-120-FL	XF-802-24-120
1"	1"	2"	0.060	5"	XF-802-32-060-FL	XF-802-32-060
1"	1"	2"	0.090	5"	XF-802-32-090-FL	XF-802-32-090
1"	1"	2"	0.120	5"	XF-802-32-120-FL	XF-802-32-120

See New Trochoidal Tool Paths
robbjack.com/robbjack-tv

Cut Titanium up to 75 inches/minute
1905 mm/minute



MXF-602/802 6/8 Flute Standard Length **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	AITiN	
					Tool Number Flats, AITiN Coated	Tool Number No Flats, AITiN Coated
10mm	10mm	20mm	2.0mm	72mm	MXF-602-10-020-FL	MXF-602-10-020
10mm	10mm	20mm	2.5mm	72mm	MXF-602-10-025-FL	MXF-602-10-025
10mm	10mm	20mm	3.0mm	72mm	MXF-602-10-030-FL	MXF-602-10-030
12mm	12mm	25mm	2.0mm	83mm	MXF-602-12-020-FL	MXF-602-12-020
12mm	12mm	25mm	2.5mm	83mm	MXF-602-12-025-FL	MXF-602-12-025
12mm	12mm	25mm	3.0mm	83mm	MXF-602-12-030-FL	MXF-602-12-030
16mm	16mm	32mm	2.0mm	92mm	MXF-602-16-020-FL	MXF-602-16-020
16mm	16mm	32mm	2.5mm	92mm	MXF-602-16-025-FL	MXF-602-16-025
16mm	16mm	32mm	3.0mm	92mm	MXF-602-16-030-FL	MXF-602-16-030
20mm	20mm	38mm	2.0mm	104mm	MXF-802-20-020-FL	MXF-802-20-020
20mm	20mm	38mm	2.5mm	104mm	MXF-802-20-025-FL	MXF-802-20-025
20mm	20mm	38mm	3.0mm	104mm	MXF-802-20-030-FL	MXF-802-20-030
25mm	25mm	38mm	2.0mm	104mm	MXF-802-25-020-FL	MXF-802-25-020
25mm	25mm	38mm	2.5mm	104mm	MXF-802-25-025-FL	MXF-802-25-025
25mm	25mm	38mm	3.0mm	104mm	MXF-802-25-030-FL	MXF-802-25-030

Eliminate Tool Pull Out!
h4 Shank Tolerance
Anti-pullout Shank Technology
Tightest in the Industry!



NOTE: Metric tools do not have flats.

XG/MXG Speeds & Feeds

XG-402 SPEEDS & FEEDS

Material	Surface Feet	1/4"		5/16"		3/8"		1/2"		5/8"		3/4"		1"	
		RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min
CAST IRON															
Ductile	400	6112	28	4890	34	4075	39	3056	43	2445	39	2037	34	1528	30
Gray	525	8022	42	6418	51	5348	58	4011	64	3209	58	2674	51	2006	45
INCONEL															
625/718	100	1528	4	1222	5	1019	6	764	7	611	6	509	5	382	5
STEEL															
1018/1020	500	7640	32	6112	39	5093	44	3820	49	3056	44	2547	39	1910	34
4130	400	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
4140	400	6112	20	4890	24	4075	28	3056	31	2445	28	2037	24	1528	21
4340	415	6341	21	5073	25	4227	29	3171	32	2536	29	2114	25	1585	22
STAINLESS STEEL															
303	550	8404	31	6723	38	5603	43	4202	48	3362	43	2801	38	2101	34
304	400	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
316	400	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
15-5/17-4	300	4584	13	3667	16	3056	18	2292	20	1834	18	1528	16	1146	14
13-8	300	4584	13	3667	16	3056	18	2292	20	1834	18	1528	16	1146	14
440C	300	4584	13	3667	16	3056	18	2292	20	1834	18	1528	16	1146	14
TOOL STEEL (ANNEALED)															
A2	400	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
D2	360	5501	16	4401	19	3667	22	2750	24	2200	22	1834	19	1375	17
H13	400	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
P20	400	6112	23	4890	28	4075	31	3056	35	2445	31	2037	28	1528	24
TITANIUM															
Com. pure	300	4584	17	3667	21	3056	24	2292	26	1834	24	1528	21	1146	18
6AL-4V	200	3056	9	2445	11	2037	12	1528	13	1222	12	1019	11	764	9
6AL-6V	175	2674	8	2139	9	1783	11	1337	12	1070	11	891	9	669	8

MXG-402 SPEEDS & FEEDS METRIC

Material	Surface Meters	6 mm		8 mm		10 mm		12 mm		16 mm		20 mm	
		RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min
CAST IRON													
Ductile	122	6475	706	4851	869	3881	978	3235	1087	2426	978	1941	869
Gray	160	8498	1060	6367	1304	5094	1467	4245	1630	3184	1467	2547	1304
INCONEL													
625/718	30	1619	108	1213	134	970	150	809	167	606	150	485	134
STEEL													
1018/1020	152	8093	807	6063	994	4851	1118	4043	1242	3032	1118	2426	994
4130	122	6475	505	4851	621	3881	699	3235	776	2426	699	1941	621
4140	122	6475	505	4851	621	3881	699	3235	776	2426	699	1941	621
4340	126	6717	523	5033	644	4027	725	3356	805	2517	725	2013	644
STAINLESS STEEL													
303	168	8903	791	6670	973	5337	1095	4448	1217	3335	1095	2668	973
304	122	6475	444	4851	546	3881	615	3235	683	2426	615	1941	546
316	122	6475	444	4851	546	3881	615	3235	683	2426	615	1941	546
15-5/17-4	91	4856	333	3638	410	2911	461	2426	512	1819	461	1455	410
13-8	91	4856	333	3638	410	2911	461	2426	512	1819	461	1455	410
440C	91	4856	333	3638	410	2911	461	2426	512	1819	461	1455	410

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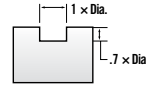
MXG-402 SPEEDS & FEEDS **METRIC** —CONTINUED FROM PREVIOUS

Material	Surface Meters	6 mm		8 mm		10 mm		12 mm		16 mm		20 mm	
		RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min	RPM	mm/min
TOOL STEEL (ANNEALED)													
A2	122	6475	444	4851	546	3881	615	3235	683	2426	615	1941	546
D2	110	5827	400	4366	492	3493	553	2911	615	2183	553	1747	492
H13	122	6475	444	4851	546	3881	615	3235	683	2426	615	1941	546
P20	122	6475	575	4851	708	3881	796	3235	885	2426	796	1941	708
TITANIUM													
Com. pure	91	4856	431	3638	531	2911	597	2426	664	1819	597	1455	531
6AL-4V	61	3237	222	2425	273	1941	307	1617	342	1213	307	970	273
6AL-6V	53	2833	194	2122	239	1698	269	1415	299	1061	269	849	239

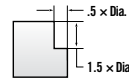
General Guidelines for XG-402 and MXG-402

- Speeds and feeds are based on applications with very rigid machine tools, toolholders, and fixturing. Speeds and feeds will vary dramatically depending on the application. Extreme forces can be generated and can cause damage, if not appropriate for the cutting conditions.
- Helical interpolation or ramping should be used to enter pockets.
- For the highest material removal rates and longest tool life profile milling is preferred over slotting (See diagrams at right).
- Use shrink fit or equivalent tool holder. If not, use flats to eliminate slippage in the tool holder!
- Climb milling is recommended.
- For ball end tools reduce feed rate by 10%.

Slotting



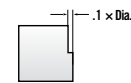
Profiling



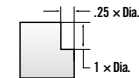
XG-502 AND XF SERIES SPEEDS & FEEDS

Material	Surface Feet	3/8"		1/2"		5/8"		3/4"		1"	
		RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min
CAST IRON											
Ductile	400	4075	58	3056	64	2445	58	2037	68	1528	60
Gray	525	5348	86	4011	96	3209	86	2674	102	2006	90
INCONEL											
625/718	150	1528	12	1146	14	917	12	764	16	573	14
STEEL											
1018/1020	500	5093	62	3820	68	3056	62	2547	74	1910	32
4130	400	4075	42	3056	46	2445	42	2037	48	1528	42
4140	400	4075	42	3056	46	2445	42	2037	48	1528	42
4340	415	4227	42	3171	48	2536	42	2114	50	1585	44
STAINLESS STEEL											
303	550	5603	62	4202	68	3362	62	2801	72	2101	64
304	400	4075	36	3056	40	2445	36	2037	44	1528	38
316	400	4075	36	3056	40	2445	36	2037	44	1528	38
15-5/17-4	300	3056	28	2292	30	1834	28	1528	32	1146	28
13-8	300	3056	28	2292	30	1834	28	1528	32	1146	28
440C	300	3056	28	2292	30	1834	28	1528	32	1146	28
TOOL STEEL (ANNEALED)											
A2	400	4075	36	3056	40	2445	36	2037	44	1528	38
D2	360	3667	32	2750	36	2200	32	1834	38	1375	34
H13	400	4075	36	3056	40	2445	36	2037	44	1528	38
P20	400	4075	44	3056	50	2445	44	2037	52	1528	46
TITANIUM											
Com. pure	300	3056	34	2292	38	1834	34	1528	40	1146	34
6AL-4V	380	3871	42	2903	48	2323	42	1935	50	1452	44
6AL-6V	175	1783	20	1337	22	1070	20	891	24	669	20

XF Finish Profiling



XG-502 Profiling



ST/MST Super Tuffy Grade Carbide End Mills

Characteristics

- Square End
- Corner Radius
- 3 Flute
- 40° Helix
- T-Process Hone

Applications

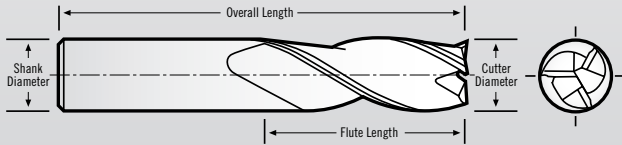
- Slotting
- Side Milling
- Helical Interpolation
- Ramping
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Cast Iron
- Steel
- Stainless Steel
- SUPER Alloys

Coatings

- Titanium Nitride
- Titanium Carbo-Nitride
- Aluminum Titan. Nitride



ST-341 and ST-343 Tolerances

Cutting Dia. (1/8" to 1/4") = +.000/- .002
 (5/16" to 3/4") = +.000/- .003
 Shank Dia. = -.0001/- .0002
 Flute Length (1/8" to 5/16") = +.030/- .000
 (3/8" to 3/4") = +.060/- .000
 OAL = ±.060

MST-341 Tolerances

Cutting Dia. = +.000/- .075mm
 Shank Dia. = -.002/- .005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm



ST-341 3 Flute Super Tuffy Carbide Stub Length



Cutting Diameter	Shank Diameter	Flute Length	Corner Break Size	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/4"	.003/.005	1-1/2"	ST-341-04	ST-341-04-T	ST-341-04-C	ST-341-04-A
3/16"	3/16"	3/8"	.003/.005	2"	ST-341-06	ST-341-06-T	ST-341-06-C	ST-341-06-A
1/4"	1/4"	1/2"	.003/.005	2-1/2"	ST-341-08	ST-341-08-T	ST-341-08-C	ST-341-08-A
5/16"	5/16"	1/2"	.004/.006	2-1/2"	ST-341-10	ST-341-10-T	ST-341-10-C	ST-341-10-A
3/8"	3/8"	5/8"	.005/.007	2-1/2"	ST-341-12	ST-341-12-T	ST-341-12-C	ST-341-12-A
1/2"	1/2"	5/8"	.006/.009	3"	ST-341-16	ST-341-16-T	ST-341-16-C	ST-341-16-A
5/8"	5/8"	3/4"	.009/.011	3-1/2"	ST-341-20	ST-341-20-T	ST-341-20-C	ST-341-20-A
3/4"	3/4"	1"	.011/.014	4"	ST-341-24	ST-341-24-T	ST-341-24-C	ST-341-24-A



MST-341 Metric 3 Flute Super Tuffy Carbide Stub Length METRIC



Cutting Diameter	Shank Diameter	Flute Length	Corner Break Size	Overall Length	Tool Number Uncoated	Tool Number Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
3mm	3mm	6mm	.075/.125mm	38mm	MST-341-03	MST-341-03-T	MST-341-03-C	MST-341-03-A
4mm	4mm	8mm	.075/.125mm	50mm	MST-341-04	MST-341-04-T	MST-341-04-C	MST-341-04-A
5mm	5mm	8mm	.075/.125mm	50mm	MST-341-05	MST-341-05-T	MST-341-05-C	MST-341-05-A
6mm	6mm	8mm	.075/.125mm	57mm	MST-341-06	MST-341-06-T	MST-341-06-C	MST-341-06-A
8mm	8mm	12mm	.100/.150mm	63mm	MST-341-08	MST-341-08-T	MST-341-08-C	MST-341-08-A
10mm	10mm	14mm	.125/.175mm	72mm	MST-341-10	MST-341-10-T	MST-341-10-C	MST-341-10-A
12mm	12mm	16mm	.150/.130mm	83mm	MST-341-12	MST-341-12-T	MST-341-12-C	MST-341-12-A
16mm	16mm	20mm	.230/.280mm	92mm	MST-341-16	MST-341-16-T	MST-341-16-C	MST-341-16-A
20mm	20mm	25mm	.280/.360mm	104mm	MST-341-20	MST-341-20-T	MST-341-20-C	MST-341-20-A

Super Tuffy Grade Carbide End Mills **ST**

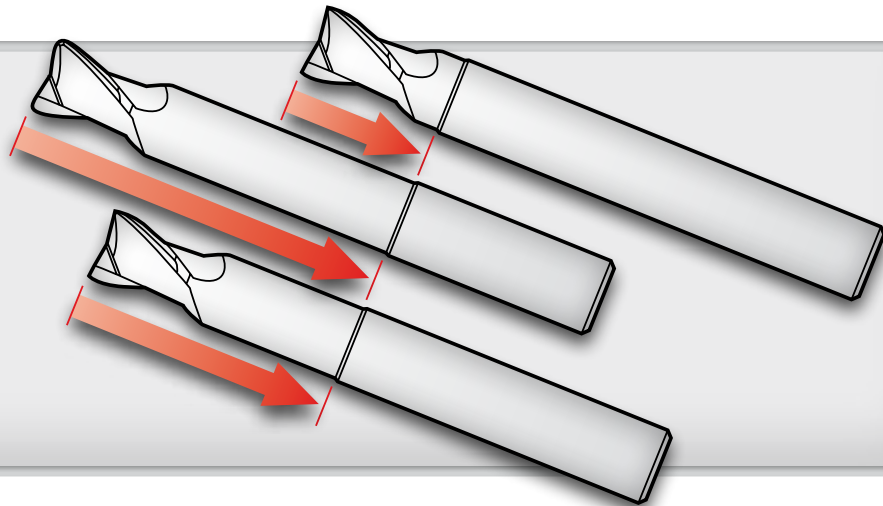


ST-343 3 Flute Super Tuffy Carbide Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Break Size	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/2"	.003/.005	1-1/2"	ST-343-04	ST-343-04-T	ST-343-04-C	ST-343-04-A
3/16"	3/16"	5/8"	.003/.005	2"	ST-343-06	ST-343-06-T	ST-343-06-C	ST-343-06-A
1/4"	1/4"	3/4"	.003/.005	2-1/2"	ST-343-08	ST-343-08-T	ST-343-08-C	ST-343-08-A
5/16"	5/16"	13/16"	.004/.006	2-1/2"	ST-343-10	ST-343-10-T	ST-343-10-C	ST-343-10-A
3/8"	3/8"	7/8"	.005/.007	2-1/2"	ST-343-12	ST-343-12-T	ST-343-12-C	ST-343-12-A
1/2"	1/2"	1"	.006/.009	3"	ST-343-16	ST-343-16-T	ST-343-16-C	ST-343-16-A
5/8"	5/8"	1-1/4"	.009/.011	3-1/2"	ST-343-20	ST-343-20-T	ST-343-20-C	ST-343-20-A
3/4"	3/4"	1-1/2"	.011/.014	4"	ST-343-24	ST-343-24-T	ST-343-24-C	ST-343-24-A

Need Reach?

See End Mill Modifications (page 14)



STR/MSTR 3 Flute Super Tuffy Grade Carbide Ruffers

Characteristics

- Square End
- Corner Break
- 3 Flute
- 30° Helix
- T-Process Hone
- Flats

Applications

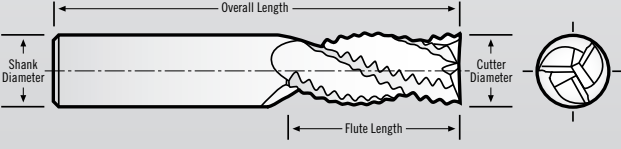
- Slotting
- Side Milling
- Ramping
- Roughing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Cast Iron
- Steel
- Stainless Steel

Coatings

- TiN Titanium Nitride
- TiCN Titanium Carbo-Nitride
- AlTiN Aluminum Titan. Nitride



STR Series Tolerances		MSTR Tolerances	
Cutting Dia. =	-.003/- .007	Cutting Dia. =	-.075/- .180mm
Shank Dia. =	-.0001/- .0002	Shank Dia. =	-.002/- .005mm
Flute Length (1/4" to 5/16") =	+.030/- .000	Flute Length =	+0.500/+1.500mm
(3/8" to 3/4") =	+.060/- .000	OAL =	± .10mm
OAL =	± .060		



TiN TiCN AlTiN

STR-301 3 Flute Super Tuffy Carbide Ruffer Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/4"	1/4"	1/2"	2-1/2"	STR-301-08*	STR-301-08-T*	STR-301-08-C*	STR-301-08-A*
5/16"	5/16"	1/2"	2-1/2"	STR-301-10*	STR-301-10-T*	STR-301-10-C*	STR-301-10-A*
3/8"	3/8"	5/8"	2-1/2"	STR-301-12	STR-301-12-T	STR-301-12-C	STR-301-12-A
7/16"	7/16"	5/8"	2-3/4"	STR-301-14*	STR-301-14-T*	STR-301-14-C*	STR-301-14-A*
1/2"	1/2"	5/8"	3"	STR-301-16	STR-301-16-T	STR-301-16-C	STR-301-16-A
5/8"	5/8"	7/8"	3-1/2"	STR-301-20	STR-301-20-T	STR-301-20-C	STR-301-20-A
3/4"	3/4"	1"	4"	STR-301-24	STR-301-24-T	STR-301-24-C	STR-301-24-A

*Does not come with flats.



MSTR-301 3 Flute Super Tuffy Carbide Ruffer Stub Length

METRIC TiN TiCN AlTiN

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
6mm	6mm	8mm	57mm	MSTR-301-06	MSTR-301-06-T	MSTR-301-06-C	MSTR-301-06-A
8mm	8mm	12mm	63mm	MSTR-301-08	MSTR-301-08-T	MSTR-301-08-C	MSTR-301-08-A
10mm	10mm	14mm	72mm	MSTR-301-10	MSTR-301-10-T	MSTR-301-10-C	MSTR-301-10-A
12mm	12mm	16mm	83mm	MSTR-301-12	MSTR-301-12-T	MSTR-301-12-C	MSTR-301-12-A
16mm	16mm	20mm	92mm	MSTR-301-16	MSTR-301-16-T	MSTR-301-16-C	MSTR-301-16-A
20mm	20mm	25mm	104mm	MSTR-301-20	MSTR-301-20-T	MSTR-301-20-C	MSTR-301-20-A

NOTE: Metric tools do not have flats.



STR-303 3 Flute Super Tuff Carbide Ruffer Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TIN Coated	Tool Number TiCN Coated	Tool Number Coated
1/4"	1/4"	3/4"	2-1/2"	STR-303-08*	STR-303-08-T*	STR-303-08-C*	STR-303-08-A*
0.2813	5/16"	3/4"	2-1/2"	STR-303-09*	STR-303-09-T*	STR-303-09-C*	STR-303-09-A*
5/16"	5/16"	13/16"	2-1/2"	STR-303-10*	STR-303-10-T*	STR-303-10-C*	STR-303-10-A*
3/8"	3/8"	7/8"	2-1/2"	STR-303-12	STR-303-12-T	STR-303-12-C	STR-303-12-A
7/16"	7/16"	1"	2-3/4"	STR-303-14*	STR-303-14-T*	STR-303-14-C*	STR-303-14-A*
1/2"	1/2"	1"	3"	STR-303-16	STR-303-16-T	STR-303-16-C	STR-303-16-A
9/16"	9/16"	1-1/4"	3-1/2"	STR-303-18*	STR-303-18-T*	STR-303-18-C*	STR-303-18-A*
5/8"	5/8"	1-1/4"	3-1/2"	STR-303-20	STR-303-20-T	STR-303-20-C	STR-303-20-A
3/4"	3/4"	1-1/2"	4"	STR-303-24	STR-303-24-T	STR-303-24-C	STR-303-24-A
1"	1"	2-1/2"	5"	STR-303-32	STR-303-32-T	STR-303-32-C	STR-303-32-A

*Does not come with flats.



MSTR-303 3 Flute Super Tuff Carbide Ruffer Standard Length

METRIC



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TIN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
6mm	6mm	14mm	57mm	MSTR-303-06	MSTR-303-06-T	MSTR-303-06-C	MSTR-303-06-A
8mm	8mm	16mm	63mm	MSTR-303-08	MSTR-303-08-T	MSTR-303-08-C	MSTR-303-08-A
10mm	10mm	20mm	72mm	MSTR-303-10	MSTR-303-10-T	MSTR-303-10-C	MSTR-303-10-A
12mm	12mm	25mm	83mm	MSTR-303-12	MSTR-303-12-T	MSTR-303-12-C	MSTR-303-12-A
16mm	16mm	32mm	92mm	MSTR-303-16	MSTR-303-16-T	MSTR-303-16-C	MSTR-303-16-A
20mm	20mm	38mm	104mm	MSTR-303-20	MSTR-303-20-T	MSTR-303-20-C	MSTR-303-20-A

NOTE: Metric tools do not have flats.

Need Without Flats?

Order any tool without flats by adding "-NF" to end of Tool Number!

NOTE: Metric sizes do not come with flats.



STR/MSTR 4 Flute Super Tuffy Grade Carbide Ruffers

Characteristics

- Square End
- Corner Break
- 4 Flute
- 30° Helix
- T-Process Hone
- Flats

Applications

- Side Milling
- Ramping
- Roughing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Cast Iron
- Steel
- Stainless Steel

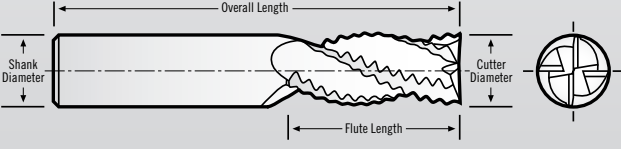
Coatings

- TiN Titanium Nitride
- TiCN Titanium Carbo-Nitride
- AlTiN Aluminum Titan. Nitride

Need WITHOUT Flats?

Order any tool without flats by adding "NF" to the end of the tool number.

Note: Metric tools DO NOT come with flats.



STR Series Tolerances	MSTR Tolerances
Cutting Dia. = -.003/-0.07	Cutting Dia. = -.075/-0.180mm
Shank Dia. = -.0001/-0.002	Shank Dia. = -.002/-0.005mm
Flute length (1/4" to 5/16") = +.030/-0.000	Flute Length = +0.500/+1.500mm
(3/8" to 3/4") = +.060/-0.000	OAL = ±0.10mm
OAL = ±0.060	



HONED EDGE!

TiN TiCN AlTiN

STR-401 4 Flute Super Tuffy Carbide Ruffer Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/4"	1/4"	1/2"	2-1/2"	STR-401-08*	STR-401-08-T*	STR-401-08-C*	STR-401-08-A*
5/16"	5/16"	1/2"	2-1/2"	STR-401-10*	STR-401-10-T*	STR-401-10-C*	STR-401-10-A*
3/8"	3/8"	5/8"	2-1/2"	STR-401-12	STR-401-12-T	STR-401-12-C	STR-401-12-A
7/16"	7/16"	5/8"	2-3/4"	STR-401-14*	STR-401-14-T*	STR-401-14-C*	STR-401-14-A*
1/2"	1/2"	5/8"	3"	STR-401-16	STR-401-16-T	STR-401-16-C	STR-401-16-A
5/8"	5/8"	7/8"	3-1/2"	STR-401-20	STR-401-20-T	STR-401-20-C	STR-401-20-A
3/4"	3/4"	1"	4"	STR-401-24	STR-401-24-T	STR-401-24-C	STR-401-24-A
1"	1"	1-1/2"	5"	STR-401-32	STR-401-32-T	STR-401-32-C	STR-401-32-A

*Does not come with flats.

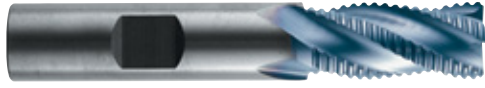


MSTR-401 4 Flute Super Tuffy Carbide Ruffer Stub Length

METRIC TiN TiCN AlTiN

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
6mm	6mm	8mm	57mm	MSTR-401-06	MSTR-401-06-T	MSTR-401-06-C	MSTR-401-06-A
8mm	8mm	12mm	63mm	MSTR-401-08	MSTR-401-08-T	MSTR-401-08-C	MSTR-401-08-A
10mm	10mm	14mm	72mm	MSTR-401-10	MSTR-401-10-T	MSTR-401-10-C	MSTR-401-10-A
12mm	12mm	16mm	83mm	MSTR-401-12	MSTR-401-12-T	MSTR-401-12-C	MSTR-401-12-A
16mm	16mm	20mm	92mm	MSTR-401-16	MSTR-401-16-T	MSTR-401-16-C	MSTR-401-16-A
20mm	20mm	25mm	104mm	MSTR-401-20	MSTR-401-20-T	MSTR-401-20-C	MSTR-401-20-A

NOTE: Metric tools do not have flats.



STR-404 4 Flute Super Tuffly Carbide Ruffer Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/4"	1/4"	3/4"	2-1/2"	STR-404-08*	STR-404-08-T*	STR-404-08-C*	STR-404-08-A*
0.2813	5/16"	3/4"	2-1/2"	STR-404-09*	STR-404-09-T*	STR-404-09-C*	STR-404-09-A*
5/16"	5/16"	13/16"	2-1/2"	STR-404-10*	STR-404-10-T*	STR-404-10-C*	STR-404-10-A*
3/8"	3/8"	7/8"	2-1/2"	STR-404-12	STR-404-12-T	STR-404-12-C	STR-404-12-A
7/16"	7/16"	1"	2-3/4"	STR-404-14*	STR-404-14-T*	STR-404-14-C*	STR-404-14-A*
1/2"	1/2"	1"	3"	STR-404-16	STR-404-16-T	STR-404-16-C	STR-404-16-A
9/16"	9/16"	1-1/4"	3-1/2"	STR-404-18*	STR-404-18-T*	STR-404-18-C*	STR-404-18-A*
5/8"	5/8"	1-1/4"	3-1/2"	STR-404-20	STR-404-20-T	STR-404-20-C	STR-404-20-A
3/4"	3/4"	1-1/2"	4"	STR-404-24	STR-404-24-T	STR-404-24-C	STR-404-24-A
1"	1"	2-1/2"	5"	STR-404-32	STR-404-32-T	STR-404-32-C	STR-404-32-A

*Does not come with flats.



MSTR-404 4 Flute Super Tuffly Carbide Ruffer Standard Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
6mm	6mm	14mm	57mm	MSTR-404-06	MSTR-404-06-T	MSTR-404-06-C	MSTR-404-06-A
8mm	8mm	16mm	63mm	MSTR-404-08	MSTR-404-08-T	MSTR-404-08-C	MSTR-404-08-A
10mm	10mm	20mm	72mm	MSTR-404-10	MSTR-404-10-T	MSTR-404-10-C	MSTR-404-10-A
12mm	12mm	25mm	83mm	MSTR-404-12	MSTR-404-12-T	MSTR-404-12-C	MSTR-404-12-A
16mm	16mm	32mm	92mm	MSTR-404-16	MSTR-404-16-T	MSTR-404-16-C	MSTR-404-16-A
20mm	20mm	38mm	104mm	MSTR-404-20	MSTR-404-20-T	MSTR-404-20-C	MSTR-404-20-A

NOTE: Metric tools do not have flats.

Need Without Flats?

Order any tool without flats by adding "-NF" to end of Tool Number!

NOTE: Metric sizes do not come with flats.



B 3 Flute Tuffy Grade Carbide Ball End Mills



Characteristics

- Ball End
- 3 Flute
- 30° Helix
- T-Process Hone

Applications

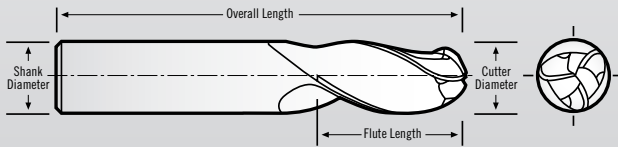
- Slotting
- Side Milling
- Helical Interpolation
- Conventional
- Ramping
- High Performance
- 3-D
- Roughing
- Semi-Finishing
- Finishing

Materials

- Cast Iron
- Steel
- Stainless Steel
- SUPER Alloys

Coatings

- TiN Titanium Nitride
- TiCN Titanium Carbo-Nitride
- AlTiN Aluminum Titan. Nitride



B Series Tolerances
 Cutting Dia. (0.0625 to 1/4") = +.000/- .002
 (0.2813 to 3/4") = +.000/- .003
 Shank Dia. = -.0001/- .0002
 Flute Length (0.0625 to 5/16") = +.030/- .000
 (3/8" to 1") = +.060/- .000
 OAL = ±.060



B-300 3 Flute Tuffy Ball End Stub Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/4"	1-1/2"	B-300-04	B-300-04-T	B-300-04-C	B-300-04-A
3/16"	3/16"	5/16"	2"	B-300-06	B-300-06-T	B-300-06-C	B-300-06-A
1/4"	1/4"	5/16"	2-1/2"	B-300-08	B-300-08-T	B-300-08-C	B-300-08-A
5/16"	5/16"	7/16"	2-1/2"	B-300-10	B-300-10-T	B-300-10-C	B-300-10-A
3/8"	3/8"	1/2"	2-1/2"	B-300-12	B-300-12-T	B-300-12-C	B-300-12-A
1/2"	1/2"	5/8"	3"	B-300-16	B-300-16-T	B-300-16-C	B-300-16-A
5/8"	5/8"	7/8"	3-1/2"	B-300-20	B-300-20-T	B-300-20-C	B-300-20-A
3/4"	3/4"	1"	4"	B-300-24	B-300-24-T	B-300-24-C	B-300-24-A

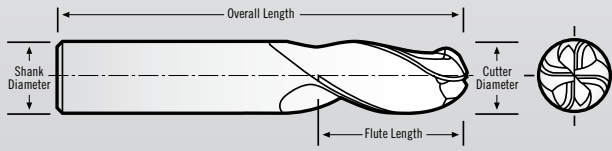
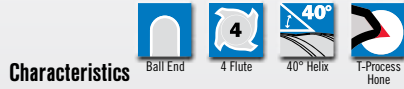


B-330 3 Flute Tuffy Ball End Standard Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/2"	1-1/2"	B-330-04	B-330-04-T	B-330-04-C	B-330-04-A
3/16"	3/16"	5/8"	2"	B-330-06	B-330-06-T	B-330-06-C	B-330-06-A
1/4"	1/4"	3/4"	2-1/2"	B-330-08	B-330-08-T	B-330-08-C	B-330-08-A
5/16"	5/16"	13/16"	2-1/2"	B-330-10	B-330-10-T	B-330-10-C	B-330-10-A
3/8"	3/8"	7/8"	2-1/2"	B-330-12	B-330-12-T	B-330-12-C	B-330-12-A
1/2"	1/2"	1"	3"	B-330-16	B-330-16-T	B-330-16-C	B-330-16-A
5/8"	5/8"	1-1/4"	3-1/2"	B-330-20	B-330-20-T	B-330-20-C	B-330-20-A
3/4"	3/4"	1-1/2"	4"	B-330-24	B-330-24-T	B-330-24-C	B-330-24-A

4 Flute Tuffy Grade Carbide Ball End Mills **B/MB**



B Series Tolerances

Cutting Dia. (0.0625 to 1/4") = +.000/- .002
 (0.2813 to 3/4") = +.000/- .003
 Shank Dia. = -.0001/- .0002
 Flute Length (0.0625 to 5/16") = +.030/- .000
 (3/8" to 1) = +.060/- .000
 OAL = ±.060

MB Tolerances

Cutting Dia. = +.000/- .075mm
 Shank Dia. = -.002/- .005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm



B-440 4 Flute Tuffy Ball End Standard Length 40° Helix



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/2"	1-1/2"	B-440-04	B-440-04-T	B-440-04-C	B-440-04-A
3/16"	3/16"	5/8"	2"	B-440-06	B-440-06-T	B-440-06-C	B-440-06-A
1/4"	1/4"	3/4"	2-1/2"	B-440-08	B-440-08-T	B-440-08-C	B-440-08-A
5/16"	5/16"	13/16"	2-1/2"	B-440-10	B-440-10-T	B-440-10-C	B-440-10-A
3/8"	3/8"	7/8"	2-1/2"	B-440-12	B-440-12-T	B-440-12-C	B-440-12-A
1/2"	1/2"	1"	3"	B-440-16	B-440-16-T	B-440-16-C	B-440-16-A
5/8"	5/8"	1-1/4"	3-1/2"	B-440-20	B-440-20-T	B-440-20-C	B-440-20-A
3/4"	3/4"	1-1/2"	4"	B-440-24	B-440-24-T	B-440-24-C	B-440-24-A



MB-440

4 Flute Tuffy Ball End Standard Length 40° Helix **METRIC**



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
3mm	3mm	12mm	38mm	MB-440-03	MB-440-03-T	MB-440-03-C	MB-440-03-A
4mm	4mm	12mm	50mm	MB-440-04	MB-440-04-T	MB-440-04-C	MB-440-04-A
5mm	5mm	14mm	50mm	MB-440-05	MB-440-05-T	MB-440-05-C	MB-440-05-A
6mm	6mm	14mm	57mm	MB-440-06	MB-440-06-T	MB-440-06-C	MB-440-06-A
8mm	8mm	16mm	63mm	MB-440-08	MB-440-08-T	MB-440-08-C	MB-440-08-A
10mm	10mm	20mm	72mm	MB-440-10	MB-440-10-T	MB-440-10-C	MB-440-10-A
12mm	12mm	25mm	83mm	MB-440-12	MB-440-12-T	MB-440-12-C	MB-440-12-A
16mm	16mm	32mm	92mm	MB-440-16	MB-440-16-T	MB-440-16-C	MB-440-16-A
20mm	20mm	38mm	104mm	MB-440-20	MB-440-20-T	MB-440-20-C	MB-440-20-A

ST/MST 3 Flute Super Tuffy Grade Carbide End Mills

Characteristics

- Square End
- 3 Flute
- 60° Helix

Applications

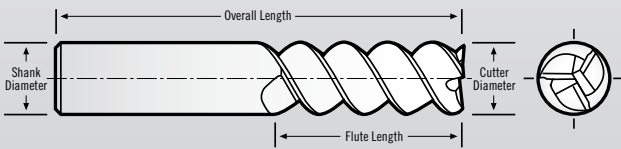
- Side Milling
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Cast Iron
- Steel
- Stainless Steel
- SUPER Alloys

Coatings

- Titanium Nitride
- Titanium Carbo-Nitride
- Aluminum Titan. Nitride



ST-360 Tolerances		MST-360 Tolerances	
Cutting Dia.	= +.000/- .003	Cutting Dia.	= +.000/- .075mm
Shank Dia.	= -.0001/- .0002	Shank Dia.	= -.002/- .005mm
Flute Length (1/8" to 1/4")	= +.030/- .002	Flute Length	= +0.500/+1.500mm
(5/16" to 3/4")	= +.060/- .003	OAL	= ±10mm
OAL	= ±.060		



ST-360 3 Flute Super Tuffy Carbide Standard Length

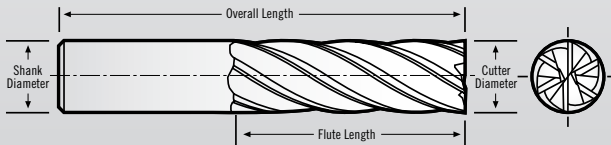
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/2"	1-1/2"	ST-360-04	ST-360-04-T	ST-360-04-C	ST-360-04-A
3/16"	3/16"	5/8"	2"	ST-360-06	ST-360-06-T	ST-360-06-C	ST-360-06-A
1/4"	1/4"	3/4"	2-1/2"	ST-360-08	ST-360-08-T	ST-360-08-C	ST-360-08-A
5/16"	5/16"	13/16"	2-1/2"	ST-360-10	ST-360-10-T	ST-360-10-C	ST-360-10-A
3/8"	3/8"	7/8"	2-1/2"	ST-360-12	ST-360-12-T	ST-360-12-C	ST-360-12-A
7/16"	7/16"	1"	2-3/4"	ST-360-14	ST-360-14-T	ST-360-14-C	ST-360-14-A
1/2"	1/2"	1"	3"	ST-360-16	ST-360-16-T	ST-360-16-C	ST-360-16-A
9/16"	9/16"	1-1/4"	3-1/2"	ST-360-18	ST-360-18-T	ST-360-18-C	ST-360-18-A
5/8"	5/8"	1-1/4"	3-1/2"	ST-360-20	ST-360-20-T	ST-360-20-C	ST-360-20-A
3/4"	3/4"	1-1/2"	4"	ST-360-24	ST-360-24-T	ST-360-24-C	ST-360-24-A



MST-360 3 Flute Super Tuffy Carbide Standard Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
3mm	3mm	12mm	38mm	MST-360-03	MST-360-03-T	MST-360-03-C	MST-360-03-A
4mm	4mm	12mm	50mm	MST-360-04	MST-360-04-T	MST-360-04-C	MST-360-04-A
5mm	5mm	14mm	50mm	MST-360-05	MST-360-05-T	MST-360-05-C	MST-360-05-A
6mm	6mm	14mm	57mm	MST-360-06	MST-360-06-T	MST-360-06-C	MST-360-06-A
8mm	8mm	16mm	63mm	MST-360-08	MST-360-08-T	MST-360-08-C	MST-360-08-A
10mm	10mm	20mm	72mm	MST-360-10	MST-360-10-T	MST-360-10-C	MST-360-10-A
12mm	12mm	25mm	83mm	MST-360-12	MST-360-12-T	MST-360-12-C	MST-360-12-A
16mm	16mm	32mm	92mm	MST-360-16	MST-360-16-T	MST-360-16-C	MST-360-16-A
20mm	20mm	38mm	104mm	MST-360-20	MST-360-20-T	MST-360-20-C	MST-360-20-A

6 Flute Super Tuffy Grade Carbide End Mills **ST/MST**



ST-630/ST-646 Tolerances
 Cutting Dia. = $+0.001/-0.000$
 Shank Dia. = $-0.001/-0.002$
 Flute Length = $+0.060/-0.000$
 OAL = ± 0.060

MST-646 Tolerances
 Cutting Dia. = $+0.025/-0.000$ mm
 Shank Dia. = $-0.002/-0.005$ mm
 Flute Length = $+0.500/+1.500$ mm
 OAL = ± 10 mm



ST-646 6 Flute Super Tuffy Carbide Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
3/8"	3/8"	7/8"	.005/.007	2-1/2"	ST-646-12	ST-646-12-T	ST-646-12-C	ST-646-12-A
1/2"	1/2"	1"	.006/.009	3"	ST-646-16	ST-646-16-T	ST-646-16-C	ST-646-16-A
5/8"	5/8"	1-1/4"	.009/.011	3-1/2"	ST-646-20	ST-646-20-T	ST-646-20-C	ST-646-20-A
3/4"	3/4"	1-1/2"	.011/.014	4"	ST-646-24	ST-646-24-T	ST-646-24-C	ST-646-24-A
1"	1"	2-1/2"	.012/.015	5"	ST-646-32	ST-646-32-T	ST-646-32-C	ST-646-32-A



MST-646 6 Flute Super Tuffy Carbide Standard Length **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
10mm	10mm	20mm	.125/.180mm	72mm	MST-646-10	MST-646-10-T	MST-646-10-C	MST-646-10-A
12mm	12mm	25mm	.150/.230mm	83mm	MST-646-12	MST-646-12-T	MST-646-12-C	MST-646-12-A
16mm	16mm	32mm	.230/.280mm	92mm	MST-646-16	MST-646-16-T	MST-646-16-C	MST-646-16-A
20mm	20mm	38mm	.280/.355mm	104mm	MST-646-20	MST-646-20-T	MST-646-20-C	MST-646-20-A



ST-630 6 Flute Super Tuffy Carbide Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
3/8"	3/8"	7/8"	2-1/2"	ST-630-12	ST-630-12-T	ST-630-12-C	ST-630-12-A
1/2"	1/2"	1"	3"	ST-630-16	ST-630-16-T	ST-630-16-C	ST-630-16-A
5/8"	5/8"	1-1/4"	3-1/2"	ST-630-20	ST-630-20-T	ST-630-20-C	ST-630-20-A
3/4"	3/4"	1-1/2"	4"	ST-630-24	ST-630-24-T	ST-630-24-C	ST-630-24-A
1"	1"	2-1/2"	5"	ST-630-32	ST-630-32-T	ST-630-32-C	ST-630-32-A

ST/MST 4 Flute Super Tuffy Grade Carbide End Mills

Characteristics

- Square End
- 4 Flute
- 30° Helix

Applications

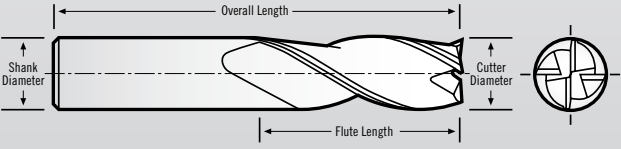
- Side Milling
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Cast Iron
- Steel
- Stainless Steel
- SUPER Alloys

Coatings

- Titanium Nitride
- Titanium Carbo-Nitride
- Aluminum Titan. Nitride



ST-430/434 Tolerances

Cutting Dia. = +.001/- .000
 Shank Dia. = -.0001/- .0002
 Flute Length (1/8" to 5/16") = +.030/- .000
 (3/8" to 1) = +.060/- .000
 OAL = ±.060

MST-430 and MST-434 Tolerances

Cutting Dia. = +.025/- .000mm
 Shank Dia. = -.002/- .005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±0.1mm



Sharp Edges
 Tolerances

ST-430 4 Flute Super Tuffy Carbide Standard Length

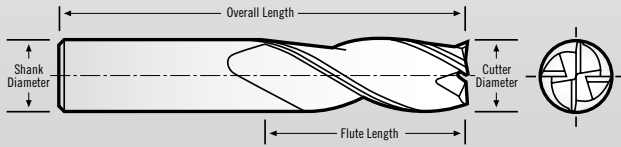
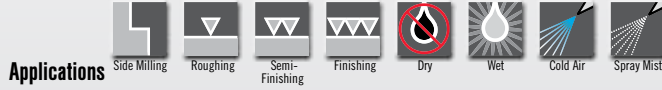
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/2"	1-1/2"	ST-430-04	ST-430-04-T	ST-430-04-C	ST-430-04-A
0.1563	3/16"	9/16"	2"	ST-430-05	ST-430-05-T	ST-430-05-C	ST-430-05-A
3/16"	3/16"	5/8"	2"	ST-430-06	ST-430-06-T	ST-430-06-C	ST-430-06-A
0.2188	1/4"	5/8"	2-1/2"	ST-430-07	ST-430-07-T	ST-430-07-C	ST-430-07-A
1/4"	1/4"	3/4"	2-1/2"	ST-430-08	ST-430-08-T	ST-430-08-C	ST-430-08-A
0.2813	5/16"	3/4"	2-1/2"	ST-430-09	ST-430-09-T	ST-430-09-C	ST-430-09-A
5/16"	5/16"	13/16"	2-1/2"	ST-430-10	ST-430-10-T	ST-430-10-C	ST-430-10-A
3/8"	3/8"	7/8"	2-1/2"	ST-430-12	ST-430-12-T	ST-430-12-C	ST-430-12-A
7/16"	7/16"	1"	2-3/4"	ST-430-14	ST-430-14-T	ST-430-14-C	ST-430-14-A
1/2"	1/2"	1"	3"	ST-430-16	ST-430-16-T	ST-430-16-C	ST-430-16-A
9/16"	9/16"	1-1/4"	3-1/2"	ST-430-18	ST-430-18-T	ST-430-18-C	ST-430-18-A
5/8"	5/8"	1-1/4"	3-1/2"	ST-430-20	ST-430-20-T	ST-430-20-C	ST-430-20-A
3/4"	3/4"	1-1/2"	4"	ST-430-24	ST-430-24-T	ST-430-24-C	ST-430-24-A



MST-430 4 Flute Super Tuffy Carbide Standard Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
3mm	3mm	12mm	38mm	MST-430-03	MST-430-03-T	MST-430-03-C	MST-430-03-A
4mm	4mm	12mm	50mm	MST-430-04	MST-430-04-T	MST-430-04-C	MST-430-04-A
5mm	5mm	14mm	50mm	MST-430-05	MST-430-05-T	MST-430-05-C	MST-430-05-A
6mm	6mm	14mm	57mm	MST-430-06	MST-430-06-T	MST-430-06-C	MST-430-06-A
8mm	8mm	16mm	63mm	MST-430-08	MST-430-08-T	MST-430-08-C	MST-430-08-A
10mm	10mm	20mm	72mm	MST-430-10	MST-430-10-T	MST-430-10-C	MST-430-10-A
12mm	12mm	25mm	83mm	MST-430-12	MST-430-12-T	MST-430-12-C	MST-430-12-A
16mm	16mm	32mm	92mm	MST-430-16	MST-430-16-T	MST-430-16-C	MST-430-16-A
20mm	20mm	38mm	104mm	MST-430-20	MST-430-20-T	MST-430-20-C	MST-430-20-A

4 Flute Super Tuffy Grade Carbide End Mills **ST/MST**



ST-430/434 Tolerances

Cutting Dia. = $+0.01/-0.00$
 Shank Dia. = $-0.001/-0.002$
 Flute Length (1/8" to 5/16") = $+0.030/-0.000$
 (3/8" to 1) = $+0.060/-0.000$
 OAL = ± 0.060

MST-430 and MST-434 Tolerances

Cutting Dia. = $+0.025/-0.000$ mm
 Shank Dia. = $-0.002/-0.005$ mm
 Flute Length = $+0.500/+1.500$ mm
 OAL = ± 10 mm



ST-434 4 Flute Super Tuffy Carbide Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Break Size	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/2"	.003/.005	1-1/2"	ST-434-04	ST-434-04-T	ST-434-04-C	ST-434-04-A
3/16"	3/16"	5/8"	.003/.005	2"	ST-434-06	ST-434-06-T	ST-434-06-C	ST-434-06-A
1/4"	1/4"	3/4"	.003/.005	2-1/2"	ST-434-08	ST-434-08-T	ST-434-08-C	ST-434-08-A
5/16"	5/16"	13/16"	.004/.006	2-1/2"	ST-434-10	ST-434-10-T	ST-434-10-C	ST-434-10-A
3/8"	3/8"	7/8"	.005/.007	2-1/2"	ST-434-12	ST-434-12-T	ST-434-12-C	ST-434-12-A
1/2"	1/2"	1"	.006/.009	3"	ST-434-16	ST-434-16-T	ST-434-16-C	ST-434-16-A
5/8"	5/8"	1-1/4"	.009/.011	3-1/2"	ST-434-20	ST-434-20-T	ST-434-20-C	ST-434-20-A
3/4"	3/4"	1-1/2"	.011/.014	4"	ST-434-24	ST-434-24-T	ST-434-24-C	ST-434-24-A



MST-434 4 Flute Super Tuffy Carbide Standard Length **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Corner Break Size	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
3mm	3mm	12mm	.075/.125mm	38mm	MST-434-03	MST-434-03-T	MST-434-03-C	MST-434-03-A
4mm	4mm	12mm	.075/.125mm	50mm	MST-434-04	MST-434-04-T	MST-434-04-C	MST-434-04-A
5mm	5mm	14mm	.075/.125mm	50mm	MST-434-05	MST-434-05-T	MST-434-05-C	MST-434-05-A
6mm	6mm	14mm	.075/.125mm	57mm	MST-434-06	MST-434-06-T	MST-434-06-C	MST-434-06-A
8mm	8mm	16mm	.100/.150mm	63mm	MST-434-08	MST-434-08-T	MST-434-08-C	MST-434-08-A
10mm	10mm	20mm	.125/.175mm	72mm	MST-434-10	MST-434-10-T	MST-434-10-C	MST-434-10-A
12mm	12mm	25mm	.150/.130mm	83mm	MST-434-12	MST-434-12-T	MST-434-12-C	MST-434-12-A
16mm	16mm	32mm	.230/.280mm	92mm	MST-434-16	MST-434-16-T	MST-434-16-C	MST-434-16-A
20mm	20mm	38mm	.280/.360mm	104mm	MST-434-20	MST-434-20-T	MST-434-20-C	MST-434-20-A

FBD 2 Flute Flat Bottom Drills for Steel and difficult alloys



Characteristics

- Corner Radius
- 2 Flute
- T-Process Hone

Applications

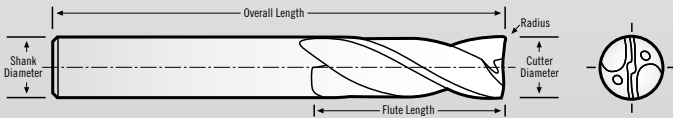
- Intersecting Holes
- Shoulder Drilling
- Angled Holes
- Guide Holes

Materials

- Cast Iron
- Steel
- Stainless Steel
- SUPER Alloys

Coatings

- Aluminum
- Titan. Nitride



FBD Series Tolerances

Cutting Dia. = +0.000/-0.001"
 Shank Dia. = -0.0001/-0.0002"
 Flute Length = +0.060/-0.000"
 OAL = ±0.060"



NEW!

180° Tip

FBD-201 2 Flute 2x Diameter Flat Bottom Drills



Cutting Diameter	Shank Diameter	Flute Length	Max Hole depth	Corner Radius	Overall Length	Tool Number AITIN Coated	Tool Number Thru Coolant AITIN Coated
1/8"	1/8"	3/8"	1/4"	0.005	1-1/2"	FBD-201-04-TP-A	FBD-201-04-TC-TP-A
3/16"	3/16"	9/16"	3/8"	0.01	2-1/2"	FBD-201-06-TP-A	FBD-201-06-TC-TP-A
1/4"	1/4"	3/4"	1/2"	0.01	2-1/2"	FBD-201-08-TP-A	FBD-201-08-TC-TP-A
5/16"	5/16"	15/16"	5/8"	0.02	2-1/2"	FBD-201-10-TP-A	FBD-201-10-TC-TP-A
3/8"	3/8"	1-1/8"	3/4"	0.02	3"	FBD-201-12-TP-A	FBD-201-12-TC-TP-A
1/2"	1/2"	1-1/2"	1"	0.02	3-1/2"	FBD-201-16-TP-A	FBD-201-16-TC-TP-A

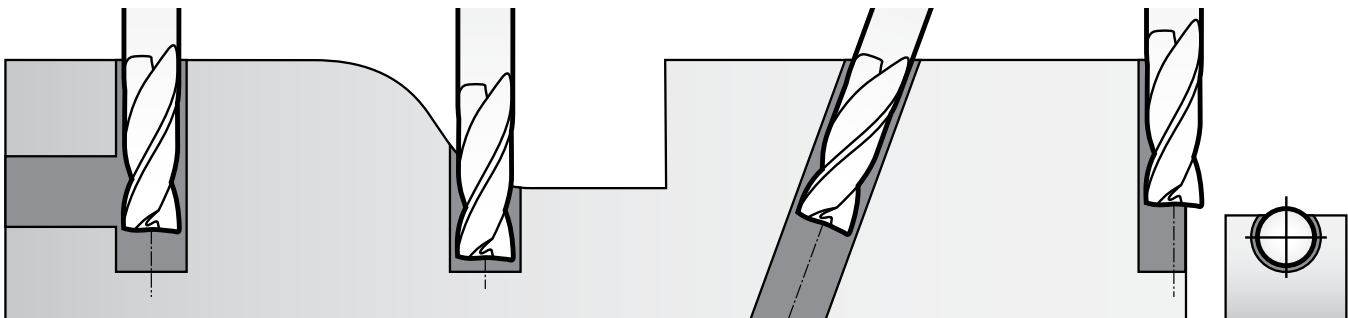


NEW!

FBD-202 2 Flute 5x Diameter Flat Bottom Drills



Cutting Diameter	Shank Diameter	Flute Length	Max Hole depth	Corner Radius	Overall Length	Tool Number AITIN Coated	Tool Number Thru Coolant AITIN Coated
1/8"	1/8"	3/4"	5/8"	0.005	2"	FBD-202-04-TP-A	FBD-202-04-TC-TP-A
3/16"	3/16"	1-1/8"	15/16"	0.01	2-1/2"	FBD-202-06-TP-A	FBD-202-06-TC-TP-A
1/4"	1/4"	1-1/2"	1-1/4"	0.01	3"	FBD-202-08-TP-A	FBD-202-08-TC-TP-A
5/16"	5/16"	1-7/8"	1-9/16"	0.02	3-1/2"	FBD-202-10-TP-A	FBD-202-10-TC-TP-A
3/8"	3/8"	2-1/4"	1-7/8"	0.02	4"	FBD-202-12-TP-A	FBD-202-12-TC-TP-A
1/2"	1/2"	3"	2-1/2"	0.02	5"	FBD-202-16-TP-A	FBD-202-16-TC-TP-A



Burr-Free Intersecting Holes

Shoulder Drilling

Drilling Angled Holes

Creating a Guide Hole

2 Flute Flat Bottom Drills for Steel and difficult alloys

FBD

Tool Diameter	Ductile Cast Iron		Alloy Steel 4130/ 4140/ A2/ H13 up to 35 HRC		303,304, 316 Stainless Steel		6Al4V Titanium, Inconel, 13-8 & 17-4SS, 440C		Inch per Revolution*
	FBD-201(2x) (SFM 200-350) RPM	FBD-202(5x) (SFM 150-300) RPM	FBD-201(2x) (SFM 150-225) RPM	FBD-202(5x) (SFM 125-200) RPM	FBD-201(2x) (SFM 100-150) RPM	FBD-202(5x) (SFM 90-150) RPM	FBD-201(2x) (SFM 60-90) RPM	FBD-202(5x) (SFM 60-90) RPM	
1/8	6112 - 10696	4584 - 9168	4584 - 6876	3820 - 6112	3056 - 4584	2750 - 4584	1834 - 2750	1834 - 2750	.001-.002
3/16	4075 - 7131	3056 - 6112	3056 - 4584	2547 - 4075	2037 - 3056	1834 - 3056	1222 - 1834	1222 - 1834	.0015-.003
1/4	3056 - 5348	2292 - 4584	2292 - 3438	1910 - 3056	1528 - 2292	1375 - 2292	917 - 1375	917 - 1375	.002-.003
5/16	2445 - 4278	1834 - 3667	1834 - 2750	1528 - 2445	1222 - 1834	1100 - 1834	733 - 1100	733 - 1100	.003-.004
3/8	2037 - 3565	1528 - 3056	1528 - 2292	1273 - 2037	1019 - 1528	917 - 1528	611 - 917	611 - 917	.005-.006
1/2	1528 - 2674	1146 - 2292	1146 - 1719	955 - 1528	764 - 1146	688 - 1146	458 - 688	458 - 688	.006-.007

Tool Diameter	Mild Carbon Steel/Gray Cast Iron		Inch per Revolution*
	FBD-201(2x) (SFM 200-350) RPM**	FBD-202(5x) (SFM 150-300) RPM**	
1/8	6112 - 10696	4584 - 9168	.002-.003
3/16	4075 - 7131	3056 - 6112	.003-.004
1/4	3056 - 5348	2292 - 4584	.004-.006
5/16	2445 - 4278	1834 - 3667	.006-.007
3/8	2037 - 3565	1528 - 3056	.006-.009
1/2	1528 - 2674	1146 - 2292	.009-.012

Use maximum RPM if it exceeds your machines RPM

Guide hole recommend if you get chatter. Pecking in small depths might help. Always start holes with short 2X drill first.

*Adjust inch per revolution to 50% when on angled surfaces is 30° or less.

*Adjust inch per revolution to 30% of recommended when on an angled or curved surface is greater than 30° or when the cutter is not fully encapsulated and only drilling a partial hole

** Adjust RPM to 70% of recommended RPM when on an angled or curved surface is greater than 30° or when the cutter is not fully encapsulated and only drilling a partial hole

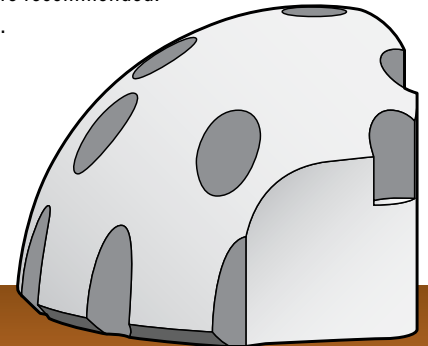
When using FBD-202 (5x) use FBD-201(2x) to start the hole to reduce walking.

Thru coolant holes recommended on FBD-202 (5x) deep holes

If chip packing is a problem thru coolant holes are recommended. Pecking may help if you do not have thru coolant.

Drilling Curved Material

If drilling on flat surfaces and the drill walks spot drill first to reduce the amount of surface contact when starting the hole. The longer a drill is, the higher the chance that it will walk.



Hi-Temp Alloys Tools in Other Sections

TS / MTS
201/301/401

(See Multiple Applications)



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TR
303/404/606

(See Multiple Applications)



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MINIATURES

(See Miniatures Applications)



132

SAWS

(See Saws Applications)



170

Tools for COMPOSITES



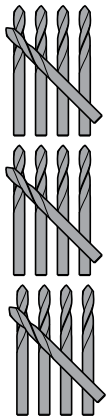
Composite Solutions

Scan this code to view:

- Videos on Drilling
- Videos on Trimming
- Tips and Tricks to Machine CFRP and Other Composites Made Easy!
- And More...

Use 135°/20° Single Shot Drills and Reams in one operation

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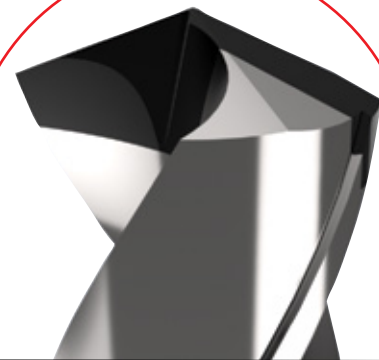


vs.



- No Delamination
- No Uncut Fibers
- No Fiber Pull Out
- Can be Resharpended

NEW!
Single Shot
PCD



Before

After

CPCD-203 – Best Trimming Tool for Composites


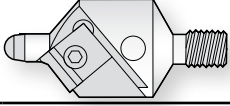





















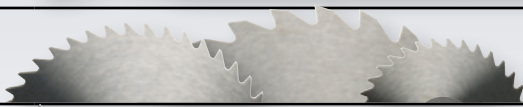
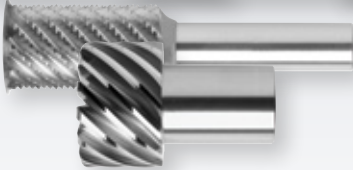
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View the CPD-203 in action on our web site!

Features:

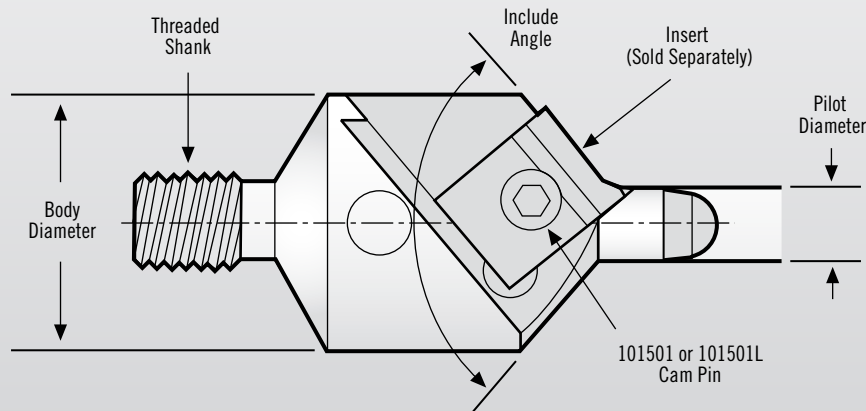
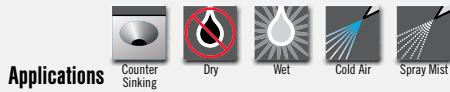
- Drill point for plunging into the part without blowing out the back side of the part
- Over 13,000 linear inches in Aircraft CFRP material

CSK	 Countersink Bodies and Inserts		102
PCD-TIPPED Drills	 PCD-Tipped Diamond Drills	NEW SIZES! 	104
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SPECIALS			

CSK Aircraft Countersinks

NEW!

Composites



SAVE UP TO 50% Versus PCD

100° Countersink with Threaded Shank and Diamond Coated Insert

RobbJack is proud to introduce our latest diamond coated product to enhance your productivity. The aircraft style countersink is designed to be used in a micro-stop cage for producing 100° countersinks with a root radius or angle for aircraft rivets.

COUNTERSINK BODIES

Body Diameter	Thread Size	Pilot Diameter Range	Tool Number
5/8"	1/4 - 28	.0970-.2570	CSKB1T-6 XXXX 1-1
3/4"	3/8 - 24	.2570-.3190	CSKB1T-7 XXXX 1-1
7/8"	3/8 - 24	.3190-.3940	CSKB1T-8 XXXX 1-1
1	7/16 - 20	.3940-.5590	CSKB1T-9 XXXX 1-1

COUNTERSINK INSERTS

Insert Style	Body Diameter	Tool Number Diamond Coated*
25° Double-Angle	5/8"	CSKIC-6IC025-1
0.020 Radius	5/8"	CSKIC-6IR020-1
0.035 Radius	3/4", 5/8", 1"	CSKIC-7IR035-1

*For the tool holder body specify the pilot diameter XXXX (example .2515 is 2515).

NEW!

SINGLE SHOT PCD DIAMOND DRILLS FOR CARBON FIBER PCD-13520 SERIES

RobbJack is utilizing a new and revolutionary technology in the manufacture of PCD tools. This new technology improves tool quality, PCD adhesion to the tool body, and increases heat resistance during cutting. All of these improvements allow tool performance that was once impossible.

- New PCD diamond tip geometry
- Best holes in carbon fiber
- Drills and reams in one operation
- Minimal delamination or uncut fibers
- Extreme tool life
- New 135°/20° 8 faceted tip design
(Best drill for widest variety of carbon fiber)
- \$548,000 cost savings per year in wing spar case study

Get a quote for your custom PCD tools
QUOTES@ROBBJACK.COM



PCD PCD-Tipped Diamond Drills

Composites

Characteristics

- 2 Flute
- 135/20° Drill Tip
- W Point Drill Tip
- PCD Diamond

Applications

- Hole Drilling
- Dry
- Wet
- Cold Air
- Spray Mist

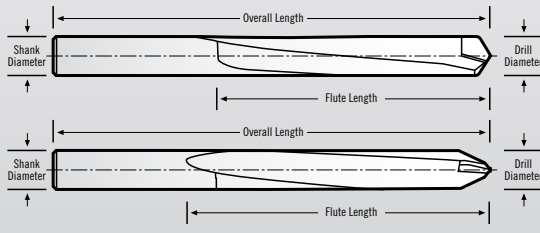
Materials

- Aluminum
- Copper
- Magnesium
- Plastics
- Composites
- Brass



Any diameter available from .0620" to .5000"

Replace the last four digits to specify the drill diameter size.



PCD-Tipped Drills Tolerances

Drill Dia. = +0.0000/-0.0005
 +0.0000/-0.0013mm

Shank Dia. = -0.0001/-0.0002
 -0.002/-0.005mm

Flute Length = +0.030
 +0.762mm

OAL = +0.060
 +1.5mm

Best Performing Drill in most Composites



Single Shot Drills and Reams in one operation



PCD 135/20° PCD-Tipped Standard Length - 8 Facet

Tool Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
.0625	1/8"	0.5	1.5	PCD-13520-0625
.0980	1/8"	0.5	1.5	PCD-13520-0980
.1285	1/8"	0.5	1.5	PCD-13520-1285
.1655	3/16"	1.4	2.7	PCD-13520-1655
.1915	1/4"	1.4	2.7	PCD-13520-1915
.2210	1/4"	1.4	2.7	PCD-13520-2210
.2510	1/4"	1.4	2.7	PCD-13520-2510
.3125	5/16"	1.5	2.7	PCD-13520-3125
.3765	3/8"	1.5	2.7	PCD-13520-3765



NEW SIZES!

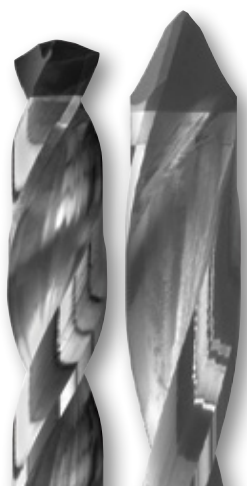


PCD W Point PCD-Tipped Standard Length

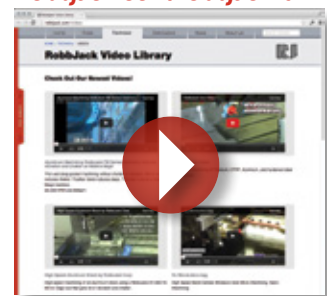
Tool Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
.0625	1/8"	0.5	1.5	PCD-11987-0625
.0980	1/8"	0.5	1.5	PCD-11987-0980
.1285	1/8"	0.5	1.5	PCD-11987-1285
.1655	3/16"	1.4	2.7	PCD-11987-1655
.1915	1/4"	1.4	2.7	PCD-11987-1915
.2210	1/4"	1.4	2.7	PCD-11987-2210
.2510	1/4"	1.4	2.7	PCD-11987-2510
.3125	5/16"	1.5	2.7	PCD-11987-3125
.3765	3/8"	1.5	2.7	PCD-11987-3765

Any diameter available from .0620" to .5000" - Replace the last four digits to specify the drill diameter size.

10-20X
 Tool Life Over Carbide!

See RobbJack Videos at robbjack.com/robbjack-tv



Get the advantage of geometries that used to be only available in carbide. Get the wear resistance of Diamond and the ability to re-sharpen PCD drills.

Solid PCD Tips Available per request. Call or email for a quote.

PCD-Tipped Diamond Drills **PCD**

Composites

Characteristics

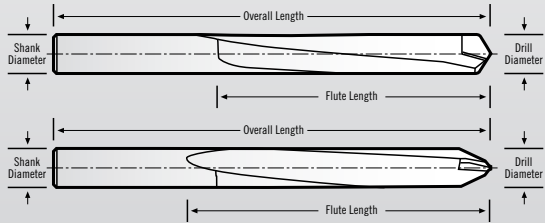
- 2 Flute
- 118° Drill Tip
- 118/62° Drill Tip
- PCD Diamond

Applications

- Hole Drilling
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Aluminum
- Copper
- Magnesium
- Plastics
- Composites
- BRASS



PCD-Tipped Drills Tolerances

Drill Dia. = +0.0000/-0.0005
+0.0000/-0.0013mm

Shank Dia. = -0.0001/-0.0002
-0.002/-0.005mm

Flute Length = +0.030
+0.762mm

OAL = +0.060
+1.5mm

Any diameter available from .0620" to .5000"

Replace the last four digits to specify the drill diameter size.



PCD 118° PCD-Tipped Standard Length - 4 Facet

Tool Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
.0625	1/8"	0.5	1.5	PCD-118-0625
.0980	1/8"	0.5	1.5	PCD-118-0980
.1285	1/8"	0.5	1.5	PCD-118-1285
.1655	3/16"	1.4	2.7	PCD-118-1655
.1915	1/4"	1.4	2.7	PCD-118-1915
.2210	1/4"	1.4	2.7	PCD-118-2210
.2510	1/4"	1.4	2.7	PCD-118-2510
.3125	5/16"	1.5	2.7	PCD-118-3125
.3765	3/8"	1.5	2.7	PCD-118-3765



NEW SIZES!

Composite Taper Tip

PCD CTT Point 118/62° PCD-Tipped Std. Length - 8 Facet

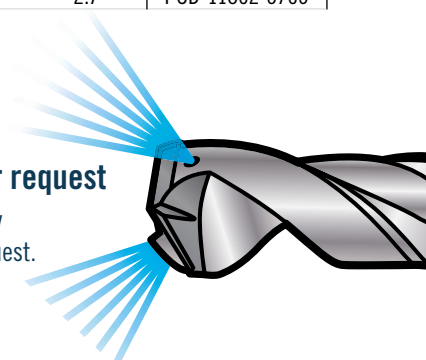
Tool Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
.0625	1/8"	0.5	1.5	PCD-11862-0625
.0980	1/8"	0.5	1.5	PCD-11862-0980
.1285	1/8"	0.5	1.5	PCD-11862-1285
.1655	3/16"	1.4	2.7	PCD-11862-1655
.1915	1/4"	1.4	2.7	PCD-11862-1915
.2210	1/4"	1.4	2.7	PCD-11862-2210
.2510	1/4"	1.4	2.7	PCD-11862-2510
.3125	5/16"	1.5	2.7	PCD-11862-3125
.3765	3/8"	1.5	2.7	PCD-11862-3765

BIG SOLUTIONS IN PCD

- Fast & Responsive Deliveries
- Guaranteed Performance
- Easy to do business with
- In-House R&D Center

Thru Coolant holes available per request

PCD Saws, form tools, hole saws, and many more PCD custom tools available upon request.



New sizes as small as .062 diameter

P810/F104 Diamond Coated Aircraft Drills

Characteristics

- 2 Flute
- 118° Drill Tip
- Elliptical Drill Tip

Applications

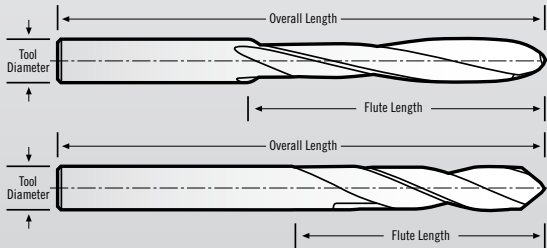
- Hole Drilling
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Aluminum (Al)
- Copper (Cu)
- Magnesium (Mg)
- Plastics
- Composites
- Brass

Coatings

- Diamond Coated (DCC)



P810/F104 Drills Tolerances

Drill Dia. = +0.0000/-0.0005
+0.000mm/-0.0127mm

Shank Dia. = -0.0001/-0.0030
+0.000mm/-0.076mm

Flute Length = +0.030
+0.762mm

OAL = +/-0.060
+/-1.5mm



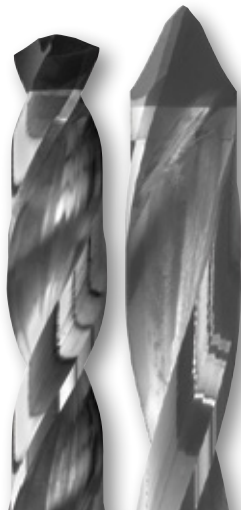
P810 118° Diamond Coated Standard Length Drills - 4 Facet

Tool Diameter	Flute Length	Overall Length	Tool Number Diamond Coated
0.0980	1.4	2.7	P810-100345-1
0.1285	1.4	2.7	P810-100344-1
0.1655	1.4	2.7	P810-100335-1
0.1915	1.4	2.7	P810-100336-1
0.1990	1.4	2.7	P810-100411-1
0.2210	1.4	2.7	P810-100346-1
0.2515	1.4	2.7	P810-100337-1
0.2812	1.4	2.7	P810-100410-1
0.3135	1.5	2.7	P810-100338-1
0.3765	1.5	2.7	P810-100341-1



F104 Elliptical Diamond Coated Standard Length Drills

Tool Diameter	Flute Length	Overall Length	Tool Number Diamond Coated
0.0980	1.4	2.7	F104-100001-1
0.1285	1.4	2.7	F104-100003-1
0.1655	1.4	2.7	F104-100007-1
0.1915	1.4	2.7	F104-100010-1
0.1990	1.4	2.7	F104-100011-1
0.2210	1.4	2.7	F104-100004-1
0.2515	1.4	2.7	F104-100002-1
0.2812	1.4	2.7	F104-100017-1
0.3135	1.5	2.7	F104-100018-1
0.3765	1.5	2.7	F104-100019-1



Get the advantage of geometries that used to be only available in carbide. Get the wear resistance of Diamond and the ability to re-sharpen PCD drills.

See Page 104

**Solid PCD Tips Available per request.
Call or email for a quote.**

Diamond Coated Drill/Reamer **P810**









Composites

NEW!

Characteristics



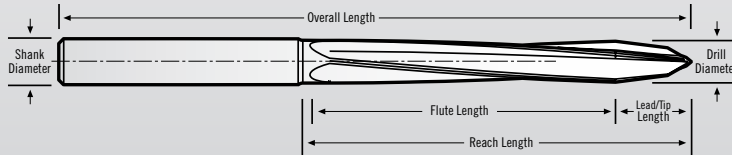

Applications

Materials




Coatings

Drill/Reamer Tolerances
 Drill Dia. = +0.0002/-0.0000"
 Shank Tolerance = h6
 Flute Length = ±0.060"
 OAL = ±0.060"



The low helix drill reamers are designed to drill and ream a precision hole in CFRC material in one step.

P810 4 Flute Diamond Coated Drill/Reamer

Drill Diameter	Tolerance from Nominal		Flute Length	Overall Length	Shank Diameter	Lead/Tip Length	Reach	Tool Number Diamond Coated
	Minimum	Maximum						
0.1280"	+0.0002"	-0.0000"	1"	3"	1/4"	0.325	1-3/4"	P810-100512-1
0.1620"	+0.0002"	-0.0000"	1"	3"	1/4"	0.3668	1-3/4"	P810-100513-1
0.1910"	+0.0002"	-0.0000"	1-1/2"	3-1/2"	1/4"	0.475	2"	P810-100486-1
0.2240"	+0.0002"	-0.0000"	1-1/2"	3-1/2"	1/4"	0.418	2"	P810-100495-1
0.2340"	+0.0002"	-0.0000"	1-1/2"	3-1/2"	1/4"	0.5232	2-1/8"	P810-100551-1
0.2510"	+0.0002"	-0.0000"	1-1/2"	3-1/2"	1/4"	0.4684		P810-100494-1
0.2640"	+0.0002"	-0.0000"	1-1/2"	3-1/2"	1/4"	0.59		P810-100510-1
0.2730"	+0.0002"	-0.0000"	1-1/2"	3-1/2"	1/4"	0.617		P810-100537-1
0.3140"	+0.0002"	-0.0000"	1-1/2"	3-1/2"	1/4"	0.7059		P810-100549-1

Recommended starting cutting speeds and feeds; 225 SFM and 10 IPM

SPECIALS

RobbJack can design and build a tool to your specifications.

Customs and specials are a large part of RobbJack's business, so contact one of our engineers with your requirements.

Typical Requests

- Tighter tolerances
- Special corner radius
- Special angle
- Reduced shank
- Multistep tools



P810 Diamond Coated Standard Drills

Characteristics  

Applications           

Materials  

Coatings  

Drill/Reamer Tolerances
 Cutting Dia. = +0.0002/-0.0000"
 Shank Tolerance = h6
 Flute Length = ±0.060"
 OAL = ±0.060"



Standard Diamond Coated Carbide Drills are 2 flute with a 118°, 4 facet drill point and come in jobber lengths. The diamond coating extends a minimum of one diameter from the drill tip on the jobber drills and past the countersink on center drills.

Diamond Coated Carbide Drills are available as specials in sizes from 0.028" to 0.750". Metric sizes are available.



P810 2 Flute 118° Diamond Coated Jobber Drills (4 facet)

Cutting Diameter	Tolerance Minimum	Tolerance Maximum	Flute Length	Overall Length	Tool Number Diamond Coated
1/32"	-0.0003"	+0.0005"	5/16"	1-1/4"	P810-100180-1
1/16"	-0.0001"	+0.0006"	3/4"	1-1/2"	P810-100023-1
3/32"	-0.0001"	+0.0006"	1"	2"	P810-100016-1
1/8"	+0.0001"	+0.0010"	1-1/4"	2-1/4"	P810-100024-1
3/16"	+0.0003"	+0.0011"	1-5/8"	2-3/4"	P810-100027-1
1/4"	+0.0006"	+0.0016"	2"	3-1/4"	P810-100002-1



P810 2 Flute Center Drills (only one end coated)

Size	Drill Diameter	Body Diameter	Countersink Angle	Overall Length	Tool Number Diamond Coated
#00	0.025"	1/8"	60°	1-1/2"	P810-100200-1
#0	1/32"	1/8"	60°	1-1/2"	P810-100071-1
#1	3/64"	1/8"	60°	1-1/2"	P810-100072-1
#2	5/64"	3/16"	60°	2"	P810-100073-1
#3	7/64"	1/4"	60°	2"	P810-100074-1
#4	1/8"	5/16"	60°	2-1/8"	P810-100075-1
#5	3/16"	7/16"	60°	2-3/4"	P810-100240-1

QUANTITY DISCOUNTS
Available at Qty 7, 13 and 20+

PCD-Tipped Router Bits **CPCD/MCPCD**

Composites

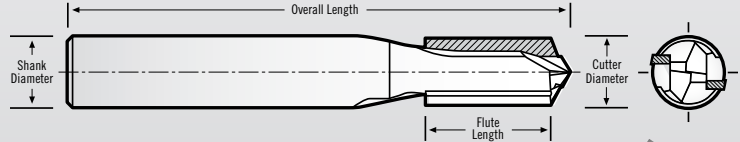
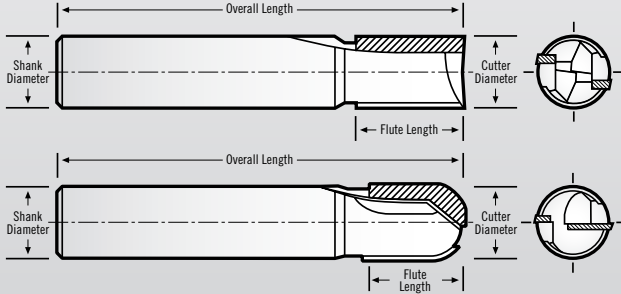
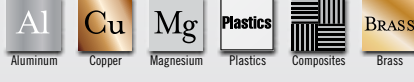
Characteristics



Applications



Materials

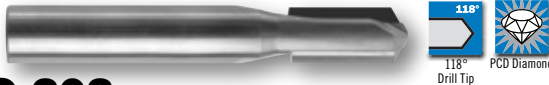


CPCD Tolerances

Cutting Dia. = ±.003
Shank Dia. = -.0001/-0.0002
Flute Length = ±.030
OAL = ±.060

MCPCD Tolerances

Cutting Dia. = ±0,076mm
Shank Dia. = -0,003/-0,005mm
Flute Length = ±0,76mm
OAL = ±1,5mm



CPCD-203 2 Flute Drill Point Composite Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Drill Point	Overall Length	Tool Number
1/8"	1/8"	5/16"	118°	1-1/2"	CPCD-203-04
3/16"	3/16"	7/16"	118°	2"	CPCD-203-06
1/4"	1/4"	9/16"	118°	2"	CPCD-203-08
3/8"	3/8"	5/8"	118°	2-1/2"	CPCD-203-12
1/2"	1/2"	7/8"	118°	3"	CPCD-203-16
5/8"	5/8"	7/8"	118°	3-1/2"	CPCD-203-20
3/4"	3/4"	7/8"	118°	4"	CPCD-203-24



MCPCD-203 2 Flute Square End Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/8"	3/8"	1-1/2"	PCD-203-04-CF
3/16"	3/16"	1/2"	2"	PCD-203-06-CF
1/4"	1/4"	5/8"	2"	PCD-203-08-CF
3/8"	3/8"	3/4"	2-1/2"	PCD-203-12-CF
1/2"	1/2"	1"	3"	PCD-203-16-CF
5/8"	5/8"	1"	3-1/2"	PCD-203-20-CF
3/4"	3/4"	1"	4"	PCD-203-24-CF



MCPCD-203 METRIC 2 Flute Drill Point Composite Std. Lgth.

Cutting Diameter	Shank Diameter	Flute Length	Drill Point	Overall Length	Tool Number
3mm	3mm	8mm	118°	38mm	MCPCD-203-03-118
6mm	6mm	14mm	118°	50mm	MCPCD-203-06-118
10mm	10mm	16mm	118°	63mm	MCPCD-203-10-118
12mm	12mm	22mm	118°	76mm	MCPCD-203-12-118



MCPCD-203 METRIC 2 Flute Square End Composite Std. Lgth.

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Corner Radius	Overall Length	Tool Number
3mm	3mm	2	8mm	Sq. End	38mm	MCPCD-203-03
6mm	6mm	2	14mm	Sq. End	50mm	MCPCD-203-06
10mm	10mm	2	16mm	Sq. End	63mm	MCPCD-203-10
12mm	12mm	2	22mm	Sq. End	76mm	MCPCD-203-12



PCD-201BN 2 Flute Ball End Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/8"	1/4"	1-1/2"	PCD-201-04BN
3/16"	3/16"	5/16"	2"	PCD-201-06BN
1/4"	1/4"	3/8"	2"	PCD-201-08BN
3/8"	3/8"	1/2"	2-1/2"	PCD-201-12BN
1/2"	1/2"	5/8"	3"	PCD-201-16BN
5/8"	5/8"	7/8"	3-1/2"	PCD-201-20BN
3/4"	3/4"	1"	4"	PCD-201-24BN



PCD-203 2 Flute Square End Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/8"	3/8"	1-1/2"	PCD-203-04
3/16"	3/16"	1/2"	2"	PCD-203-06
1/4"	1/4"	5/8"	2"	PCD-203-08
3/8"	3/8"	3/4"	2-1/2"	PCD-203-12
1/2"	1/2"	1"	3"	PCD-203-16
5/8"	5/8"	1"	3-1/2"	PCD-203-20
3/4"	3/4"	1"	4"	PCD-203-24

CR/MCR Compression Router

Characteristics



Square End 4 Flute 6 Flute

Applications




Slotting Side Milling Helical Interpolation Ramping Roughing Semi-Finishing Finishing Dry Wet Cold Air Spray Mist

Materials

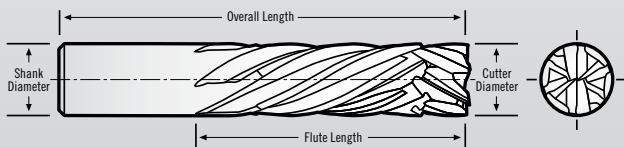


Composites

Coatings



Diamond Coated (DCC) Diamond-Like Carbon (DLC)



CR Tolerances

Cutting Dia. = $-.001/-0.003$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length (<0.3125) = $+.020/+0.030$
 (>0.3125) = $+.030/+0.060$
 OAL = ± 0.060

MCR Tolerances

Cutting Dia. = $-0.025/-0.075\text{mm}$
 Shank Dia. = $-0.002/-0.005\text{mm}$
 Flute Length = $+0.500/+1.500\text{mm}$
 OAL = $\pm 10\text{mm}$



UNCOATED



CR Compression Router – 4/6 Flute Uncoated

Cutting Diameter	Shank Diameter	Number of Flutes	Upshear Length	Flute Length	Overall Length	Tool Number Uncoated
1/4"	1/4"	4	3/16"	3/4"	2-1/2"	CR-402-08
3/8"	3/8"	6	1/4"	1"	2-1/2"	CR-602-12
1/2"	1/2"	6	1/4"	1-1/8"	3"	CR-602-16



MCR Compression Router – 4/6 Flute Uncoated **METRIC**

Cutting Diameter	Shank Diameter	Number of Flutes	Upshear Length	Flute Length	Overall Length	Tool Number Uncoated
6mm	6mm	4	5mm	20mm	63mm	MCR-402-06
10mm	10mm	6	6mm	25mm	63mm	MCR-602-10
12mm	12mm	6	6mm	28mm	76mm	MCR-602-12



DLC COATED



CR Compression Router – 4/6 Flute Black Widow DLC Coated

Cutting Diameter	Shank Diameter	Number of Flutes	Upshear Length	Flute Length	Overall Length	Tool Number DLC Coated
1/4"	1/4"	4	3/16"	3/4"	2-1/2"	CR-402-08-DLC
3/8"	3/8"	6	1/4"	1"	2-1/2"	CR-602-12-DLC
1/2"	1/2"	6	1/4"	1-1/8"	3"	CR-602-16-DLC



MCR Compression Router – 4/6 Flute Black Widow DLC Coated **METRIC**

Cutting Diameter	Shank Diameter	Number of Flutes	Upshear Length	Flute Length	Overall Length	Tool Number DLC Coated
6mm	6mm	4	5mm	20mm	63mm	MCR-402-06-DLC
10mm	10mm	6	6mm	25mm	63mm	MCR-602-10-DLC
12mm	12mm	6	6mm	28mm	76mm	MCR-602-12-DLC



DIAMOND COATED



CR Compression Router – 4/6 Flute Diamond Coated

Cutting Diameter	Shank Diameter	Number of Flutes	Upshear Length	Flute Length	Overall Length	Tool Number Diamond Coated
1/4"	1/4"	4	3/16"	3/4"	2-1/2"	CR-402-08-D
3/8"	3/8"	6	1/4"	1"	2-1/2"	CR-602-12-D
1/2"	1/2"	6	1/4"	1-1/8"	3"	CR-602-16-D



MCR Compression Router – 4/6 Flute Diamond Coated **METRIC**

Cutting Diameter	Shank Diameter	Number of Flutes	Upshear Length	Flute Length	Overall Length	Tool Number Diamond Coated
6mm	6mm	4	5mm	20mm	63mm	MCR-402-06-D
10mm	10mm	6	6mm	25mm	63mm	MCR-602-10-D
12mm	12mm	6	6mm	28mm	76mm	MCR-602-12-D

Carbide Composite Router **CE/MCE**

Characteristics



Square End 6 Flute 8 Flute

Applications




Slotting Side Milling Helical Interpolation Ramping Roughing Semi-Finishing Finishing Dry Wet Cold Air Spray Mist

Materials

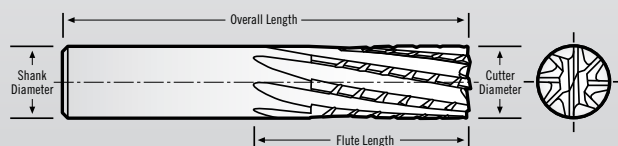


Composites

Coatings



Diamond Coated (DCC) Diamond-Like Carbon (DLC)



CE Tolerances

Cutting Dia. = $-.001/-0.003$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length (<0.3125) = $+0.020/+0.030$
 (>0.3125) = $+0.030/+0.060$
 OAL = ±0.060

MCE Tolerances

Cutting Dia. = $-0.025/-0.075$ mm
 Shank Dia. = $-0.002/-0.005$ mm
 Flute Length = $+0.500/+1.500$ mm
 OAL = ±10 mm



UNCOATED



CE Carbide Composite Router – 6/8 Flute Uncoated

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number Uncoated
1/4"	1/4"	6	3/4"	2-1/2"	CE-602-08
3/8"	3/8"	8	1"	2-1/2"	CE-802-12
1/2"	1/2"	8	1-1/8"	3"	CE-802-16



MCE Carbide Composite Router – 6/8 Flute Uncoated METRIC

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number Uncoated
6mm	6mm	6	20mm	63mm	MCE-602-06
10mm	10mm	8	25mm	63mm	MCE-802-10
12mm	12mm	8	28mm	76mm	MCE-802-12



DLC COATED



CE Carbide Composite Router – 6/8 Flute Black Widow DLC Coated

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number DLC Coated
1/4"	1/4"	6	3/4"	2-1/2"	CE-602-08-DLC
3/8"	3/8"	8	1"	2-1/2"	CE-802-12-DLC
1/2"	1/2"	8	1-1/8"	3"	CE-802-16-DLC



MCE Carbide Composite Router – 6/8 Flute Black Widow DLC Coated METRIC

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number DLC Coated
6mm	6mm	6	20mm	63mm	MCE-602-06-DLC
10mm	10mm	8	25mm	63mm	MCE-802-10-DLC
12mm	12mm	8	28mm	76mm	MCE-802-12-DLC



DIAMOND COATED



CE Carbide Composite Router – 6/8 Flute Diamond Coated

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number Diamond Coated
1/4"	1/4"	6	3/4"	2-1/2"	CE-602-08-D
3/8"	3/8"	8	1"	2-1/2"	CE-802-12-D
1/2"	1/2"	8	1-1/8"	3"	CE-802-16-D

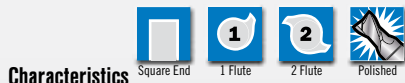


MCE Carbide Composite Router – 6/8 Flute Diamond Coated METRIC

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number Diamond Coated
6mm	6mm	6	20mm	63mm	MCE-602-06-D
10mm	10mm	8	25mm	63mm	MCE-802-10-D
12mm	12mm	8	28mm	76mm	MCE-802-12-D

PM/MPM/MPD/GTS Tuffy Grade Carbide Router Bits

Composites



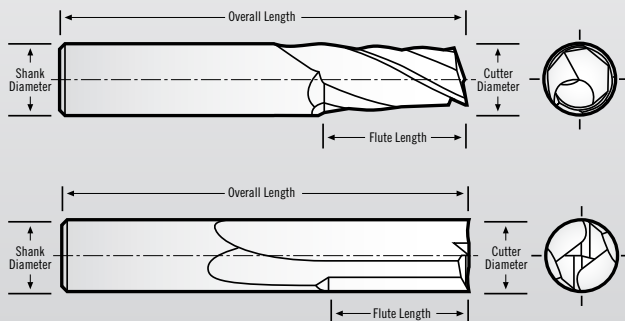
Characteristics



Applications



Materials



PM/PMD Series Tolerances

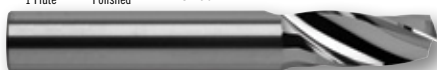
Cutting Dia. = +0.000/-0.002
 Shank Dia. = -0.0001/-0.0002
 Flute Length = +0.060/-0.000
 OAL = ±0.060

MPM Tolerances

Cutting Dia. = +.000/-0.075mm
 Shank Dia. = -.002/-0.005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm

GTS Series Tolerances

Cutting Dia. = +.000/-0.002
 Shank Dia. = -.0001/-0.0002
 Flute Length = +.060/-0.000
 OAL = ±0.060



PM Upshear 1 Flute Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/8"	1/2"	2"	PM-104-04
1/8"	1/4"	1/2"	2"	PM-108-04
3/16"	3/16"	5/8"	2"	PM-106-06
3/16"	1/4"	5/8"	2"	PM-108-06
3/16"	1/4"	1-1/4"	3"	PM-108-06L
1/4"	1/4"	3/4"	2"	PM-108-08
1/4"	1/4"	1-1/2"	3"	PM-108-08L
3/8"	3/8"	1-1/4"	3"	PM-112-12
1/2"	1/2"	1-1/2"	4"	PM-116-16



PMD Downshear 1 Flute Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/4"	1/2"	2"	PMD-108-04
3/16"	1/4"	5/8"	2"	PMD-108-06
1/4"	1/4"	3/4"	2"	PMD-108-08



MPM Upshear 1 Flute Tuffy Grade **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
4mm	3mm	12mm	50mm	MPM-104-04
6mm	4mm	12mm	50mm	MPM-106-04
6mm	6mm	14mm	50mm	MPM-106-05
6mm	6mm	14mm	57mm	MPM-106-06
8mm	8mm	22mm	63mm	MPM-108-08
10mm	10mm	25mm	72mm	MPM-110-10
12mm	12mm	25mm	83mm	MPM-112-12

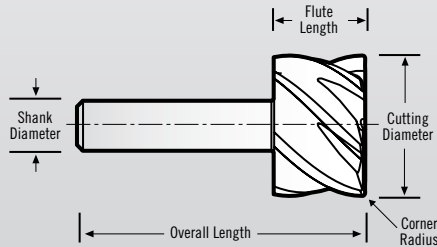


GTS 2 Flute Tuffy Grade Straight Flute

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/4"	1/2"	2"	GTS-201-04
1/4"	1/4"	3/4"	2-1/2"	GTS-201-08
3/8"	3/8"	7/8"	2-1/2"	GTS-201-12
1/2"	1/2"	1"	3"	GTS-201-16

Replaceable Tip End Mills **P820**

NEW!



Standard Tolerances

Cutting Dia. = +0.001/-0.001"
 Shank Tolerance h6
 Flute Length = ±.060"
 OAL = ±.060"

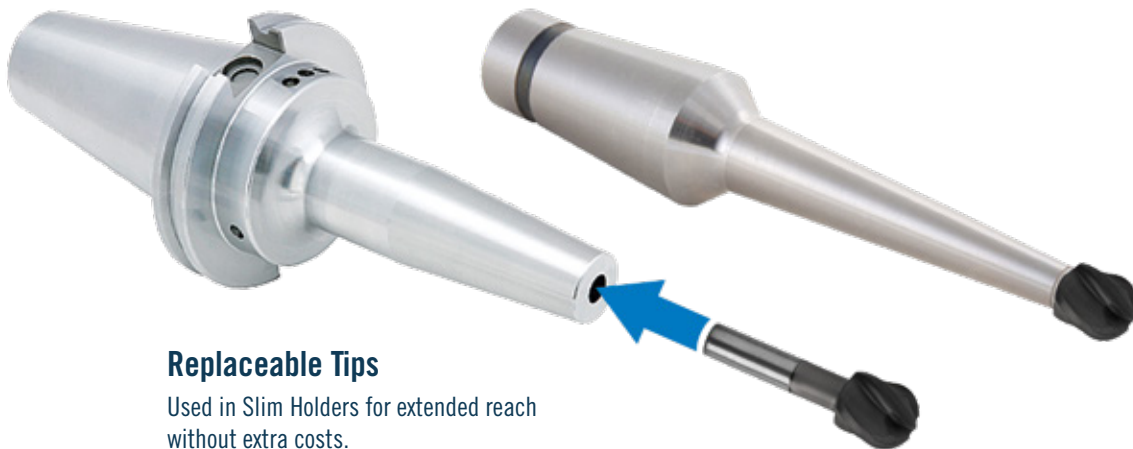
RobbJack is proud to introduce our latest diamond coated product to enhance your productivity: The 0.500" Replaceable Tip End Mill.

This tool is intended to be held in a heat shrink holder and give you 4 and 6 flute productivity as compared to the 2 flutes available from insert end mills this size. Depending on your application several configurations are currently available from stock.



P820 4 & 6 Flute 1/2" Replaceable Tip End Mill (with 1/4" h6 shank)

Cutting Diameter	Shank Diameter	Flute Length	Flute Number	Corner Radius	Overall Length	Tool Number Diamond Coated
1/2"	1/4"	1/2"	6	Sq. End	1-1/2"	P820-201143-1
1/2"	1/4"	1/2"	4	Sq. End	1-1/2"	P820-201142-1
1/2"	1/4"	1/2"	4	.030"	1-1/2"	P820-201206-1
1/2"	1/4"	1/2"	4	Ball End	1-1/2"	P820-201145-1



Replaceable Tips

Used in Slim Holders for extended reach without extra costs.

P38 Lightning Diamond Coated Series End Mills



Composites



Characteristics

Standard Tolerances

Cutting Dia. = +0.001/-0.001"
 Shank Tolerance h6
 Flute Length = ±.060"
 OAL = ±.060"



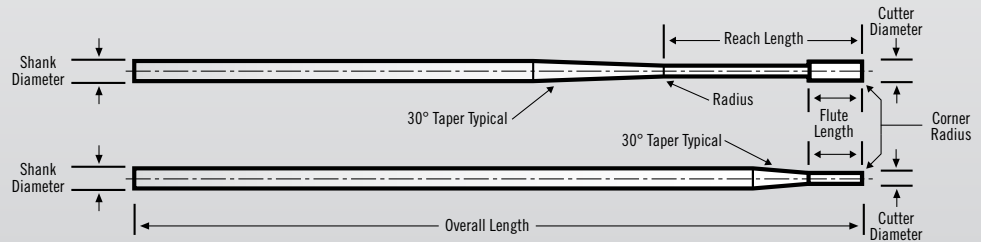
Applications



Materials



Coatings



P38 2 Flute Lightning Diamond Coated End Mills

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number Diamond Coated
1/64"	1/8"	3/64"	Ball End		3"	P38-005101-1
1/64"	1/8"	3/64"	Sq. End		3"	P38-005102-1
1/64"	1/8"	3/64"	Ball End	1/4"	3"	P38-005103-1
1/64"	1/8"	3/64"	Sq. End	1/4"	3"	P38-005104-1
1/64"	1/8"	3/64"	Ball End	1/2"	3"	P38-005105-1
1/64"	1/8"	3/64"	Sq. End	1/2"	3"	P38-005106-1

NEW!

P38 4 Flute Lightning Diamond Coated End Mills

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number Diamond Coated
1/32"	1/8"	3/32"	Sq. End	—	1-1/2"	P38-200219-1
1/32"	1/8"	3/32"	Sq. End	—	3"	P38-005108-1
1/32"	1/8"	3/32"	.005"	—	3"	P38-005109-1
1/32"	1/8"	3/32"	Ball End	—	1-1/2"	P38-200202-1
1/32"	1/8"	3/32"	Ball End	—	3"	P38-005107-1
1/32"	1/8"	3/32"	Sq. End	13/32"	3"	P38-005111-1
1/32"	1/8"	3/32"	.005"	13/32"	3"	P38-005112-1
1/32"	1/8"	3/32"	Ball End	13/32"	3"	P38-005110-1
1/32"	1/8"	3/32"	Sq. End	5/8"	3"	P38-005114-1
1/32"	1/8"	3/32"	.005"	5/8"	3"	P38-005115-1
1/32"	1/8"	3/32"	Ball End	5/8"	3"	P38-005113-1
1/32"	1/8"	3/32"	Sq. End	29/32"	3"	P38-005117-1
1/32"	1/8"	3/32"	.005"	29/32"	3"	P38-005118-1
1/32"	1/8"	3/32"	Ball End	29/32"	3"	P38-005116-1
3/64"	1/8"	9/64"	Sq. End	—	3"	P38-005120-1
3/64"	1/8"	9/64"	.010"	—	3"	P38-005121-1
3/64"	1/8"	9/64"	Ball End	—	3"	P38-005119-1
3/64"	1/8"	9/64"	Sq. End	9/16"	3"	P38-005123-1
3/64"	1/8"	9/64"	.010"	9/16"	3"	P38-005124-1
3/64"	1/8"	9/64"	Ball End	9/16"	3"	P38-005122-1
3/64"	1/8"	9/64"	Sq. End	3/4"	3"	P38-005126-1
3/64"	1/8"	9/64"	.010"	3/4"	3"	P38-005127-1
3/64"	1/8"	9/64"	Ball End	3/4"	3"	P38-005125-1
1/16"	1/16"	1/16"	Sq. End	5/16"	3"	P38-005156-1
1/16"	1/16"	1/16"	Ball End	5/16"	3"	P38-005155-1
1/16"	1/8"	3/16"	Sq. End	—	1-1/2"	P38-200477-1
1/16"	1/8"	3/16"	Sq. End	—	3"	P38-005129-1
1/16"	1/8"	3/16"	.010"	—	3"	P38-005130-1

**10-20X
Tool Life!**

**DIAMOND
COATED**



P38 4 Flute Lightning Diamond Coated End Mills

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number Diamond Coated
1/16"	1/8"	3/16"	Ball End	—	1-1/2"	P38-200175-1
1/16"	1/8"	3/16"	Ball End	—	3"	P38-005128-1
1/16"	1/8"	3/16"	Sq. End	3/4"	3"	P38-005132-1
1/16"	1/8"	3/16"	.010"	3/4"	3"	P38-005133-1
1/16"	1/8"	3/16"	Ball End	3/4"	3"	P38-005131-1
1/16"	1/8"	3/16"	Sq. End	1"	3"	P38-005135-1
1/16"	1/8"	3/16"	.010"	1"	3"	P38-005136-1
1/16"	1/8"	3/16"	Ball End	1"	3"	P38-005134-1
3/32"	3/32"	3/32"	Sq. End	11/32"	3"	P38-005158-1
3/32"	3/32"	3/32"	Ball End	11/32"	3"	P38-005157-1
3/32"	1/8"	9/32"	Sq. End	—	3"	P38-005138-1
3/32"	1/8"	9/32"	.010"	—	3"	P38-005139-1
3/32"	1/8"	9/32"	Ball End	—	3"	P38-005137-1
3/32"	1/8"	9/32"	Sq. End	1"	3"	P38-005141-1
3/32"	1/8"	9/32"	.010"	1"	3"	P38-005142-1
3/32"	1/8"	9/32"	Ball End	1"	3"	P38-005140-1
3/32"	1/8"	9/32"	Sq. End	1-1/2"	3"	P38-005144-1
3/32"	1/8"	9/32"	.010"	1-1/2"	3"	P38-005145-1
3/32"	1/8"	9/32"	Ball End	1-1/2"	3"	P38-005143-1
3/32"	1/8"	3/8"	Sq. End	—	1-1/2"	P38-200002-1
3/32"	1/8"	3/8"	Ball End	—	1-1/2"	P38-200004-1
1/8"	1/8"	1/8"	Sq. End	5/8"	3"	P38-005160-1
1/8"	1/8"	1/8"	.015"	5/8"	3"	P38-005161-1
1/8"	1/8"	1/8"	.031"	5/8"	3"	P38-005162-1
1/8"	1/8"	1/8"	Ball End	5/8"	3"	P38-005159-1
1/8"	1/8"	3/8"	Sq. End	—	3"	P38-005147-1
1/8"	1/8"	3/8"	.010"	—	3"	P38-005148-1
1/8"	1/8"	3/8"	Ball End	—	3"	P38-005146-1
1/8"	1/8"	3/8"	Sq. End	1"	3"	P38-005150-1
1/8"	1/8"	3/8"	.010"	1"	3"	P38-005151-1
1/8"	1/8"	3/8"	Ball End	1"	3"	P38-005149-1
1/8"	1/8"	3/8"	Sq. End	2"	3"	P38-005153-1
1/8"	1/8"	3/8"	.010"	2"	3"	P38-005154-1
1/8"	1/8"	3/8"	Ball End	2"	3"	P38-005152-1
1/8"	1/8"	1/2"	Sq. End	—	1-1/2"	P38-200006-1
1/8"	1/8"	1/2"	Ball End	—	1-1/2"	P38-200008-1
1/8"	1/8"	1"	Sq. End	—	3"	P38-200010-1
1/8"	1/8"	1"	Ball End	—	3"	P38-200012-1
3/16"	3/16"	3/16"	Sq. End	0.688"	3"	P38-005164-1
3/16"	3/16"	3/16"	.062"	0.688"	3"	P38-005165-1
3/16"	3/16"	3/16"	Ball End	0.688"	3"	P38-005163-1
3/16"	3/16"	5/8"	Sq. End	—	2"	P38-200014-1
3/16"	3/16"	5/8"	Ball End	—	2"	P38-200016-1
1/4"	1/4"	1/4"	Sq. End	3/4"	4"	P38-005167-1
1/4"	1/4"	1/4"	.015"	3/4"	4"	P38-005168-1
1/4"	1/4"	1/4"	.030"	3/4"	4"	P38-005169-1
1/4"	1/4"	1/4"	.062"	3/4"	4"	P38-005170-1
1/4"	1/4"	1/4"	Ball End	3/4"	4"	P38-005166-1
1/4"	1/4"	3/4"	Sq. End	—	2-1/2"	P38-200022-1
1/4"	1/4"	3/4"	Ball End	—	2-1/2"	P38-200024-1
1/4"	1/4"	1-1/4"	Sq. End	—	3"	P38-200026-1
1/4"	1/4"	1-1/4"	Ball End	—	3"	P38-200028-1
3/8"	3/8"	7/8"	Sq. End	—	2-1/2"	P38-200038-1
3/8"	3/8"	7/8"	Ball End	—	2-1/2"	P38-200040-1
1/2"	1/2"	1"	Sq. End	—	3"	P38-200054-1
1/2"	1/2"	1"	Ball End	—	3"	P38-200056-1
1/2"	1/2"	2"	Sq. End	—	4"	P38-200058-1
1/2"	1/2"	2"	Ball End	—	4"	P38-200060-1

The Lightning series of tools offer a cost-effective solution for the machining of graphite electrodes. By reducing the coating thickness the edge sharpness is increased and cost is reduced. These tools offer a cost-effective solution.

NEW!

P38/P820 Graphite Machining

Speeds and Feeds for Graphite

CUTTING FEEDS

Tool Diameter	Soft Graphite Chipload Per Tooth (CLPT)		Medium Graphite Chipload Per Tooth (CLPT)		Hard Graphite Chipload Per Tooth (CLPT)	
	Roughing (clpt)	Finishing (clpt)	Roughing (clpt)	Finishing (clpt)	Roughing (clpt)	Finishing (clpt)
1/32"	0.0006–0.0008	0.0005–0.0006	0.0005–0.0006	0.0004–0.0005	0.0004–0.0005	0.0003–0.0004
1/16"	0.0013–0.0015	0.0010–0.0013	0.0010–0.0013	0.0008–0.0010	0.0008–0.0010	0.0005–0.0008
3/32"	0.0019–0.0023	0.0015–0.0019	0.0015–0.0019	0.0011–0.0015	0.0011–0.0015	0.0008–0.0011
1/8"	0.0025–0.0030	0.0020–0.0025	0.0020–0.0025	0.0015–0.0020	0.0015–0.0020	0.0010–0.0015
3/16"	0.0038–0.0045	0.0030–0.0038	0.0030–0.0038	0.0023–0.0030	0.0023–0.0030	0.0015–0.0023
1/4"	0.0050–0.0060	0.0040–0.0050	0.0040–0.0050	0.0030–0.0040	0.0030–0.0040	0.0020–0.0030
5/16"	0.0063–0.0075	0.0050–0.0063	0.0050–0.0063	0.0038–0.0050	0.0038–0.0050	0.0025–0.0038
3/8"	0.0075–0.0090	0.0060–0.0075	0.0060–0.0075	0.0045–0.0060	0.0045–0.0060	0.0030–0.0045
7/16"	0.0088–0.0105	0.0070–0.0088	0.0070–0.0088	0.0053–0.0070	0.0053–0.0070	0.0035–0.0053
1/2"	0.0100–0.0120	0.0080–0.0100	0.0080–0.0100	0.0060–0.0080	0.0060–0.0080	0.0040–0.0060

Speeds and Feeds are only general starting points and may vary depending on specific applications.

CUTTING SPEEDS

Graphite Hardness	Cutting Speed
	Surface Feet Per Minute
Soft Graphite	1000–2000 sfm
Medium Graphite	750–1500 sfm
Hard Graphite	500–1250 sfm



FROM ROBBJACK:

2 Great Problem Solving Tools Made to Order

Sound Reduction Perforation Tools

Designed for Airplane Engine Nacelles

Up to 80,000 Holes
in Fiberglass
Up to 40,000 Holes
in Carbon Fiber

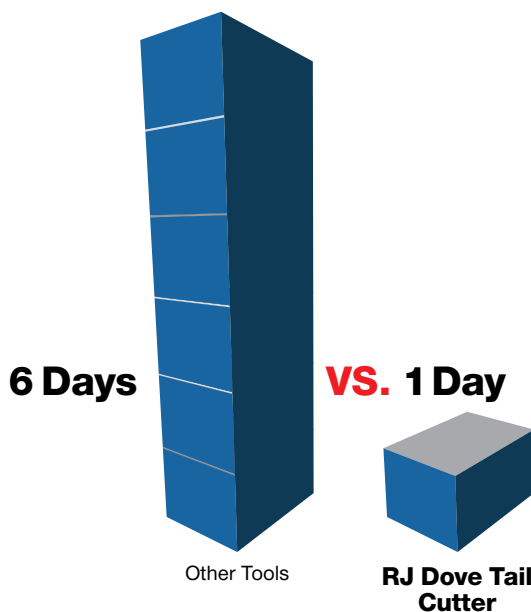
- No Uncut Fiber
- No Delamination
- No Fiber Pullout
- Best Finishes



Produces the
Cleanest Holes



Dove Tail Cutters – Cut 40 Hours Off Operation!



- Reduce Cycle Time
by 1 Week
- Cut the Dove Tail
and Trim the Part
at the Same Time
- Available with
Diamond Coating



Special dove tail cutters for carbon fiber that eliminate the operation of trimming the part to match the CAD file. Used in composite aircraft ribs and spars or where any dovetail cuts are needed.

Composites Tools in Other Sections

MINIATURES

(See Miniatures Applications)



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A1 / MA1 201

(See Aluminum Applications)



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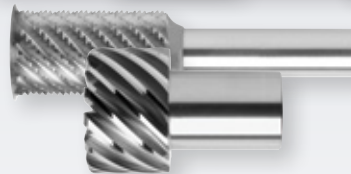
SAWS

(See Saws Applications)



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SPECIALS



Made to Order

**Threaded
Shank Tools**
in a
**Solid Piece
of Carbide**
by Robblack

Eliminate the problem of TIR and tool length associated with brazed threads. Can be diamond coated.

**Nut Plate
Drills**
*Made from a
Solid Piece of Carbide*



Tools for

DIE/MOLD & HARDENED MATERIALS



Scan this
code to:

- Watch Videos
- Get Technical Info
- Get Tips and Tricks
- And More...

Tools for **DIE/MOLD & HARDENED MATERIALS**

Die/Mold



Die/Mold

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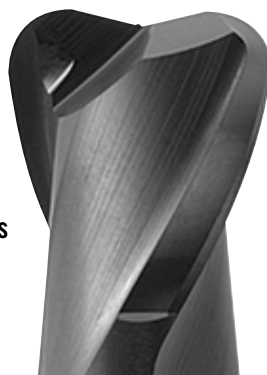
- Watch Videos
- See Tips and Tricks
- Learn How to Choose the Right Tool
- And More...

Featured Tools: **TM/MTM Series – High Feed Mill**



Page 128

- High Speed Geometry
- This Tool Works Great in High Speed Tool Paths and in Tight Areas

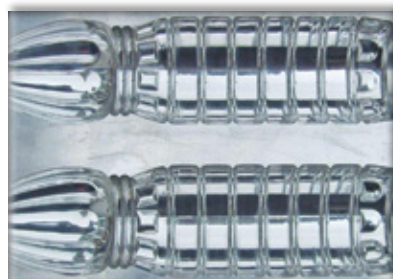


DM/MDM Series – 3-D Cutting of Cavities & Cores



Page 125

3-D Cutting of Cavities & Cores



HM/MHM Series – Straight Walls, Flat Floors, Open Areas



Page 130

Straight Walls, Flat Floors, Open Areas



Die/Mold & Hardened Materials **TOOLS**

P38		4 Flute Lightning Series End Mills Diamond Coated for Graphite Electrodes		122
P820		4 and 6 Flute Replaceable Tip End Mills Diamond Coated for Graphite Electrodes		124
DM		2 Flute Extended Length Ball Nose		125
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MHM		4, 6, 8 and 10 Flute Corner Radius		130
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P38 Lightning Diamond Coated Series End Mills



Characteristics



Applications



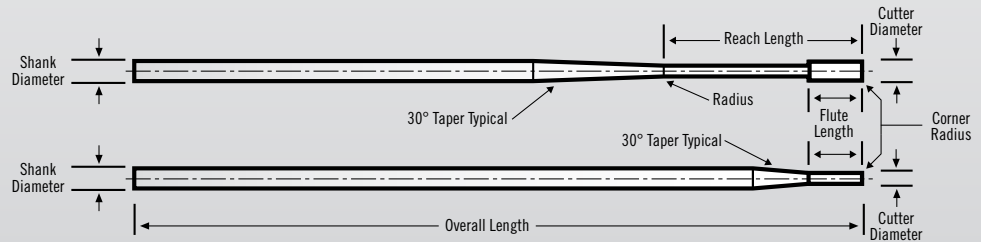
Materials



Coatings

Standard Tolerances

Cutting Dia. = +0.001/-0.001"
 Shank Tolerance h6
 Flute Length = ±.060"
 OAL = ±.060"



P38 2 Flute Lightning Diamond Coated Series End Mills for Graphite Electrodes

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number Diamond Coated
1/64"	1/8"	3/64"	Ball End		3"	P38-005101-1
1/64"	1/8"	3/64"	Sq. End		3"	P38-005102-1
1/64"	1/8"	3/64"	Ball End	1/4"	3"	P38-005103-1
1/64"	1/8"	3/64"	Sq. End	1/4"	3"	P38-005104-1
1/64"	1/8"	3/64"	Ball End	1/2"	3"	P38-005105-1
1/64"	1/8"	3/64"	Sq. End	1/2"	3"	P38-005106-1



P38 4 Flute Lightning Diamond Coated Series End Mills for Graphite Electrodes

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number Diamond Coated
1/32"	1/8"	3/32"	Sq. End	—	1-1/2"	P38-200219-1
1/32"	1/8"	3/32"	Sq. End	—	3"	P38-005108-1
1/32"	1/8"	3/32"	.005"	—	3"	P38-005109-1
1/32"	1/8"	3/32"	Ball End	—	1-1/2"	P38-200202-1
1/32"	1/8"	3/32"	Ball End	—	3"	P38-005107-1
1/32"	1/8"	3/32"	Sq. End	13/32"	3"	P38-005111-1
1/32"	1/8"	3/32"	.005"	13/32"	3"	P38-005112-1
1/32"	1/8"	3/32"	Ball End	13/32"	3"	P38-005110-1
1/32"	1/8"	3/32"	Sq. End	5/8"	3"	P38-005114-1
1/32"	1/8"	3/32"	.005"	5/8"	3"	P38-005115-1
1/32"	1/8"	3/32"	Ball End	5/8"	3"	P38-005113-1
1/32"	1/8"	3/32"	Sq. End	29/32"	3"	P38-005117-1
1/32"	1/8"	3/32"	.005"	29/32"	3"	P38-005118-1
1/32"	1/8"	3/32"	Ball End	29/32"	3"	P38-005116-1
3/64"	1/8"	9/64"	Sq. End	—	3"	P38-005120-1
3/64"	1/8"	9/64"	.010"	—	3"	P38-005121-1
3/64"	1/8"	9/64"	Ball End	—	3"	P38-005119-1
3/64"	1/8"	9/64"	Sq. End	9/16"	3"	P38-005123-1
3/64"	1/8"	9/64"	.010"	9/16"	3"	P38-005124-1
3/64"	1/8"	9/64"	Ball End	9/16"	3"	P38-005122-1
3/64"	1/8"	9/64"	Sq. End	3/4"	3"	P38-005126-1
3/64"	1/8"	9/64"	.010"	3/4"	3"	P38-005127-1
3/64"	1/8"	9/64"	Ball End	3/4"	3"	P38-005125-1
1/16"	1/16"	1/16"	Sq. End	5/16"	3"	P38-005156-1
1/16"	1/16"	1/16"	Ball End	5/16"	3"	P38-005155-1
1/16"	1/8"	3/16"	Sq. End	—	1-1/2"	P38-200477-1
1/16"	1/8"	3/16"	Sq. End	—	3"	P38-005129-1
1/16"	1/8"	3/16"	.010"	—	3"	P38-005130-1



DIAMOND COATED



P38 4 Flute Lightning Diamond Coated Series End Mills for Graphite Electrodes

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number Diamond Coated
1/16"	1/8"	3/16"	Ball End	—	1-1/2"	P38-200175-1
1/16"	1/8"	3/16"	Ball End	—	3"	P38-005128-1
1/16"	1/8"	3/16"	Sq. End	3/4"	3"	P38-005132-1
1/16"	1/8"	3/16"	.010"	3/4"	3"	P38-005133-1
1/16"	1/8"	3/16"	Ball End	3/4"	3"	P38-005131-1
1/16"	1/8"	3/16"	Sq. End	1"	3"	P38-005135-1
1/16"	1/8"	3/16"	.010"	1"	3"	P38-005136-1
1/16"	1/8"	3/16"	Ball End	1"	3"	P38-005134-1
3/32"	3/32"	3/32"	Sq. End	11/32"	3"	P38-005158-1
3/32"	3/32"	3/32"	Ball End	11/32"	3"	P38-005157-1
3/32"	1/8"	9/32"	Sq. End	—	3"	P38-005138-1
3/32"	1/8"	9/32"	.010"	—	3"	P38-005139-1
3/32"	1/8"	9/32"	Ball End	—	3"	P38-005137-1
3/32"	1/8"	9/32"	Sq. End	1"	3"	P38-005141-1
3/32"	1/8"	9/32"	.010"	1"	3"	P38-005142-1
3/32"	1/8"	9/32"	Ball End	1"	3"	P38-005140-1
3/32"	1/8"	9/32"	Sq. End	1-1/2"	3"	P38-005144-1
3/32"	1/8"	9/32"	.010"	1-1/2"	3"	P38-005145-1
3/32"	1/8"	9/32"	Ball End	1-1/2"	3"	P38-005143-1
3/32"	1/8"	3/8"	Sq. End	—	1-1/2"	P38-200002-1
3/32"	1/8"	3/8"	Ball End	—	1-1/2"	P38-200004-1
1/8"	1/8"	1/8"	Sq. End	5/8"	3"	P38-005160-1
1/8"	1/8"	1/8"	.015"	5/8"	3"	P38-005161-1
1/8"	1/8"	1/8"	.031"	5/8"	3"	P38-005162-1
1/8"	1/8"	1/8"	Ball End	5/8"	3"	P38-005159-1
1/8"	1/8"	3/8"	Sq. End	—	3"	P38-005147-1
1/8"	1/8"	3/8"	.010"	—	3"	P38-005148-1
1/8"	1/8"	3/8"	Ball End	—	3"	P38-005146-1
1/8"	1/8"	3/8"	Sq. End	1"	3"	P38-005150-1
1/8"	1/8"	3/8"	.010"	1"	3"	P38-005151-1
1/8"	1/8"	3/8"	Ball End	1"	3"	P38-005149-1
1/8"	1/8"	3/8"	Sq. End	2"	3"	P38-005153-1
1/8"	1/8"	3/8"	.010"	2"	3"	P38-005154-1
1/8"	1/8"	3/8"	Ball End	2"	3"	P38-005152-1
1/8"	1/8"	1/2"	Sq. End	—	1-1/2"	P38-200006-1
1/8"	1/8"	1/2"	Ball End	—	1-1/2"	P38-200008-1
1/8"	1/8"	1"	Sq. End	—	3"	P38-200010-1
1/8"	1/8"	1"	Ball End	—	3"	P38-200012-1
3/16"	3/16"	3/16"	Sq. End	0.688"	3"	P38-005164-1
3/16"	3/16"	3/16"	.062"	0.688"	3"	P38-005165-1
3/16"	3/16"	3/16"	Ball End	0.688"	3"	P38-005163-1
3/16"	3/16"	5/8"	Sq. End	—	2"	P38-200014-1
3/16"	3/16"	5/8"	Ball End	—	2"	P38-200016-1
1/4"	1/4"	1/4"	Sq. End	3/4"	4"	P38-005167-1
1/4"	1/4"	1/4"	.015"	3/4"	4"	P38-005168-1
1/4"	1/4"	1/4"	.030"	3/4"	4"	P38-005169-1
1/4"	1/4"	1/4"	.062"	3/4"	4"	P38-005170-1
1/4"	1/4"	1/4"	Ball End	3/4"	4"	P38-005166-1
1/4"	1/4"	3/4"	Sq. End	—	2-1/2"	P38-200022-1
1/4"	1/4"	3/4"	Ball End	—	2-1/2"	P38-200024-1
1/4"	1/4"	1-1/4"	Sq. End	—	3"	P38-200026-1
1/4"	1/4"	1-1/4"	Ball End	—	3"	P38-200028-1
3/8"	3/8"	7/8"	Sq. End	—	2-1/2"	P38-200038-1
3/8"	3/8"	7/8"	Ball End	—	2-1/2"	P38-200040-1
1/2"	1/2"	1"	Sq. End	—	3"	P38-200054-1
1/2"	1/2"	1"	Ball End	—	3"	P38-200056-1
1/2"	1/2"	2"	Sq. End	—	4"	P38-200058-1
1/2"	1/2"	2"	Ball End	—	4"	P38-200060-1

The Lightning series of tools offer a cost-effective solution for the machining of graphite electrodes. By reducing the coating thickness the edge sharpness is increased and cost is reduced. These tools offer a cost-effective solution.

NEW!

P820 Replaceable Tip End Mills



Characteristics



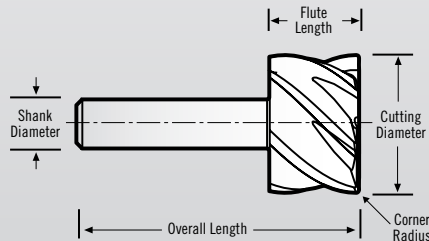
Applications



Materials



Coatings



Standard Tolerances

Cutting Dia. = $+0.001/-0.001$ "
 Shank Tolerance h6
 Flute Length = ± 0.060 "
 OAL = ± 0.060 "



RobbJack is proud to introduce our latest diamond coated product to enhance your productivity: The 1/2" Replaceable Tip End Mill.

This tool is intended to be held in a heat shrink holder and give you 4 and 6 flute productivity as compared to the 2 flutes available from insert end mills this size. Depending on your application several configurations are currently available from stock.



P820 4 & 6 Flute 1/2" Replaceable Tip End Mill (with 1/4" h6 shank) for Graphite Electrodes

Cutting Diameter	Shank Diameter	Flute Length	Flute Number	Corner Radius	Overall Length	Tool Number Diamond Coated
1/2"	1/4"	1/2"	6	Sq. End	1-1/2"	P820-201143-1
1/2"	1/4"	1/2"	4	Sq. End	1-1/2"	P820-201142-1
1/2"	1/4"	1/2"	4	.030"	1-1/2"	P820-201206-1
1/2"	1/4"	1/2"	4	Ball End	1-1/2"	P820-201145-1

Speeds and Feeds for Graphite

CUTTING FEEDS

Tool Diameter	Soft Graphite Chipload Per Tooth (CLPT)		Medium Graphite Chipload Per Tooth (CLPT)		Hard Graphite Chipload Per Tooth (CLPT)	
	Roughing (clpt)	Finishing (clpt)	Roughing (clpt)	Finishing (clpt)	Roughing (clpt)	Finishing (clpt)
1/32"	0.0006–0.0008	0.0005–0.0006	0.0005–0.0006	0.0004–0.0005	0.0004–0.0005	0.0003–0.0004
1/16"	0.0013–0.0015	0.0010–0.0013	0.0010–0.0013	0.0008–0.0010	0.0008–0.0010	0.0005–0.0008
3/32"	0.0019–0.0023	0.0015–0.0019	0.0015–0.0019	0.0011–0.0015	0.0011–0.0015	0.0008–0.0011
1/8"	0.0025–0.0030	0.0020–0.0025	0.0020–0.0025	0.0015–0.0020	0.0015–0.0020	0.0010–0.0015
3/16"	0.0038–0.0045	0.0030–0.0038	0.0030–0.0038	0.0023–0.0030	0.0023–0.0030	0.0015–0.0023
1/4"	0.0050–0.0060	0.0040–0.0050	0.0040–0.0050	0.0030–0.0040	0.0030–0.0040	0.0020–0.0030
5/16"	0.0063–0.0075	0.0050–0.0063	0.0050–0.0063	0.0038–0.0050	0.0038–0.0050	0.0025–0.0038
3/8"	0.0075–0.0090	0.0060–0.0075	0.0060–0.0075	0.0045–0.0060	0.0045–0.0060	0.0030–0.0045
7/16"	0.0088–0.0105	0.0070–0.0088	0.0070–0.0088	0.0053–0.0070	0.0053–0.0070	0.0035–0.0053
1/2"	0.0100–0.0120	0.0080–0.0100	0.0080–0.0100	0.0060–0.0080	0.0060–0.0080	0.0040–0.0060

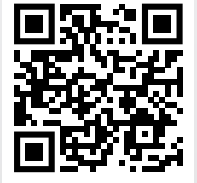
Speeds and Feeds are only general starting points and may vary depending on specific applications.

CUTTING SPEEDS

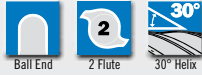
Graphite Hardness	Cutting Speed
	Surface Feet Per Minute
Soft Graphite	1000–2000 sfm
Medium Graphite	750–1500 sfm
Hard Graphite	500–1250 sfm



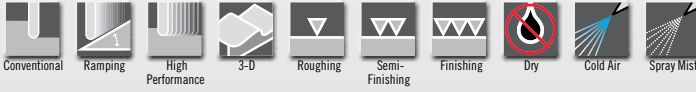
Die/Mold End Mills **DM/MDM**



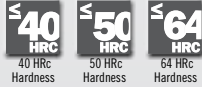
Characteristics



Applications

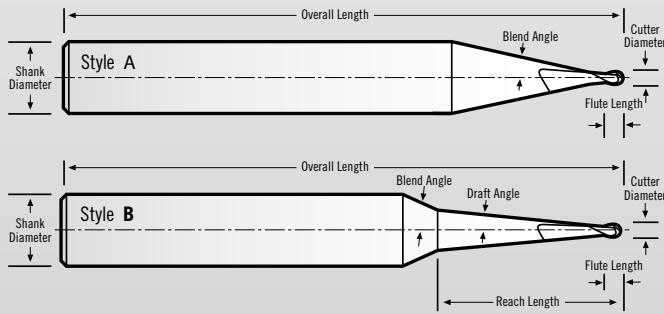


Materials



Used for Hardened Materials

Coatings



DM Tolerances

Cutting Dia. (1/32–0.1875) = ±.0003
 (0.250–0.50) = –.0007/–.0013
 Shank Dia. = –.0001/–.0002
 Flute Length (1/32–0.50) = +.000/+ .020
 OAL = ±.060

MDM Tolerances

Cutting Dia. (0.5–5.0) = ±.008mm
 (6.0–12.0) = –.018/–.033mm
 Shank Dia. = –.002/–.005mm
 Flute Length (0.5–12.0) = +.000/+ .500mm
 OAL = ±10mm



DM 2 Flute Grade Ball End Extended Length

Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Tool Style	Overall Length	Tool Number AITiN Coated
1/32"	1/4"	1/32"	–	–	8°	A	2-1/2"	DM-201-01
1/32"	1/4"	1/32"	1/8"	3°	18°	B	2-1/2"	DM-202-01
1/32"	1/4"	1/32"	3/16"	1.5°	16.5°	B	2-1/2"	DM-203-01
1/32"	1/4"	1/32"	3/8"	1.5°	16.5°	B	2-1/2"	DM-204-01
1/32"	1/4"	1/32"	9/16"	1.5°	16.5°	B	2-1/2"	DM-205-01
1/16"	1/4"	1/16"	–	–	8°	A	2-1/2"	DM-201-02
1/16"	1/4"	1/16"	3/16"	3°	18°	B	2-1/2"	DM-202-02
1/16"	1/4"	1/16"	3/8"	1.5°	16.5°	B	2-1/2"	DM-203-02
1/16"	1/4"	1/16"	3/4"	1.5°	16.5°	B	2-1/2"	DM-204-02
1/16"	1/4"	1/16"	1-1/8"	1.5°	16.5°	B	2-1/2"	DM-205-02
3/32"	1/4"	3/32"	–	–	8°	A	2-1/2"	DM-201-03
3/32"	1/4"	3/32"	1/4"	3°	18°	B	2-1/2"	DM-202-03
3/32"	1/4"	3/32"	1/2"	1.5°	16.5°	B	2-1/2"	DM-203-03
3/32"	1/4"	3/32"	15/16"	1.5°	16.5°	B	2-1/2"	DM-204-03
3/32"	1/4"	3/32"	1-5/16"	1.5°	16.5°	B	2-1/2"	DM-205-03
1/8"	1/4"	1/8"	–	–	8°	A	3	DM-201-04
1/8"	1/4"	1/8"	5/16"	3°	18°	B	3	DM-202-04
1/8"	1/4"	1/8"	5/8"	1.5°	16.5°	B	3	DM-203-04
1/8"	1/4"	1/8"	1	1°	16°	B	3	DM-204-04
1/8"	1/4"	1/8"	1-1/2"	1°	16°	B	3	DM-205-04

DM Die/Mold End Mills

DM 2 Flute Grade Ball End Extended Length — CONTINUED FROM PREVIOUS



Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Tool Style	Overall Length	Tool Number AITiN Coated
3/16"	1/4"	3/16"	—	—	8°	A	3	DM-201-06
3/16"	1/4"	3/16"	3/8"	2°	17°	B	3	DM-202-06
3/16"	1/4"	3/16"	3/4"	1.5°	16.5°	B	3	DM-203-06
3/16"	1/4"	3/16"	1-1/8"	1°	16°	B	3	DM-204-06
3/16"	1/4"	3/16"	1-9/16"	1°	16°	B	3	DM-205-06
1/4"	1/4"	1/4"	—	—	—	C	3	DM-201-08
5/16"	5/16"	5/16"	—	—	—	C	3-1/8"	DM-201-10
3/8"	3/8"	3/8"	—	—	—	C	3-1/2"	DM-201-12
7/16"	7/16"	7/16"	—	—	—	C	3-3/4"	DM-201-14
1/2"	1/2"	1/2"	—	—	—	C	4	DM-201-16



MDM 2 Flute Tuffy Ball End Extended Length **METRIC**



Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Tool Style	Overall Length	Tool Number AITiN Coated
0.5mm	6mm	0.5mm	—	—	8°	A	63mm	MDM-201-0.5
0.5mm	6mm	0.5mm	1mm	3°	18°	B	63mm	MDM-203-0.5
0.5mm	6mm	0.5mm	3mm	1.5°	16.5°	B	63mm	MDM-204-0.5
0.5mm	6mm	0.5mm	5mm	1.5°	16.5°	B	63mm	MDM-205-0.5
0.5mm	6mm	0.5mm	10mm	1.5°	16.5°	B	63mm	MDM-206-0.5
0.8mm	6mm	0.8mm	—	—	8°	A	63mm	MDM-201-0.8
0.8mm	6mm	0.8mm	3mm	3°	18°	B	63mm	MDM-203-0.8
0.8mm	6mm	0.8mm	5mm	1.5°	16.5°	B	63mm	MDM-204-0.8
0.8mm	6mm	0.8mm	10mm	1.5°	16.5°	B	63mm	MDM-205-0.8
0.8mm	6mm	0.8mm	15mm	1.5°	16.5°	B	63mm	MDM-206-0.8
1mm	6mm	1mm	—	—	8°	A	63mm	MDM-201-01
1mm	6mm	1mm	3mm	3°	18°	B	63mm	MDM-203-01
1mm	6mm	1mm	5mm	1.5°	16.5°	B	63mm	MDM-204-01
1mm	6mm	1mm	10mm	1.5°	16.5°	B	63mm	MDM-205-01
1mm	6mm	1mm	20mm	1.5°	16.5°	B	63mm	MDM-206-01
1.5mm	6mm	1.5mm	—	—	8°	A	63mm	MDM-201-01.5
1.5mm	6mm	1.5mm	5mm	3°	18°	B	63mm	MDM-203-01.5
1.5mm	6mm	1.5mm	10mm	1.5°	16.5°	B	63mm	MDM-204-01.5
1.5mm	6mm	1.5mm	20mm	1.5°	16.5°	B	63mm	MDM-205-01.5
1.5mm	6mm	1.5mm	30mm	1.5°	16.5°	B	63mm	MDM-206-01.5
2mm	6mm	2mm	—	—	8°	A	63mm	MDM-201-02
2mm	6mm	2mm	5mm	3°	18°	B	63mm	MDM-203-02
2mm	6mm	2mm	10mm	1.5°	16.5°	B	63mm	MDM-204-02
2mm	6mm	2mm	20mm	1.5°	16.5°	B	63mm	MDM-205-02
2mm	6mm	2mm	30mm	1.5°	16.5°	B	63mm	MDM-206-02
3mm	6mm	3mm	—	—	8°	A	75mm	MDM-201-03
3mm	6mm	3mm	5mm	3°	18°	B	75mm	MDM-203-03
3mm	6mm	3mm	15mm	1.5°	16.5°	B	75mm	MDM-204-03
3mm	6mm	3mm	30mm	1°	16°	B	75mm	MDM-205-03
3mm	6mm	3mm	45mm	1°	16°	B	75mm	MDM-206-03
4mm	6mm	4mm	—	—	8°	A	75mm	MDM-201-04
4mm	6mm	4mm	10mm	2°	17°	B	75mm	MDM-203-04
4mm	6mm	4mm	15mm	1.5°	16.5°	B	75mm	MDM-204-04
4mm	6mm	4mm	20mm	1°	16°	B	75mm	MDM-205-04
5mm	6mm	5mm	—	—	8°	B	75mm	MDM-201-05
5mm	6mm	5mm	10mm	2°	17°	B	75mm	MDM-203-05
5mm	6mm	5mm	25mm	1°	16°	B	75mm	MDM-204-05
6mm	6mm	6mm	—	—	—	C	75mm	MDM-201-06
8mm	8mm	8mm	—	—	—	C	80mm	MDM-201-08
10mm	10mm	10mm	—	—	—	C	82mm	MDM-201-10
12mm	12mm	12mm	—	—	—	C	100mm	MDM-201-12



DM SERIES SPEEDS & FEEDS (Chipload per Tooth)

Tool Number	Cutter Diameter	Steels 30-40 HRc		Steels 40-50 HRc		Steels 50-60 HRc	
		ROUGHING	FINISHING	ROUGHING	FINISHING	ROUGHING	FINISHING
DM-201-01	1/32"	0.0006-0.0008	0.0005-0.0006	0.0005-0.0006	0.0004-0.0005	0.0004-0.0005	0.0003-0.0004
DM-201-02	1/16"	0.0013-0.0015	0.0010-0.0013	0.0010-0.0013	0.0008-0.0010	0.0008-0.0010	0.0005-0.0008
DM-201-03	3/32"	0.0019-0.0023	0.0015-0.0019	0.0015-0.0019	0.0011-0.0015	0.0011-0.0015	0.0008-0.0011
DM-201-04	1/8"	0.0025-0.0030	0.0020-0.0025	0.0020-0.0025	0.0015-0.0020	0.0015-0.0020	0.0010-0.0015
DM-201-06	3/16"	0.0038-0.0045	0.0030-0.0038	0.0030-0.0038	0.0023-0.0030	0.0023-0.0030	0.0015-0.0023
DM-201-08	1/4"	0.0050-0.0060	0.0040-0.0050	0.0040-0.0050	0.0030-0.0040	0.0030-0.0040	0.0020-0.0030
DM-201-10	5/16"	0.0063-0.0075	0.0050-0.0063	0.0050-0.0063	0.0038-0.0050	0.0038-0.0050	0.0025-0.0038
DM-201-12	3/8"	0.0075-0.0090	0.0060-0.0075	0.0060-0.0075	0.0045-0.0060	0.0045-0.0060	0.0030-0.0045
DM-201-14	7/16"	0.0088-0.0105	0.0070-0.0088	0.0070-0.0088	0.0053-0.0070	0.0053-0.0070	0.0035-0.0053
DM-201-16	1/2"	0.0100-0.0120	0.0080-0.0100	0.0080-0.0100	0.0060-0.0080	0.0060-0.0080	0.0040-0.0060

DM SERIES SPEEDS & FEEDS (Roughing & Semi-Finishing)

Tool Number	Cutter Diameter	Rotations Per Minute (RPM)		
		STEELS 30-40HRc	STEELS 40-50HRc	STEELS 50-60HRc
DM-201-01	1/32"	20,000-40,000	20,000-40,000	20,000-40,000
DM-201-02	1/16"	20,000-40,000	20,000-40,000	20,000-36,000
DM-201-03	3/32"	20,000-32,000	20,000-32,000	16,000-24,000
DM-201-04	1/8"	15,000-24,000	18,000-24,000	12,000-18,000
DM-201-06	3/16"	10,000-16,000	12,000-16,000	8,100-12,000
DM-201-08	1/4"	7,600-12,000	9,100-12,000	6,100-9,100
DM-201-10	5/16"	6,000-9,700	7,300-9,700	4,800-7,300
DM-201-12	3/8"	5,000-8,100	6,100-8,100	4,000-6,100
DM-201-14	7/16"	4,300-6,900	5,200-6,900	3,400-5,200
DM-201-16	1/2"	3,800-6,100	4,500-6,100	3,000-4,500

DM Series Guidelines

- Special diameters and lengths are available on a make-to-order basis.
- Air or mist coolant on materials greater than 40 HRc.

Radial Step Over



Roughing or Semi-Finishing
25% - 40% of tool diameter

Radial Step Over for finishing depends on finish requirements.

DM SERIES SPEEDS & FEEDS (Finishing)

Tool Number	Cutter Diameter	Rotations Per Minute (RPM)		
		STEELS 30-40HRc	STEELS 40-50HRc	STEELS 50-60HRc
DM-201-01	1/32"	20,000-40,000	20,000-40,000	20,000-40,000
DM-201-02	1/16"	20,000-40,000	20,000-40,000	20,000-36,000
DM-201-03	3/32"	20,000-32,000	20,000-32,000	16,000-24,000
DM-201-04	1/8"	15,000-24,000	18,000-24,000	12,000-18,000
DM-201-06	3/16"	10,000-16,000	12,000-16,000	8,100-12,000
DM-201-08	1/4"	7,600-12,000	9,100-12,000	6,100-9,100
DM-201-10	5/16"	6,000-9,700	7,300-9,700	4,800-7,300
DM-201-12	3/8"	5,000-8,100	6,100-8,100	4,000-6,100
DM-201-14	7/16"	4,300-6,900	5,200-6,900	3,400-5,200
DM-201-16	1/2"	3,800-6,100	4,500-6,100	3,000-4,500

Axial Depth

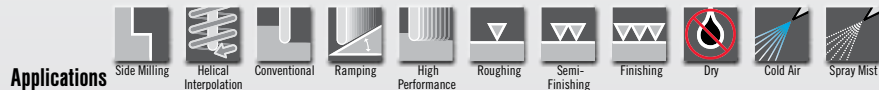


- 30-40 HRc Axial depth = 10% of tool diameter
- 40-50 HRc Axial depth = 5% of tool diameter
- 50-60 HRc Axial depth = 4% of tool diameter

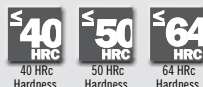
TM/MTM Solid Carbide Toroid Style End Mills



Characteristics



Applications



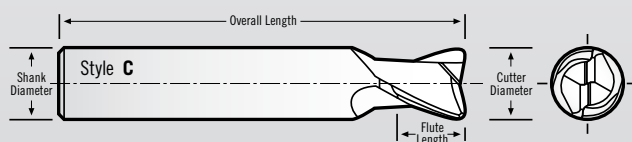
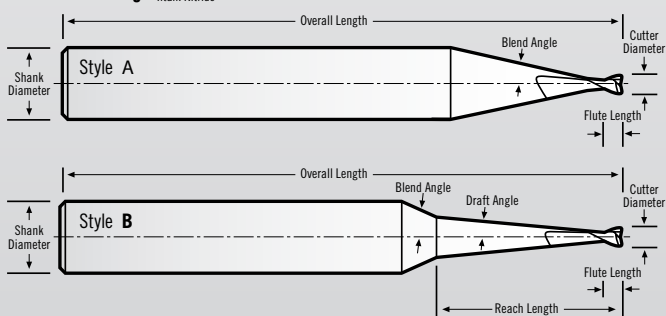
Materials

Used for Hardened Materials



Coatings

Aluminum
Titan. Nitride



TM Tolerances:

Cutting Dia. = $-.001/-0.002$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length (1/32 to 0.50) = $+0.000/+0.020$
 OAL = ± 0.060

MTM Tolerances

Cutting Dia. = $-.025/-0.050$ mm
 Shank Dia. = $-.002/-0.005$ mm
 Flute Length = $+0.50/+1.50$ mm
 OAL = ± 10 mm



TM 2 Flute Tuffly Grade Toroid End Mill

Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Corner Radius	Tool Style	Overall Length	Tool Number AITiN Coated
1/32"	1/4"	1/32"	—	—	8°	.008	A	2-1/2"	TM-201-01
1/32"	1/4"	1/32"	1/8"	3°	18°	.008	B	2-1/2"	TM-202-01
1/32"	1/4"	1/32"	3/16"	1.5°	16.5°	.008	B	2-1/2"	TM-203-01
1/32"	1/4"	1/32"	3/8"	1.5°	16.5°	.008	B	2-1/2"	TM-204-01
1/32"	1/4"	1/32"	9/16"	1.5°	16.5°	.008	B	2-1/2"	TM-205-01
1/16"	1/4"	1/16"	—	—	8°	.012	A	2-1/2"	TM-201-02
1/16"	1/4"	1/16"	3/16"	3°	18°	.012	B	2-1/2"	TM-202-02
1/16"	1/4"	1/16"	3/8"	1.5°	16.5°	.012	B	2-1/2"	TM-203-02
1/16"	1/4"	1/16"	3/4"	1.5°	16.5°	.012	B	2-1/2"	TM-204-02
1/16"	1/4"	1/16"	1-1/8"	1.5°	16.5°	.012	B	2-1/2"	TM-205-02
3/32"	1/4"	3/32"	—	—	8°	.020	A	2-1/2"	TM-201-03
3/32"	1/4"	3/32"	1/4"	3°	18°	.020	B	2-1/2"	TM-202-03
3/32"	1/4"	3/32"	1/2"	1.5°	16.5°	.020	B	2-1/2"	TM-203-03
3/32"	1/4"	3/32"	15/16"	1.5°	16.5°	.020	B	2-1/2"	TM-204-03
3/32"	1/4"	3/32"	1-5/16"	1.5°	16.5°	.020	B	2-1/2"	TM-205-03
1/8"	1/4"	1/8"	—	—	8°	.020	A	3"	TM-201-04
1/8"	1/4"	1/8"	5/16"	3°	18°	.020	B	3"	TM-202-04
1/8"	1/4"	1/8"	5/8"	1.5°	16.5°	.020	B	3"	TM-203-04
1/8"	1/4"	1/8"	1"	1°	16°	.020	B	3"	TM-204-04
1/8"	1/4"	1/8"	1-1/2"	1°	16°	.020	B	3"	TM-205-04
3/16"	1/4"	3/16"	—	—	8°	.040	A	3"	TM-201-06
3/16"	1/4"	3/16"	3/8"	2°	17°	.040	B	3"	TM-202-06
3/16"	1/4"	3/16"	3/4"	1.5°	16.5°	.040	B	3"	TM-203-06
3/16"	1/4"	3/16"	1-1/8"	1°	16°	.040	B	3"	TM-204-06
3/16"	1/4"	3/16"	1-9/16"	1°	16°	.040	B	3"	TM-205-06
1/4"	1/4"	1/4"	—	—	—	.040	C	3"	TM-201-08
5/16"	5/16"	5/16"	—	—	—	.040	C	3-1/8"	TM-201-10
3/8"	3/8"	3/8"	—	—	—	.080	C	3-1/5"	TM-201-12
7/16"	7/16"	7/16"	—	—	—	.080	C	3-3/4"	TM-201-14
1/2"	1/2"	1/2"	—	—	—	.120	C	4"	TM-201-16



MTM Metrics 2 Flute Tuff Grade Toroid End Mill **METRIC**



Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Corner Radius	Tool Style	Overall Length	Tool Number AlTiN Coated
0.8mm	6mm	0.8mm	—	—	8°	0.2mm	A	63mm	MTM-201-0.8
0.8mm	6mm	0.8mm	3mm	3°	18°	0.2mm	B	63mm	MTM-202-0.8
0.8mm	6mm	0.8mm	5mm	1.5°	16.5°	0.2mm	B	63mm	MTM-203-0.8
0.8mm	6mm	0.8mm	10mm	1.5°	16.5°	0.2mm	B	63mm	MTM-204-0.8
0.8mm	6mm	0.8mm	15mm	1.5°	16.5°	0.2mm	B	63mm	MTM-205-0.8
1mm	6mm	1mm	—	—	8°	0.3mm	A	63mm	MTM-201-01
1mm	6mm	1mm	3mm	3°	18°	0.3mm	B	63mm	MTM-202-01
1mm	6mm	1mm	5mm	1.5°	16.5°	0.3mm	B	63mm	MTM-203-01
1mm	6mm	1mm	10mm	1.5°	16.5°	0.3mm	B	63mm	MTM-204-01
1mm	6mm	1mm	20mm	1.5°	16.5°	0.3mm	B	63mm	MTM-205-01
1.5mm	6mm	1.5mm	—	—	8°	0.5mm	A	63mm	MTM-201-01.5
1.5mm	6mm	1.5mm	5mm	3°	18°	0.5mm	B	63mm	MTM-202-01.5
1.5mm	6mm	1.5mm	10mm	1.5°	16.5°	0.5mm	B	63mm	MTM-203-01.5
1.5mm	6mm	1.5mm	20mm	1.5°	16.5°	0.5mm	B	63mm	MTM-204-01.5
1.5mm	6mm	1.5mm	30mm	1.5°	16.5°	0.5mm	B	63mm	MTM-205-01.5
2mm	6mm	2mm	—	—	8°	0.5mm	A	63mm	MTM-201-02
2mm	6mm	2mm	5mm	3°	18°	0.5mm	B	63mm	MTM-202-02
2mm	6mm	2mm	10mm	1.5°	16.5°	0.5mm	B	63mm	MTM-203-02
2mm	6mm	2mm	20mm	1.5°	16.5°	0.5mm	B	63mm	MTM-204-02
2mm	6mm	2mm	30mm	1.5°	16.5°	0.5mm	B	63mm	MTM-205-02
3mm	6mm	3mm	—	—	8°	0.5mm	A	75mm	MTM-201-03
3mm	6mm	3mm	5mm	3°	18°	0.5mm	B	75mm	MTM-202-03
3mm	6mm	3mm	15mm	1.5°	16.5°	0.5mm	B	75mm	MTM-203-03
3mm	6mm	3mm	30mm	1°	16°	0.5mm	B	75mm	MTM-204-03
3mm	6mm	3mm	45mm	1°	16°	0.5mm	B	75mm	MTM-205-03
4mm	6mm	4mm	—	—	8°	0.5mm	A	75mm	MTM-201-04
4mm	6mm	4mm	10mm	2°	17°	0.5mm	B	75mm	MTM-202-04
4mm	6mm	4mm	15mm	1.5°	16.5°	0.5mm	B	75mm	MTM-203-04
4mm	6mm	4mm	20mm	1°	16°	0.5mm	B	75mm	MTM-204-04
5mm	6mm	5mm	—	—	8°	1mm	A	75mm	MTM-201-05
5mm	6mm	5mm	10mm	3°	18°	1mm	B	75mm	MTM-202-05
5mm	6mm	5mm	25mm	1°	16°	1mm	B	75mm	MTM-203-05
6mm	6mm	6mm	—	—	—	1mm	C	75mm	MTM-201-06
8mm	8mm	8mm	—	—	—	1mm	C	80mm	MTM-201-08
10mm	10mm	10mm	—	—	—	2mm	C	82mm	MTM-201-10
12mm	12mm	12mm	—	—	—	3mm	C	100mm	MTM-201-12

Die/Mold

TM SERIES SPEEDS & FEEDS (Semi-Finishing & Finishing)

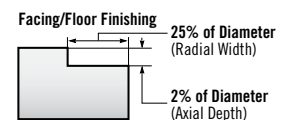
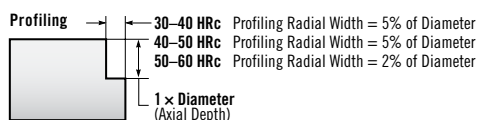
Tool Number	Cutter Diameter	Steels 30–40 HRC		Steels 40–50 HRC		Steels 50–60 HRC	
		RPM	CHIPLOAD PER TOOTH	RPM	CHIPLOAD PER TOOTH	RPM	CHIPLOAD PER TOOTH
TM-201-01	1/32"	34,000–40,000	0.0001–0.00025	26,000–30,000	0.0001–0.0002	16,000–18,000	0.0001–0.0002
TM-201-02	1/16"	34,000–40,000	0.0003–0.0005	25,000–30,000	0.0003–0.0005	16,000–18,000	0.0002–0.0004
TM-201-03	3/32"	22,000–26,000	0.0006–0.00075	16,000–19,000	0.0005–0.0007	10,000–12,000	0.0005–0.0006
TM-201-04	1/8"	17,000–20,000	0.0008–0.001	13,000–17,000	0.0007–0.0009	8,000–13,000	0.0006–0.0008
TM-201-06	3/16"	12,000–14,000	0.0011–0.0015	9,000–12,000	0.001–0.0014	5,300–9,000	0.0009–0.0012
TM-201-08	1/4"	9,000–10,400	0.0015–0.002	7,000–9,000	0.0014–0.0018	4,000–6,600	0.0012–0.0016
TM-201-10	5/16"	7,200–8,300	0.0019–0.0025	5,500–7,200	0.0017–0.0023	3,200–5,400	0.0015–0.0020
TM-201-12	3/8"	6,000–6,900	0.0020–0.003	4,600–6,000	0.0018–0.0027	2,700–4,500	0.0016–0.0024
TM-201-14	7/16"	5,200–6,000	0.0023–0.0035	4,000–5,200	0.0021–0.0032	2,300–3,900	0.0019–0.0028
TM-201-16	1/2"	4,500–5,200	0.0025–0.004	3,500–4,500	0.0023–0.0036	2,100–3,500	0.0020–0.0032

(Use maximum RPM if suggested RPM is higher than the machine's capabilities)

TM Series Guidelines

- Speeds and feeds are only general starting points and may vary depending on specific applications.
- Use Climb Milling for better finish and longer tool life.
- Air or mist coolant on materials greater than 40 HRC.

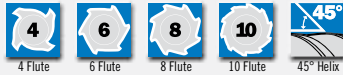
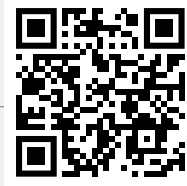
- Good machines, tool holders, and programming methods all help in extending tool life.
- The best way to engage into the material is by helical interpolation or entering from off the part.
- Use for tight areas like helical bores or tight corners. For large open areas use HM/MHM Series.



Additional Notes

- Special diameters, lengths, and corner radii are available on a make-to-order basis.
- Special draft angles (blend angle) or necked shanks for part clearance are available upon request and usually ship within the next business day.

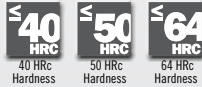
HM/MHM Die/Mold End Mills



Characteristics



Applications



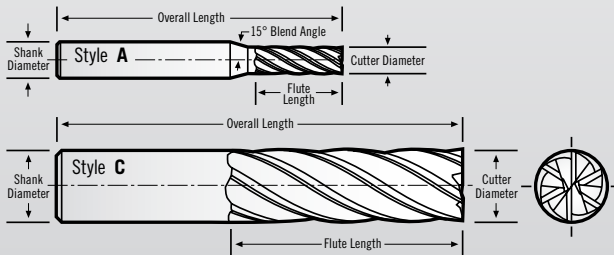
Materials

Used for Hardened Materials



Coatings

Aluminum
Titan, Nitride



HM Tolerances

Cutting Dia. = $-.001/-0.002$
Shank Dia. = $-.0001/-0.0002$
Flute Length = $+0.060/-0.000$
OAL = ± 0.060

MHM Tolerances

Cutting Dia. = $-.025/-0.050$ mm
Shank Dia. = $-.002/-0.005$ mm
Flute Length = $+0.50/+1.50$ mm
OAL = ± 10 mm



HM Multi-Flute Tuffy Grade



Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Corner Radius	Tool Style	Overall Length	Tool Number AITiN Coated
1/8"	1/4"	4	3/8"	0.015	A	3	HM-402-04
3/16"	1/4"	4	9/16"	0.02	A	3	HM-402-06
1/4"	1/4"	6	5/8"	0.02	C	3-1/2"	HM-602-08
5/16"	5/16"	6	3/4"	0.03	C	4	HM-602-10
3/8"	3/8"	6	1"	0.03	C	4	HM-602-12
7/16"	7/16"	6	1-1/8"	0.04	C	4	HM-602-14
1/2"	1/2"	6	1-1/4"	0.04	C	4	HM-602-16
5/8"	5/8"	6	1-5/8"	0.04	C	6	HM-602-20
3/4"	3/4"	8	1-3/4"	0.06	C	6	HM-802-24
1"	1"	10	2"	0.06	C	6	HM-102-32



MHM Metric Multi-Flute Tuffy Grade **METRIC**



Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Corner Radius	Tool Style	Overall Length	Tool Number AITiN Coated
3mm	6mm	4	9mm	0.4mm	A	76mm	MHM-402-03
4mm	6mm	4	12mm	0.5mm	A	76mm	MHM-402-04
5mm	6mm	4	15mm	0.5mm	C	90mm	MHM-402-05
6mm	6mm	6	15mm	0.5mm	C	90mm	MHM-602-06
8mm	8mm	6	20mm	0.75mm	C	100mm	MHM-602-08
10mm	10mm	6	25mm	0.75mm	C	100mm	MHM-602-10
12mm	12mm	6	30mm	1mm	C	100mm	MHM-602-12
16mm	16mm	6	40mm	1mm	C	150mm	MHM-602-16
20mm	20mm	8	45mm	1.5mm	C	150mm	MHM-802-20
25mm	25mm	10	50mm	1.5mm	C	150mm	MHM-102-25

HM SERIES SPEEDS & FEEDS (Semi-Finishing & Finishing)

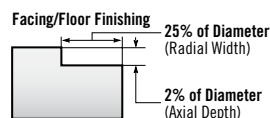
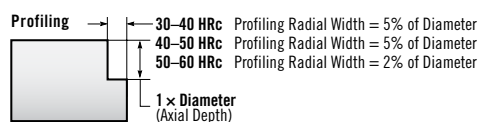
Tool Number	Cutter Diameter	Steels 30–40 HRc		Steels 40–50 HRc		Steels 50–60 HRc	
		RPM	CLPT	RPM	CLPT	RPM	CLPT
HM-402-04	1/8"	17,000–20,000	0.0008–0.001	13,000–17,000	0.0007–0.0009	8,000–13,000	0.0006–0.0008
HM-402-06	3/16"	12,000–14,000	0.0011–0.0015	9,000–12,000	0.0010–0.0014	5,300–9,000	0.0009–0.0012
HM-602-08	1/4"	9,000–10,400	0.0015–0.002	7,000–9,000	0.0014–0.0018	4,000–6,600	0.0012–0.0016
HM-602-10	5/16"	7,200–8,300	0.0019–0.0025	5,500–7,200	0.0017–0.0023	3,200–5,400	0.0015–0.0020
HM-602-12	3/8"	6,000–6,900	0.0020–0.003	4,600–6,000	0.0018–0.0027	2,700–4,500	0.0016–0.0024
HM-602-14	7/16"	5,200–6,000	0.0023–0.0035	4,000–5,200	0.0021–0.0032	2,300–3,900	0.0019–0.0028
HM-602-16	1/2"	4,500–5,200	0.0025–0.004	3,500–4,500	0.0023–0.0036	2,100–3,500	0.0020–0.0032
HM-602-20	5/8"	3,600–4,150	0.0026–0.0042	2,800–3,600	0.0023–0.0038	1,600–2,750	0.0021–0.0034
HM-802-24	3/4"	3,000–3,500	0.0028–0.005	2,300–3,000	0.0025–0.0045	1,350–2,250	0.0023–0.0041
HM-102-32	1"	2,200–2,600	0.0030–0.006	1,700–2,200	0.0027–0.0054	1,000–1,700	0.0024–0.0049

HM Series Guidelines

- Speeds and feeds are only general starting points and may vary depending on specific applications.
- Use Climb Milling for better finish and longer tool life.
- Air or mist coolant on materials greater than 40 HRc.
- Good machines, tool holders, and programming methods all help in extending tool life.
- The best way to engage into the material is by helical interpolation or entering from off the part.
- Use for open areas of floors or walls. For tight areas like helical bores or tight corners use TM/MTM Series.

Additional Notes

- Special draft angles (blend angle) or necked shanks for part clearance are available upon request.
- Special diameters, lengths, and corner radii are available on a make-to-order basis.



Die/Mold Tools in Other Sections

ET

Engraving Tools
(See Multiple Applications)



166

Tools for **MINIATURES**



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“...these tools are amazing! They run faster and longer than any other tool we have ever tried.**”**



SS-2 / MSS-2		2 Flute Stub Length Tuffly Grade Miniature End Mill		134
SR-2 / MSR-2		2 Flute Standard Length Tuffly Grade Miniature End Mill		136
SS-2BN / MSS-2BN		2 Flute Ball End Stub Length Tuffly Grade Miniature End Mill		138
SR-2BN / MSR-2BN		2 Flute Ball End Standard Length Tuffly Grade Miniature End Mill		139
SS-4 / MSS-4		4 Flute Stub Length Tuffly Grade Miniature End Mill		140
SR-4 / MSR-4		4 Flute Standard Length Tuffly Grade Miniature End Mill		140
ACH / MAH ACH-M		Accuhold End Mill Ultra Precision Extension Holders		141
ER 8/11/16/20/25		Solid ER-Mill Extensions		142

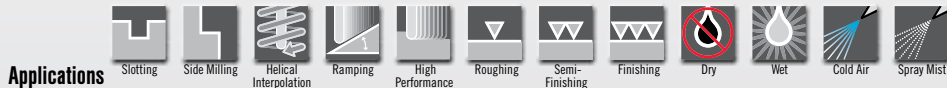
NEW
Coatings
Available!



SS-2 2 Flute Miniature End Mills



Characteristics



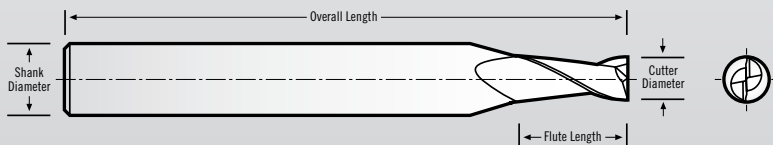
Applications



Materials



Coatings



SS/SR Tolerances

Cutting Dia. = ± 0.005 "
 Shank Dia. = $-0.001/-0.002$ "
 Flute Length = $+0.003/-0.000$ "
 OAL = $+0.040/-0.000$ "

MSS/MSR Tolerances

Cutting Dia. = ± 0.10 mm
 Shank Dia. = $-0.002/-0.005$ mm
 Flute Length = $+0.10/-0.00$ mm
 OAL = $+1/-0.00$ mm



SS-2 2 Flute Tuffy Grade Stub Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number Coated	Tool Number DLC Coated
.005"	1/8"	.0100"	1-1/2"	SS-2-005	SS-2-005-T	SS-2-005-C	SS-2-005-A	SS-2-005-DLC
.006"	1/8"	.0120"	1-1/2"	SS-2-006	SS-2-006-T	SS-2-006-C	SS-2-006-A	SS-2-006-DLC
.007"	1/8"	.0140"	1-1/2"	SS-2-007	SS-2-007-T	SS-2-007-C	SS-2-007-A	SS-2-007-DLC
.008"	1/8"	.0160"	1-1/2"	SS-2-008	SS-2-008-T	SS-2-008-C	SS-2-008-A	SS-2-008-DLC
.009"	1/8"	.0180"	1-1/2"	SS-2-009	SS-2-009-T	SS-2-009-C	SS-2-009-A	SS-2-009-DLC
.010"	1/8"	.0150"	1-1/2"	SS-2-010	SS-2-010-T	SS-2-010-C	SS-2-010-A	SS-2-010-DLC
.011"	1/8"	.0165"	1-1/2"	SS-2-011	SS-2-011-T	SS-2-011-C	SS-2-011-A	SS-2-011-DLC
.012"	1/8"	.0180"	1-1/2"	SS-2-012	SS-2-012-T	SS-2-012-C	SS-2-012-A	SS-2-012-DLC
.013"	1/8"	.0195"	1-1/2"	SS-2-013	SS-2-013-T	SS-2-013-C	SS-2-013-A	SS-2-013-DLC
.014"	1/8"	.0210"	1-1/2"	SS-2-014	SS-2-014-T	SS-2-014-C	SS-2-014-A	SS-2-014-DLC
.015"	1/8"	.0225"	1-1/2"	SS-2-015	SS-2-015-T	SS-2-015-C	SS-2-015-A	SS-2-015-DLC
.016"	1/8"	.0240"	1-1/2"	SS-2-016	SS-2-016-T	SS-2-016-C	SS-2-016-A	SS-2-016-DLC
.017"	1/8"	.0255"	1-1/2"	SS-2-017	SS-2-017-T	SS-2-017-C	SS-2-017-A	SS-2-017-DLC
.018"	1/8"	.0270"	1-1/2"	SS-2-018	SS-2-018-T	SS-2-018-C	SS-2-018-A	SS-2-018-DLC
.019"	1/8"	.0285"	1-1/2"	SS-2-019	SS-2-019-T	SS-2-019-C	SS-2-019-A	SS-2-019-DLC
.020"	1/8"	.0300"	1-1/2"	SS-2-020	SS-2-020-T	SS-2-020-C	SS-2-020-A	SS-2-020-DLC
.021"	1/8"	.0315"	1-1/2"	SS-2-021	SS-2-021-T	SS-2-021-C	SS-2-021-A	SS-2-021-DLC
.022"	1/8"	.0330"	1-1/2"	SS-2-022	SS-2-022-T	SS-2-022-C	SS-2-022-A	SS-2-022-DLC
.023"	1/8"	.0345"	1-1/2"	SS-2-023	SS-2-023-T	SS-2-023-C	SS-2-023-A	SS-2-023-DLC
.024"	1/8"	.0360"	1-1/2"	SS-2-024	SS-2-024-T	SS-2-024-C	SS-2-024-A	SS-2-024-DLC
.025"	1/8"	.0375"	1-1/2"	SS-2-025	SS-2-025-T	SS-2-025-C	SS-2-025-A	SS-2-025-DLC
.026"	1/8"	.0390"	1-1/2"	SS-2-026	SS-2-026-T	SS-2-026-C	SS-2-026-A	SS-2-026-DLC
.027"	1/8"	.0405"	1-1/2"	SS-2-027	SS-2-027-T	SS-2-027-C	SS-2-027-A	SS-2-027-DLC
.028"	1/8"	.0420"	1-1/2"	SS-2-028	SS-2-028-T	SS-2-028-C	SS-2-028-A	SS-2-028-DLC
.029"	1/8"	.0435"	1-1/2"	SS-2-029	SS-2-029-T	SS-2-029-C	SS-2-029-A	SS-2-029-DLC
.030"	1/8"	.0450"	1-1/2"	SS-2-030	SS-2-030-T	SS-2-030-C	SS-2-030-A	SS-2-030-DLC
.031"	1/8"	.0465"	1-1/2"	SS-2-031	SS-2-031-T	SS-2-031-C	SS-2-031-A	SS-2-031-DLC
.032"	1/8"	.0480"	1-1/2"	SS-2-032	SS-2-032-T	SS-2-032-C	SS-2-032-A	SS-2-032-DLC
.033"	1/8"	.0495"	1-1/2"	SS-2-033	SS-2-033-T	SS-2-033-C	SS-2-033-A	SS-2-033-DLC
.034"	1/8"	.0510"	1-1/2"	SS-2-034	SS-2-034-T	SS-2-034-C	SS-2-034-A	SS-2-034-DLC

2 Flute Miniature End Mills **SS-2/MSS-2**



SS-2 2 Flute Tuffly Grade Stub Length —CONTINUED FROM PREVIOUS



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TIN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.035"	1/8"	.0525"	1-1/2"	SS-2-035	SS-2-035-T	SS-2-035-C	SS-2-035-A	SS-2-035-DLC
.036"	1/8"	.0540"	1-1/2"	SS-2-036	SS-2-036-T	SS-2-036-C	SS-2-036-A	SS-2-036-DLC
.037"	1/8"	.0555"	1-1/2"	SS-2-037	SS-2-037-T	SS-2-037-C	SS-2-037-A	SS-2-037-DLC
.038"	1/8"	.0570"	1-1/2"	SS-2-038	SS-2-038-T	SS-2-038-C	SS-2-038-A	SS-2-038-DLC
.039"	1/8"	.0585"	1-1/2"	SS-2-039	SS-2-039-T	SS-2-039-C	SS-2-039-A	SS-2-039-DLC
.040"	1/8"	.0600"	1-1/2"	SS-2-040	SS-2-040-T	SS-2-040-C	SS-2-040-A	SS-2-040-DLC
.041"	1/8"	.0615"	1-1/2"	SS-2-041	SS-2-041-T	SS-2-041-C	SS-2-041-A	SS-2-041-DLC
.042"	1/8"	.0630"	1-1/2"	SS-2-042	SS-2-042-T	SS-2-042-C	SS-2-042-A	SS-2-042-DLC
.043"	1/8"	.0645"	1-1/2"	SS-2-043	SS-2-043-T	SS-2-043-C	SS-2-043-A	SS-2-043-DLC
.044"	1/8"	.0660"	1-1/2"	SS-2-044	SS-2-044-T	SS-2-044-C	SS-2-044-A	SS-2-044-DLC
.045"	1/8"	.0675"	1-1/2"	SS-2-045	SS-2-045-T	SS-2-045-C	SS-2-045-A	SS-2-045-DLC
.046"	1/8"	.0690"	1-1/2"	SS-2-046	SS-2-046-T	SS-2-046-C	SS-2-046-A	SS-2-046-DLC
.047"	1/8"	.0705"	1-1/2"	SS-2-047	SS-2-047-T	SS-2-047-C	SS-2-047-A	SS-2-047-DLC
.048"	1/8"	.0720"	1-1/2"	SS-2-048	SS-2-048-T	SS-2-048-C	SS-2-048-A	SS-2-048-DLC
.049"	1/8"	.0735"	1-1/2"	SS-2-049	SS-2-049-T	SS-2-049-C	SS-2-049-A	SS-2-049-DLC
.050"	1/8"	.0750"	1-1/2"	SS-2-050	SS-2-050-T	SS-2-050-C	SS-2-050-A	SS-2-050-DLC
.051"	1/8"	.0765"	1-1/2"	SS-2-051	SS-2-051-T	SS-2-051-C	SS-2-051-A	SS-2-051-DLC
.052"	1/8"	.0780"	1-1/2"	SS-2-052	SS-2-052-T	SS-2-052-C	SS-2-052-A	SS-2-052-DLC
.053"	1/8"	.0795"	1-1/2"	SS-2-053	SS-2-053-T	SS-2-053-C	SS-2-053-A	SS-2-053-DLC
.054"	1/8"	.0810"	1-1/2"	SS-2-054	SS-2-054-T	SS-2-054-C	SS-2-054-A	SS-2-054-DLC
.055"	1/8"	.0825"	1-1/2"	SS-2-055	SS-2-055-T	SS-2-055-C	SS-2-055-A	SS-2-055-DLC
.056"	1/8"	.0840"	1-1/2"	SS-2-056	SS-2-056-T	SS-2-056-C	SS-2-056-A	SS-2-056-DLC
.057"	1/8"	.0855"	1-1/2"	SS-2-057	SS-2-057-T	SS-2-057-C	SS-2-057-A	SS-2-057-DLC
.058"	1/8"	.0870"	1-1/2"	SS-2-058	SS-2-058-T	SS-2-058-C	SS-2-058-A	SS-2-058-DLC
.059"	1/8"	.0885"	1-1/2"	SS-2-059	SS-2-059-T	SS-2-059-C	SS-2-059-A	SS-2-059-DLC
.060"	1/8"	.0900"	1-1/2"	SS-2-060	SS-2-060-T	SS-2-060-C	SS-2-060-A	SS-2-060-DLC
.061"	1/8"	.0915"	1-1/2"	SS-2-061	SS-2-061-T	SS-2-061-C	SS-2-061-A	SS-2-061-DLC
.062"	1/8"	.0930"	1-1/2"	SS-2-062	SS-2-062-T	SS-2-062-C	SS-2-062-A	SS-2-062-DLC



MSS-2 Metric 2 Flute Miniature Stub Length **METRIC**



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TIN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.15mm	3mm	.225mm	38mm	MSS-2-015	MSS-2-015-T	MSS-2-015-C	MSS-2-015-A	MSS-2-015-DLC
.20mm	3mm	.300mm	38mm	MSS-2-020	MSS-2-020-T	MSS-2-020-C	MSS-2-020-A	MSS-2-020-DLC
.25mm	3mm	.375mm	38mm	MSS-2-025	MSS-2-025-T	MSS-2-025-C	MSS-2-025-A	MSS-2-025-DLC
.30mm	3mm	.450mm	38mm	MSS-2-030	MSS-2-030-T	MSS-2-030-C	MSS-2-030-A	MSS-2-030-DLC
.35mm	3mm	.525mm	38mm	MSS-2-035	MSS-2-035-T	MSS-2-035-C	MSS-2-035-A	MSS-2-035-DLC
.40mm	3mm	.600mm	38mm	MSS-2-040	MSS-2-040-T	MSS-2-040-C	MSS-2-040-A	MSS-2-040-DLC
.45mm	3mm	.675mm	38mm	MSS-2-045	MSS-2-045-T	MSS-2-045-C	MSS-2-045-A	MSS-2-045-DLC
.50mm	3mm	.750mm	38mm	MSS-2-050	MSS-2-050-T	MSS-2-050-C	MSS-2-050-A	MSS-2-050-DLC
.55mm	3mm	.825mm	38mm	MSS-2-055	MSS-2-055-T	MSS-2-055-C	MSS-2-055-A	MSS-2-055-DLC
.60mm	3mm	.900mm	38mm	MSS-2-060	MSS-2-060-T	MSS-2-060-C	MSS-2-060-A	MSS-2-060-DLC
.65mm	3mm	.975mm	38mm	MSS-2-065	MSS-2-065-T	MSS-2-065-C	MSS-2-065-A	MSS-2-065-DLC
.70mm	3mm	1.05mm	38mm	MSS-2-070	MSS-2-070-T	MSS-2-070-C	MSS-2-070-A	MSS-2-070-DLC
.80mm	3mm	1.20mm	38mm	MSS-2-080	MSS-2-080-T	MSS-2-080-C	MSS-2-080-A	MSS-2-080-DLC
1mm	3mm	1.50mm	38mm	MSS-2-100	MSS-2-100-T	MSS-2-100-C	MSS-2-100-A	MSS-2-100-DLC
1.50mm	3mm	2.25mm	38mm	MSS-2-150	MSS-2-150-T	MSS-2-150-C	MSS-2-150-A	MSS-2-150-DLC

SR-2 2 Flute Miniature End Mills



SR-2 2 Flute Tuffy Grade Standard Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TIN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.010"	1/8"	.0300	1-1/2"	SR-2-010	SR-2-010-T	SR-2-010-C	SR-2-010-A	SR-2-010-DLC
.011"	1/8"	.0330	1-1/2"	SR-2-011	SR-2-011-T	SR-2-011-C	SR-2-011-A	SR-2-011-DLC
.012"	1/8"	.0360	1-1/2"	SR-2-012	SR-2-012-T	SR-2-012-C	SR-2-012-A	SR-2-012-DLC
.013"	1/8"	.0390	1-1/2"	SR-2-013	SR-2-013-T	SR-2-013-C	SR-2-013-A	SR-2-013-DLC
.014"	1/8"	.0420	1-1/2"	SR-2-014	SR-2-014-T	SR-2-014-C	SR-2-014-A	SR-2-014-DLC
.015"	1/8"	.0450	1-1/2"	SR-2-015	SR-2-015-T	SR-2-015-C	SR-2-015-A	SR-2-015-DLC
.016"	1/8"	.0480	1-1/2"	SR-2-016	SR-2-016-T	SR-2-016-C	SR-2-016-A	SR-2-016-DLC
.017"	1/8"	.0510	1-1/2"	SR-2-017	SR-2-017-T	SR-2-017-C	SR-2-017-A	SR-2-017-DLC
.018"	1/8"	.0540	1-1/2"	SR-2-018	SR-2-018-T	SR-2-018-C	SR-2-018-A	SR-2-018-DLC
.019"	1/8"	.0570	1-1/2"	SR-2-019	SR-2-019-T	SR-2-019-C	SR-2-019-A	SR-2-019-DLC
.020"	1/8"	.0600	1-1/2"	SR-2-020	SR-2-020-T	SR-2-020-C	SR-2-020-A	SR-2-020-DLC
.021"	1/8"	.0630	1-1/2"	SR-2-021	SR-2-021-T	SR-2-021-C	SR-2-021-A	SR-2-021-DLC
.022"	1/8"	.0660	1-1/2"	SR-2-022	SR-2-022-T	SR-2-022-C	SR-2-022-A	SR-2-022-DLC
.023"	1/8"	.0690	1-1/2"	SR-2-023	SR-2-023-T	SR-2-023-C	SR-2-023-A	SR-2-023-DLC
.024"	1/8"	.0720	1-1/2"	SR-2-024	SR-2-024-T	SR-2-024-C	SR-2-024-A	SR-2-024-DLC
.025"	1/8"	.0750	1-1/2"	SR-2-025	SR-2-025-T	SR-2-025-C	SR-2-025-A	SR-2-025-DLC
.026"	1/8"	.0780	1-1/2"	SR-2-026	SR-2-026-T	SR-2-026-C	SR-2-026-A	SR-2-026-DLC
.027"	1/8"	.0810	1-1/2"	SR-2-027	SR-2-027-T	SR-2-027-C	SR-2-027-A	SR-2-027-DLC
.028"	1/8"	.0840	1-1/2"	SR-2-028	SR-2-028-T	SR-2-028-C	SR-2-028-A	SR-2-028-DLC
.029"	1/8"	.0870	1-1/2"	SR-2-029	SR-2-029-T	SR-2-029-C	SR-2-029-A	SR-2-029-DLC
.030"	1/8"	.0900	1-1/2"	SR-2-030	SR-2-030-T	SR-2-030-C	SR-2-030-A	SR-2-030-DLC
.031"	1/8"	.0930	1-1/2"	SR-2-031	SR-2-031-T	SR-2-031-C	SR-2-031-A	SR-2-031-DLC
.032"	1/8"	.0960	1-1/2"	SR-2-032	SR-2-032-T	SR-2-032-C	SR-2-032-A	SR-2-032-DLC
.033"	1/8"	.0990	1-1/2"	SR-2-033	SR-2-033-T	SR-2-033-C	SR-2-033-A	SR-2-033-DLC
.034"	1/8"	.1020	1-1/2"	SR-2-034	SR-2-034-T	SR-2-034-C	SR-2-034-A	SR-2-034-DLC
.035"	1/8"	.1050	1-1/2"	SR-2-035	SR-2-035-T	SR-2-035-C	SR-2-035-A	SR-2-035-DLC
.036"	1/8"	.1080	1-1/2"	SR-2-036	SR-2-036-T	SR-2-036-C	SR-2-036-A	SR-2-036-DLC
.037"	1/8"	.1110	1-1/2"	SR-2-037	SR-2-037-T	SR-2-037-C	SR-2-037-A	SR-2-037-DLC
.038"	1/8"	.1140	1-1/2"	SR-2-038	SR-2-038-T	SR-2-038-C	SR-2-038-A	SR-2-038-DLC
.039"	1/8"	.1170	1-1/2"	SR-2-039	SR-2-039-T	SR-2-039-C	SR-2-039-A	SR-2-039-DLC
.040"	1/8"	.1200	1-1/2"	SR-2-040	SR-2-040-T	SR-2-040-C	SR-2-040-A	SR-2-040-DLC
.041"	1/8"	.1230	1-1/2"	SR-2-041	SR-2-041-T	SR-2-041-C	SR-2-041-A	SR-2-041-DLC
.042"	1/8"	.1260	1-1/2"	SR-2-042	SR-2-042-T	SR-2-042-C	SR-2-042-A	SR-2-042-DLC
.043"	1/8"	.1290	1-1/2"	SR-2-043	SR-2-043-T	SR-2-043-C	SR-2-043-A	SR-2-043-DLC
.044"	1/8"	.1320	1-1/2"	SR-2-044	SR-2-044-T	SR-2-044-C	SR-2-044-A	SR-2-044-DLC
.045"	1/8"	.1350	1-1/2"	SR-2-045	SR-2-045-T	SR-2-045-C	SR-2-045-A	SR-2-045-DLC
.046"	1/8"	.1380	1-1/2"	SR-2-046	SR-2-046-T	SR-2-046-C	SR-2-046-A	SR-2-046-DLC
.047"	1/8"	.1410	1-1/2"	SR-2-047	SR-2-047-T	SR-2-047-C	SR-2-047-A	SR-2-047-DLC
.048"	1/8"	.1440	1-1/2"	SR-2-048	SR-2-048-T	SR-2-048-C	SR-2-048-A	SR-2-048-DLC
.049"	1/8"	.1470	1-1/2"	SR-2-049	SR-2-049-T	SR-2-049-C	SR-2-049-A	SR-2-049-DLC
.050"	1/8"	.1500	1-1/2"	SR-2-050	SR-2-050-T	SR-2-050-C	SR-2-050-A	SR-2-050-DLC
.051"	1/8"	.1530	1-1/2"	SR-2-051	SR-2-051-T	SR-2-051-C	SR-2-051-A	SR-2-051-DLC
.052"	1/8"	.1560	1-1/2"	SR-2-052	SR-2-052-T	SR-2-052-C	SR-2-052-A	SR-2-052-DLC
.053"	1/8"	.1590	1-1/2"	SR-2-053	SR-2-053-T	SR-2-053-C	SR-2-053-A	SR-2-053-DLC
.054"	1/8"	.1620	1-1/2"	SR-2-054	SR-2-054-T	SR-2-054-C	SR-2-054-A	SR-2-054-DLC
.055"	1/8"	.1650	1-1/2"	SR-2-055	SR-2-055-T	SR-2-055-C	SR-2-055-A	SR-2-055-DLC
.056"	1/8"	.1680	1-1/2"	SR-2-056	SR-2-056-T	SR-2-056-C	SR-2-056-A	SR-2-056-DLC
.057"	1/8"	.1710	1-1/2"	SR-2-057	SR-2-057-T	SR-2-057-C	SR-2-057-A	SR-2-057-DLC
.058"	1/8"	.1740	1-1/2"	SR-2-058	SR-2-058-T	SR-2-058-C	SR-2-058-A	SR-2-058-DLC
.059"	1/8"	.1770	1-1/2"	SR-2-059	SR-2-059-T	SR-2-059-C	SR-2-059-A	SR-2-059-DLC
.060"	1/8"	.1800	1-1/2"	SR-2-060	SR-2-060-T	SR-2-060-C	SR-2-060-A	SR-2-060-DLC
.061"	1/8"	.1830	1-1/2"	SR-2-061	SR-2-061-T	SR-2-061-C	SR-2-061-A	SR-2-061-DLC
.062"	1/8"	.1860	1-1/2"	SR-2-062	SR-2-062-T	SR-2-062-C	SR-2-062-A	SR-2-062-DLC

Miniatures

2 Flute Miniature End Mills **MSR-2**



Tight Tolerances



MSR-2 2 Flute Standard Length **METRIC**

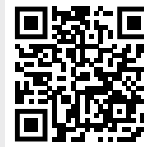


Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TIN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number Coated
.25mm	3mm	.75mm	38mm	MSR-2-025	MSR-2-025-T	MSR-2-025-C	MSR-2-025-A	MSR-2-025-DLC
.30mm	3mm	.90mm	38mm	MSR-2-030	MSR-2-030-T	MSR-2-030-C	MSR-2-030-A	MSR-2-030-DLC
.35mm	3mm	1.05mm	38mm	MSR-2-035	MSR-2-035-T	MSR-2-035-C	MSR-2-035-A	MSR-2-035-DLC
.40mm	3mm	1.20mm	38mm	MSR-2-040	MSR-2-040-T	MSR-2-040-C	MSR-2-040-A	MSR-2-040-DLC
.45mm	3mm	1.35mm	38mm	MSR-2-045	MSR-2-045-T	MSR-2-045-C	MSR-2-045-A	MSR-2-045-DLC
.50mm	3mm	1.50mm	38mm	MSR-2-050	MSR-2-050-T	MSR-2-050-C	MSR-2-050-A	MSR-2-050-DLC
.55mm	3mm	1.65mm	38mm	MSR-2-055	MSR-2-055-T	MSR-2-055-C	MSR-2-055-A	MSR-2-055-DLC
.60mm	3mm	1.80mm	38mm	MSR-2-060	MSR-2-060-T	MSR-2-060-C	MSR-2-060-A	MSR-2-060-DLC
.65mm	3mm	1.95mm	38mm	MSR-2-065	MSR-2-065-T	MSR-2-065-C	MSR-2-065-A	MSR-2-065-DLC
.70mm	3mm	2.10mm	38mm	MSR-2-070	MSR-2-070-T	MSR-2-070-C	MSR-2-070-A	MSR-2-070-DLC
.80mm	3mm	2.40mm	38mm	MSR-2-080	MSR-2-080-T	MSR-2-080-C	MSR-2-080-A	MSR-2-080-DLC
1mm	3mm	3.00mm	38mm	MSR-2-100	MSR-2-100-T	MSR-2-100-C	MSR-2-100-A	MSR-2-100-DLC
1.50mm	3mm	4.50mm	38mm	MSR-2-150	MSR-2-150-T	MSR-2-150-C	MSR-2-150-A	MSR-2-150-DLC

Minimatures



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SS/SR-2BN 2 Flute Miniature Ball End Mills

Miniatures

Characteristics

- Ball End
- 2 Flute
- 30° Helix

Applications

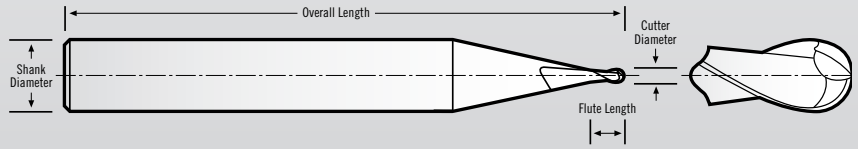
- Slotting
- Side Milling
- Helical Interpolation
- Conventional
- Ramping
- 3-D
- High Performance
- Roughing
- Semi-Finishing
- Finishing
- Dry
- Wet
- Cold Air
- Spray Mist

Materials

- Aluminum
- Copper
- Titanium
- Magnesium
- Cast Iron
- Steel
- Stainless Steel
- SUPER Alloys
- Plastics
- Composites
- 40 HRC Hardness
- BRASS

Coatings

- Titanium Nitride
- Titanium Carbo-Nitride
- Aluminum Titan. Nitride
- Diamond-Like Carbon (DLC)



SS/SR Tolerances

Cutting Dia. = $\pm .0005"$
 Shank Dia. = $-.0001/-0.0002"$
 Flute Length = $+.003/-0.000"$
 OAL = $+.040/-0.000"$

MSS/MSR Tolerances

Cutting Dia. = $\pm .010$ mm
 Shank Dia. = $-.002/-0.005$ mm
 Flute Length = $+0.10/-0.00$ mm
 OAL = $+1/-0.00$ mm



SS-2BN 2 Flute Ball End Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.010"	1/8"	.0150"	1-1/2"	SS-2-010-BN	SS-2-010-BN-T	SS-2-010-BN-C	SS-2-010-BN-A	SS-2-010-BN-DLC
.015"	1/8"	.0230"	1-1/2"	SS-2-015-BN	SS-2-015-BN-T	SS-2-015-BN-C	SS-2-015-BN-A	SS-2-015-BN-DLC
.016"	1/8"	.0240"	1-1/2"	SS-2-016-BN	SS-2-016-BN-T	SS-2-016-BN-C	SS-2-016-BN-A	SS-2-016-BN-DLC
.020"	1/8"	.0300"	1-1/2"	SS-2-020-BN	SS-2-020-BN-T	SS-2-020-BN-C	SS-2-020-BN-A	SS-2-020-BN-DLC
.025"	1/8"	.0375"	1-1/2"	SS-2-025-BN	SS-2-025-BN-T	SS-2-025-BN-C	SS-2-025-BN-A	SS-2-025-BN-DLC
.030"	1/8"	.0450"	1-1/2"	SS-2-030-BN	SS-2-030-BN-T	SS-2-030-BN-C	SS-2-030-BN-A	SS-2-030-BN-DLC
.031"	1/8"	.0465"	1-1/2"	SS-2-031-BN	SS-2-031-BN-T	SS-2-031-BN-C	SS-2-031-BN-A	SS-2-031-BN-DLC
.040"	1/8"	.0600"	1-1/2"	SS-2-040-BN	SS-2-040-BN-T	SS-2-040-BN-C	SS-2-040-BN-A	SS-2-040-BN-DLC
.047"	1/8"	.0750"	1-1/2"	SS-2-047-BN	SS-2-047-BN-T	SS-2-047-BN-C	SS-2-047-BN-A	SS-2-047-BN-DLC
.055"	1/8"	.0825"	1-1/2"	SS-2-055-BN	SS-2-055-BN-T	SS-2-055-BN-C	SS-2-055-BN-A	SS-2-055-BN-DLC
.060"	1/8"	.0900"	1-1/2"	SS-2-060-BN	SS-2-060-BN-T	SS-2-060-BN-C	SS-2-060-BN-A	SS-2-060-BN-DLC



MSS-2BN Metric 2 Flute Ball End Stub Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.50mm	3mm	.750mm	38mm	MSS-2-050-BN	MSS-2-050-BN-T	MSS-2-050BN-C	MSS-2-050BN-A	MSS-2-050BN-DLC
.60mm	3mm	.900mm	38mm	MSS-2-060-BN	MSS-2-060-BN-T	MSS-2-060BN-C	MSS-2-060BN-A	MSS-2-060BN-DLC
.70mm	3mm	1.05mm	38mm	MSS-2-070-BN	MSS-2-070-BN-T	MSS-2-070BN-C	MSS-2-070BN-A	MSS-2-070BN-DLC
.80mm	3mm	1.20mm	38mm	MSS-2-080-BN	MSS-2-080-BN-T	MSS-2-080BN-C	MSS-2-080BN-A	MSS-2-080BN-DLC
1mm	3mm	1.50mm	38mm	MSS-2-100-BN	MSS-2-100-BN-T	MSS-2-100BN-C	MSS-2-100BN-A	MSS-2-100BN-DLC
1.50mm	3mm	2.25mm	38mm	MSS-2-150-BN	MSS-2-150-BN-T	MSS-2-150BN-C	MSS-2-150BN-A	MSS-2-150BN-DLC

2 Flute Miniature Ball End Mills **MSS/MSR-2BN**



Tight Tolerances



SR-2BN 2 Flute Ball End Tuffy Grade Standard Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.010"	1/8"	.0300"	1-1/2"	SR-2-010-BN	SR-2-010-BN-T	SR-2-010-BN-C	SR-2-010-BN-A	SR-2-010-BN-DLC
.015"	1/8"	.0450"	1-1/2"	SR-2-015-BN	SR-2-015-BN-T	SR-2-015-BN-C	SR-2-015-BN-A	SR-2-015-BN-DLC
.016"	1/8"	.0480"	1-1/2"	SR-2-016-BN	SR-2-016-BN-T	SR-2-016-BN-C	SR-2-016-BN-A	SR-2-016-BN-DLC
.020"	1/8"	.0600"	1-1/2"	SR-2-020-BN	SR-2-020-BN-T	SR-2-020-BN-C	SR-2-020-BN-A	SR-2-020-BN-DLC
.025"	1/8"	.0750"	1-1/2"	SR-2-025-BN	SR-2-025-BN-T	SR-2-025-BN-C	SR-2-025-BN-A	SR-2-025-BN-DLC
.030"	1/8"	.0900"	1-1/2"	SR-2-030-BN	SR-2-030-BN-T	SR-2-030-BN-C	SR-2-030-BN-A	SR-2-030-BN-DLC
.031"	1/8"	.0930"	1-1/2"	SR-2-031-BN	SR-2-031-BN-T	SR-2-031-BN-C	SR-2-031-BN-A	SR-2-031-BN-DLC
.040"	1/8"	.1200"	1-1/2"	SR-2-040-BN	SR-2-040-BN-T	SR-2-040-BN-C	SR-2-040-BN-A	SR-2-040-BN-DLC
.047"	1/8"	.1410"	1-1/2"	SR-2-047-BN	SR-2-047-BN-T	SR-2-047-BN-C	SR-2-047-BN-A	SR-2-047-BN-DLC
.050"	1/8"	.1500"	1-1/2"	SR-2-050-BN	SR-2-050-BN-T	SR-2-050-BN-C	SR-2-050-BN-A	SR-2-050-BN-DLC
.055"	1/8"	.1650"	1-1/2"	SR-2-055-BN	SR-2-055-BN-T	SR-2-055-BN-C	SR-2-055-BN-A	SR-2-055-BN-DLC
.060"	1/8"	.1800"	1-1/2"	SR-2-060-BN	SR-2-060-BN-T	SR-2-060-BN-C	SR-2-060-BN-A	SR-2-060-BN-DLC



MSR-2BN Metric 2 Flute Ball End Tuffy Grade Standard Length



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN-Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.50mm	3mm	1.50mm	38mm	MSR-2-050-BN	MSR-2-050-BN-T	MSR-2-050-BN-C	MSR-2-050-BN-A	MSR-2-050-BN-DLC
.60mm	3mm	1.80mm	38mm	MSR-2-060-BN	MSR-2-060-BN-T	MSR-2-060-BN-C	MSR-2-060-BN-A	MSR-2-060-BN-DLC
.70mm	3mm	2.10mm	38mm	MSR-2-070-BN	MSR-2-070-BN-T	MSR-2-070-BN-C	MSR-2-070-BN-A	MSR-2-070-BN-DLC
.80mm	3mm	2.40mm	38mm	MSR-2-080-BN	MSR-2-080-BN-T	MSR-2-080-BN-C	MSR-2-080-BN-A	MSR-2-080-BN-DLC
1mm	3mm	3.00mm	38mm	MSR-2-100-BN	MSR-2-100-BN-T	MSR-2-100-BN-C	MSR-2-100-BN-A	MSR-2-100-BN-DLC
1.50mm	3mm	4.50mm	38mm	MSR-2-150-BN	MSR-2-150-BN-T	MSR-2-150-BN-C	MSR-2-150-BN-A	MSR-2-150-BN-DLC

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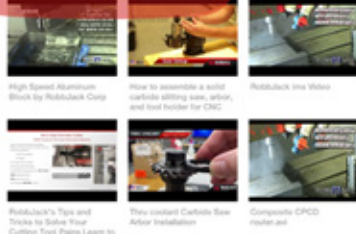
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Established in 1958, RobbJack Corporation specializes in the engineering, manufacture and sale of solid carbide cutting tools. We continue to offer the broadest line of carbide end mills with the closest tolerances available for CNC milling equipment. RobbJack staff possesses extraordinary expertise. Our top 25% of employees average 25 years with us, a combined 185 years of experience in the cutting tool industry. Application specialists take a consultative role from the initial sale to total product support, delivering timely feedback and innovative solutions.

Recent Videos



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Minimatures

SS/MSS-4 4 Flute Miniature End Mills













Miniatures

Characteristics





Applications

Materials









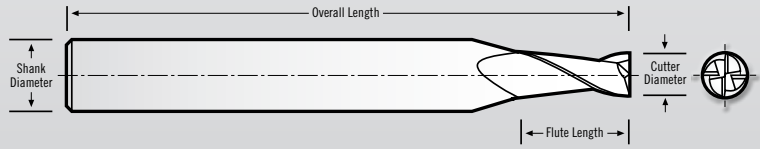





Coatings







SS/SR Tolerances
 Cutting Dia. = ±.0005"
 Shank Dia. = -.0001/-0.0002"
 Flute Length = +.003/-0.000"
 OAL = +.040/-0.000"

MSS/MSR Tolerances
 Cutting Dia. = ±.010mm
 Shank Dia. = -.002/-0.005mm
 Flute Length = +0.10/-0.00mm
 OAL = +1/-0.00mm



SS-4 4 Flute Tuffy Grade Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	TiN	TiCN	AlTiN	DLC
					Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.031"	1/8"	.0465"	1-1/2"	SS-4-031	SS-4-031-T	SS-4-031-C	SS-4-031-A	SS-4-031-DLC
.040"	1/8"	.0600"	1-1/2"	SS-4-040	SS-4-040-T	SS-4-040-C	SS-4-040-A	SS-4-040-DLC
.047"	1/8"	.0705"	1-1/2"	SS-4-047	SS-4-047-T	SS-4-047-C	SS-4-047-A	SS-4-047-DLC
.050"	1/8"	.0750"	1-1/2"	SS-4-050	SS-4-050-T	SS-4-050-C	SS-4-050-A	SS-4-050-DLC
.055"	1/8"	.0825"	1-1/2"	SS-4-055	SS-4-055-T	SS-4-055-C	SS-4-055-A	SS-4-055-DLC
.060"	1/8"	.0900"	1-1/2"	SS-4-060	SS-4-060-T	SS-4-060-C	SS-4-060-A	SS-4-060-DLC



METRIC

MSS-4 Metric 4 Flute Tuffy Grade Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	TiN	TiCN	AlTiN	DLC
					Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.80mm	3mm	1.20mm	38mm	MSS-4-080	MSS-4-080-T	MSS-4-080-C	MSS-4-080-A	MSS-4-080-DLC
1mm	3mm	1.50mm	38mm	MSS-4-100	MSS-4-100-T	MSS-4-100-C	MSS-4-100-A	MSS-4-100-DLC
1.50mm	3mm	2.25mm	38mm	MSS-4-150	MSS-4-150-T	MSS-4-150-C	MSS-4-150-A	MSS-4-150-DLC



SR-4 4 Flute Tuffy Grade Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	TiN	TiCN	AlTiN	DLC
					Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.031"	1/8"	.0930"	1-1/2"	SR-4-031	SR-4-031-T	SR-4-031-C	SR-4-031-A	SR-4-031-DLC
.040"	1/8"	.1200"	1-1/2"	SR-4-040	SR-4-040-T	SR-4-040-C	SR-4-040-A	SR-4-040-DLC
.047"	1/8"	.1410"	1-1/2"	SR-4-047	SR-4-047-T	SR-4-047-C	SR-4-047-A	SR-4-047-DLC
.050"	1/8"	.1500"	1-1/2"	SR-4-050	SR-4-050-T	SR-4-050-C	SR-4-050-A	SR-4-050-DLC
.055"	1/8"	.1650"	1-1/2"	SR-4-055	SR-4-055-T	SR-4-055-C	SR-4-055-A	SR-4-055-DLC
.060"	1/8"	.1800"	1-1/2"	SR-4-060	SR-4-060-T	SR-4-060-C	SR-4-060-A	SR-4-060-DLC



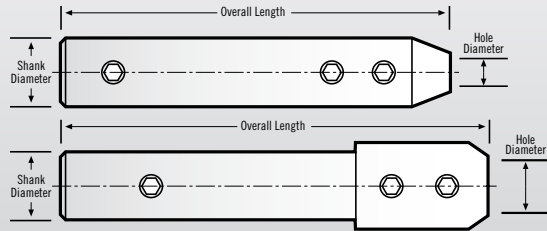
METRIC

MSR-4 Metric 4 Flute Tuffy Grade Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	TiN	TiCN	AlTiN	DLC
					Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.80mm	3mm	2.40mm	38mm	MSR-4-080	MSR-4-080-T	MSR-4-080-C	MSR-4-080-A	MSR-4-080-DLC
1mm	3mm	3.00mm	38mm	MSR-4-100	MSR-4-100-T	MSR-4-100-C	MSR-4-100-A	MSR-4-100-DLC
1.50mm	3mm	4.50mm	38mm	MSR-4-150	MSR-4-150-T	MSR-4-150-C	MSR-4-150-A	MSR-4-150-DLC



Accuhold End Mill Extension Holder **ACH/MAH**



ACH Tolerances

Hole Dia. = $+0.0015/-0.0000$
 Shank Dia. = $-0.001/-0.0003$
 OAL = ± 0.060

MAH Tolerances

Hole Dia. = $+0.004/-0.000$ mm
 Shank Dia. = $+0.000/-0.007$ mm
 OAL = ± 1.5 mm



ACH Accuhold End Mill Ultra Precision Extension Holder

Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3/32"	3/8"	2-1/8"	5-40	ACH-03
1/8"	3/8"	3-1/4"	8-32	ACH-04
1/8"	3/8"	6"	8-32	ACH-04-L
5/32"	1/2"	3-1/2"	8-32	ACH-05
3/16"	1/2"	3-1/2"	8-32	ACH-06
3/16"	1/2"	5"	8-32	ACH-06-L
1/4"	5/8"	4-1/4"	10-32	ACH-08
1/4"	5/8"	6"	10-32	ACH-08-L
5/16"	3/4"	4-1/2"	1/4-28	ACH-10
3/8"	3/4"	4-1/2"	5/16-24	ACH-12
3/8"	3/4"	6"	5/16-24	ACH-12-L
7/16"	3/4"	4-1/2"	5/16-24	ACH-14
1/2"	3/4"	4-3/4"	3/8-24	ACH-16*
1/2"	1"	4-3/4"	3/8-24	ACH-16L
1/2"	1"	6"	3/8-24	ACH-16-32-L
9/16"	1"	5-1/4"	3/8-24	ACH-18
5/8"	1"	5-1/2"	3/8-24	ACH-20
3/4"	1"	5-1/4"	7/16-20	ACH-24**
3/4"	1-1/4"	6"	7/16-20	ACH-24-1.25
1"	1"	5-1/2"	7/16-20	ACH-32**

* 1" Diameter x 1.5" Long Head

**ACH-24 & ACH-32 have a 1-1/4" diameter x 2-1/4" long head and hole depth of only 2" deep

Metric End Mill Extension Holder with Inch Shank.

Use this precision end mill extension holder to convert your inch tool holder to be able to hold onto metric shanks. This is the tightest tolerance end mill extension used to reach into parts that need longer length. Precision end mills need precision holders to eliminate runout (TIR) and reduce tool breakage. Convert your inch tool holder to metric sizes.



METRIC



MAH Precision Extension Holder for Metric Size End Mill

Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3mm	10mm	82.5mm		MAH-03
4mm	12mm	110mm		MAH-04
5mm	12mm	110mm		MAH-05
6mm	16mm	125mm		MAH-06
8mm	20mm	135mm		MAH-08
10mm	20mm	135mm		MAH-10
12mm	25mm	150mm		MAH-12*

* 1" Diameter x 1.5" Long Head



NEW!



ACH-M Metric to Inch End Mill Ultra Precision Extension Holder

Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3mm	3/8"	3-1/4"	6-32	ACH-M3
4mm	1/2"	3-1/2"	8-32	ACH-M4
5mm	1/2"	3-1/2"	10-32	ACH-M5
6mm	5/8"	4-1/4"	10-32	ACH-M6
7mm	5/8"	4-1/4"	10-32	ACH-M7
8mm	3/4"	4-1/2"	1/4-28	ACH-M8
9mm	3/4"	4-1/2"	5/16-24	ACH-M9
10mm	3/4"	4-1/2"	5/16-24	ACH-M10
11mm	3/4"	4-1/2"	5/16-24	ACH-M11
12mm	3/4"	4-3/4"	3/8-24	ACH-M12*
12mm	1"	4-3/4"	3/8-24	ACH-M12-1
13mm	1"	4-3/4"	3/8-24	ACH-M13
14mm	1"	5-1/2"	3/8-24	ACH-M14
15mm	1"	5-1/2"	3/8-24	ACH-M15
16mm	1"	5-1/2"	3/8-24	ACH-M16
18mm	1"	5-1/4"	7/16-20	ACH-M18**
20mm	1"	6"	7/16-20	ACH-M20-1
20mm	1-1/4"	6"	7/16-20	ACH-M20
25mm	1"	6-1/2"	7/16-20	ACH-M25**

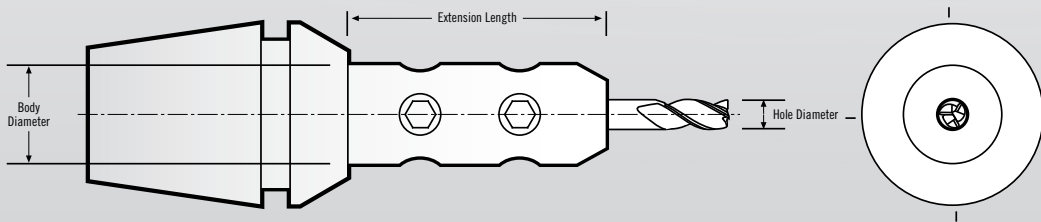
*ACH-M12 has a 1" diameter x 1.5" long head

**ACH-M18 & ACH-M25 have a 1-1/4" diameter x 2-1/4" long head and hole depth of only 2" deep

ER Solid ER-Mill Extensions

- Enables micro tools to clear fixturing
- Maintains exceptional TIR at extended length
- Solves deflection and chatter issues
- Coolant-thru versions for ER16 sizes now available
- TIR <.0002in at full extension

NEW!



Coolant-Thru Versions Available For ER16!

Miniatures

ER8 Solid Mill Extension



Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	10mm	7mm	8	ER8-M3-S
3mm	15mm	7mm	8	ER8-M3-L
1/8"	0.394"	0.276"	8	ER8-04-S

NOTE: ER8 Holders Include a special M10x.75 clamping nut.

ER16 Solid Mill Extension



Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	16mm	9.5mm	16	ER16-M3-S
3mm	25mm	9.5mm	16	ER16-M3-L
3mm	25mm	9.5mm	16	ER16-M3-L-TC*
1/8"	5/8"	3/8"	16	ER16-04-S
1/8"	1"	3/8"	16	ER16-04-M
1/8"	1"	3/8"	16	ER16-04-M-TC*
4mm	16mm	9.5mm	16	ER16-M4-S
4mm	25mm	9.5mm	16	ER16-M4-L
3/16"	5/8"	3/8"	16	ER16-06-S
3/16"	1"	3/8"	16	ER16-06-L
5mm	16mm	9.5mm	16	ER16-M5-S
5mm	25mm	9.5mm	16	ER16-M5-L

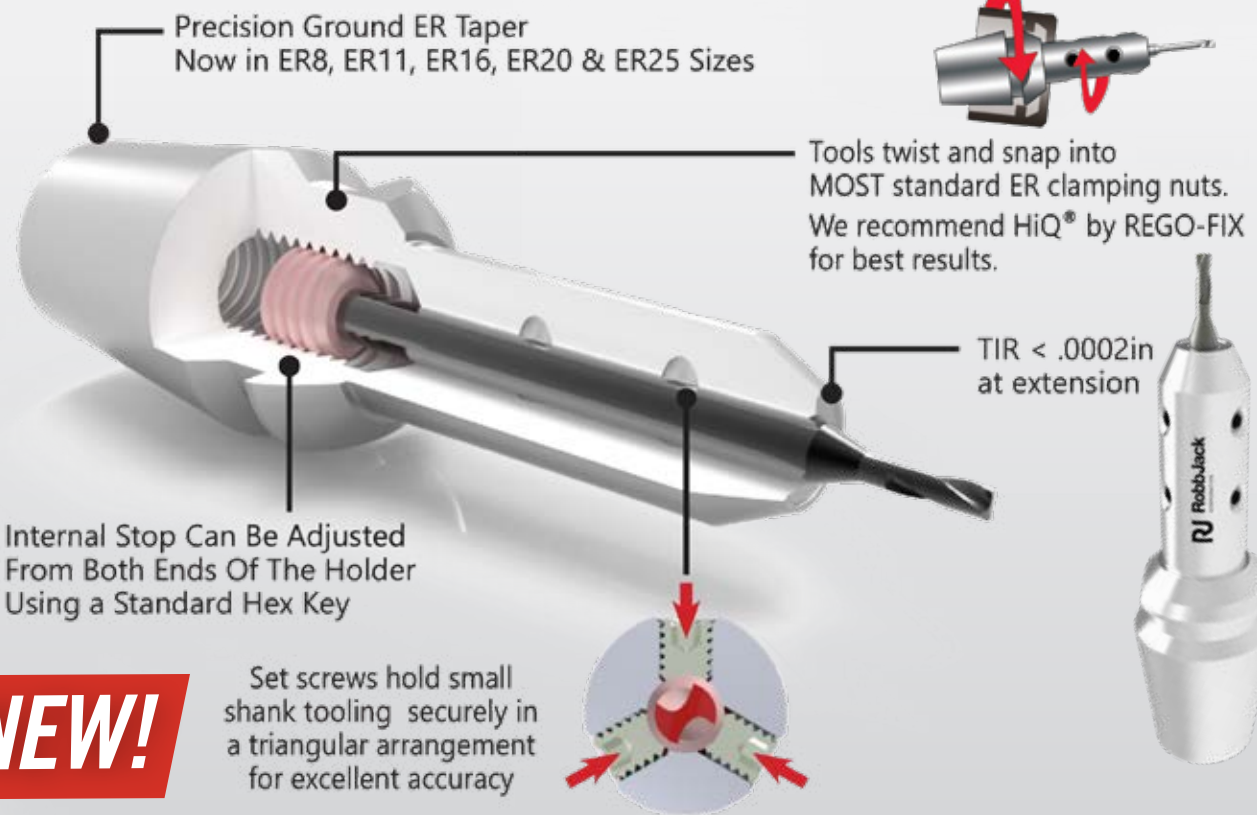
* Coolant-Thru Version

ER11 Solid Mill Extension



Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	10mm	8mm	11	ER11-M3-S
3mm	15mm	8mm	11	ER11-M3-SL
3mm	20mm	8mm	11	ER11-M3-L
1/8"	0.394"	0.315"	11	ER11-04-S
1/8"	0.59"	0.315"	11	ER11-04-SL
1/8"	0.787"	0.315"	11	ER11-04-L
4mm	15mm	8mm	11	ER11-M4-SL
4mm	20mm	8mm	11	ER11-M4-L





NEW!

ER20 Solid Mill Extension

Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	14mm	9.5mm	20	ER20-M3-S
3mm	25mm	9.5mm	20	ER20-M3-L
1/8"	5/8"	3/8"	20	ER20-04-S
1/8"	1"	3/8"	20	ER20-04-L
4mm	16mm	9.5mm	20	ER20-M4-S
4mm	25mm	9.5mm	20	ER20-M4-L
3/16"	0.55"	0.45"	20	ER20-06-S
3/16"	5/8"	0.45"	20	ER20-06-SL
3/16"	1"	0.45"	20	ER20-06-L
5mm	14mm	11.4mm	20	ER20-M5-S
5mm	25mm	11.4mm	20	ER20-M5-L
6mm	14mm	12.5mm	20	ER20-M6-S
6mm	25mm	12.5mm	20	ER20-M6-L
1/4"	0.55"	0.492"	20	ER20-08-S
1/4"	1"	0.492"	20	ER20-08-L

ER25 Solid Mill Extension

Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	25mm	10mm	25	ER25-M3
1/8"	1"	0.394"	25	ER25-04
4mm	25mm	10mm	25	ER25-M4
3/16"	1"	0.492"	25	ER25-06
5mm	25mm	12.5mm	25	ER25-M5
6mm	25mm	12.5mm	25	ER25-M6
1/4"	1"	0.492"	25	ER25-08
5/16"	1"	0.629"	25	ER25-10
8mm	25mm	16mm	25	ER25-M8

ER Replacement Set Screws

Size	Fits	Tool Number
M6	ER11	M6-ER-SCREW
M8	ER16 & 20	M8-ER-SCREW
M10	ER25	M10-ER-SCREW



ER Replacement Stop Screws

Size	Tool Number
M3	M3-ER-SCREW
M4	M4-ER-SCREW
M5	M5-ER-SCREW



Tools for

MULTIPLE APPLICATIONS













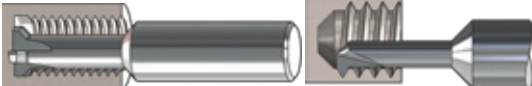







Many different uses!

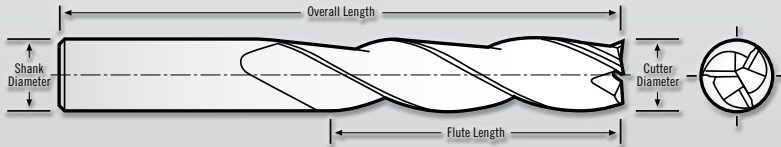
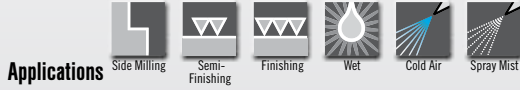
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Multiple Application **TOOLS**

TL / MTL 303	3 Flute Extra Length Tuffly Grade Carbide End Mill		146
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TL/MTL Tuffy Grade Carbide End Mills



TL Series Tolerances

Cutting Dia. (1/8") = $-.001/-0.002$
 (3/16" to 3/4") = $+.001/-0.000$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+.060/-0.000$
 OAL = ± 0.060

MTL Tolerances

Cutting Dia. 3mm = $-.025/-0.051$ mm
 4 to 20mm = $+.025/-0.000$ mm
 Shank Dia. = $-.002/-0.005$ mm
 Flute Length = $+.0500/+1.500$ mm
 OAL = ± 10 mm

S1 Tolerances

Cutting Dia. (1/16" to 1/4") = $+.000/-0.002$
 (9/32" to 3/4") = $+.000/-0.003$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length (1/16" to 5/16") = $+.030/-0.000$
 (3/8" to 3/4") = $+.060/-0.000$
 OAL = ± 0.060



TL-303 3 Flute Extra Length Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/8"	1"	3"	TL-303-04*
3/16"	3/16"	1-1/8"	3"	TL-303-06*
1/4"	1/4"	1-1/4"	3"	TL-303-08*
5/16"	5/16"	1-3/8"	3-1/8"	TL-303-10*
3/8"	3/8"	1-1/2"	3-1/4"	TL-303-12
7/16"	7/16"	1-3/4"	3-3/4"	TL-303-14*
1/2"	1/2"	2"	4"	TL-303-16
5/8"	5/8"	2-1/2"	4-5/8"	TL-303-20
3/4"	3/4"	3"	5"	TL-303-24

*Does not come with flats.

MTL-303 Metric 3 Flute Extra Length Tuffy Grade METRIC

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
3mm	3mm	25mm	75mm	MTL-303-03
4mm	4mm	26mm	75mm	MTL-303-04
5mm	5mm	28mm	75mm	MTL-303-05
6mm	6mm	32mm	75mm	MTL-303-06
8mm	8mm	35mm	80mm	MTL-303-08
10mm	10mm	38mm	82mm	MTL-303-10
12mm	12mm	50mm	100mm	MTL-303-12
16mm	16mm	63mm	110mm	MTL-303-16
20mm	20mm	75mm	130mm	MTL-303-20

NOTE: Metric tools do not have flats.

2 Flute Tuffy Grade Carbide End Mills **T6**



Characteristics



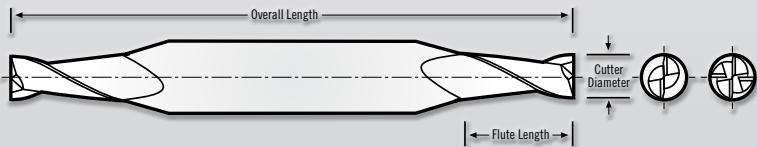
Applications



Materials



Coatings



T6 Series Tolerances

Cutting Dia. = ± 0.005
 Shank Dia. = $-0.001/-0.002$
 Flute Length = $+0.030/-0.000$
 OAL = ± 0.060



Multiple Applications



T6-200 2 Flute Stub Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	3/16"	1/8"	2-1/2"	T6-200-02	T6-200-02-T	T6-200-02-C	T6-200-02-A	T6-200-02-DLC
5/64"	3/16"	5/32"	2-1/2"	T6-200-02.5	T6-200-02.5-T	T6-200-02.5-C	T6-200-02.5-A	T6-200-02.5-DLC
3/32"	3/16"	5/32"	2-1/2"	T6-200-03	T6-200-03-T	T6-200-03-C	T6-200-03-A	T6-200-03-DLC
7/64"	3/16"	3/16"	2-1/2"	T6-200-03.5	T6-200-03.5-T	T6-200-03.5-C	T6-200-03.5-A	T6-200-03.5-DLC
1/8"	3/16"	3/16"	2-1/2"	T6-200-04	T6-200-04-T	T6-200-04-C	T6-200-04-A	T6-200-04-DLC
9/64"	3/16"	7/32"	2-1/2"	T6-200-04.5	T6-200-04.5-T	T6-200-04.5-C	T6-200-04.5-A	T6-200-04.5-DLC
5/32"	3/16"	9/32"	2-1/2"	T6-200-05	T6-200-05-T	T6-200-05-C	T6-200-05-A	T6-200-05-DLC
11/64"	3/16"	9/32"	2-1/2"	T6-200-05.5	T6-200-05.5-T	T6-200-05.5-C	T6-200-05.5-A	T6-200-05.5-DLC
3/16"	3/16"	3/8"	2"	T6-200-06*	T6-200-06-T*	T6-200-06-C*	T6-200-06-A*	T6-200-06-DLC*

*Single End only to allow plus/minus tolerance



T6-202 2 Flute Standard Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	3/16"	3/16"	2-1/2"	T6-202-02	T6-202-02-T	T6-202-02-C	T6-202-02-A	T6-202-02-DLC
5/64"	3/16"	5/16"	2-1/2"	T6-202-02.5	T6-202-02.5-T	T6-202-02.5-C	T6-202-02.5-A	T6-202-02.5-DLC
3/32"	3/16"	3/8"	2-1/2"	T6-202-03	T6-202-03-T	T6-202-03-C	T6-202-03-A	T6-202-03-DLC
7/64"	3/16"	3/8"	2-1/2"	T6-202-03.5	T6-202-03.5-T	T6-202-03.5-C	T6-202-03.5-A	T6-202-03.5-DLC
1/8"	3/16"	3/8"	2-1/2"	T6-202-04	T6-202-04-T	T6-202-04-C	T6-202-04-A	T6-202-04-DLC
9/64"	3/16"	7/16"	2-1/2"	T6-202-04.5	T6-202-04.5-T	T6-202-04.5-C	T6-202-04.5-A	T6-202-04.5-DLC
5/32"	3/16"	7/16"	2-1/2"	T6-202-05	T6-202-05-T	T6-202-05-C	T6-202-05-A	T6-202-05-DLC
11/64"	3/16"	7/16"	2-1/2"	T6-202-05.5	T6-202-05.5-T	T6-202-05.5-C	T6-202-05.5-A	T6-202-05.5-DLC
3/16"	3/16"	1/2"	2"	T6-202-06*	T6-202-06-T*	T6-202-06-C*	T6-202-06-A*	T6-202-06-DLC*

*Single End only to allow plus/minus tolerance

T6 4 Flute Tuffy Grade Carbide End Mills

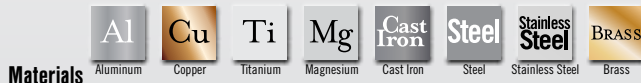
Multiple Applications



Characteristics



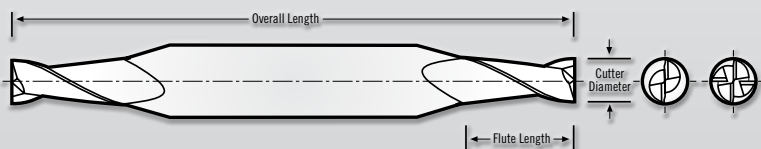
Applications



Materials



Coatings



T6 Series Tolerances

Cutting Dia. = ±.0005
 Shank Dia. = -.0001/- .0002
 Flute Length = +.030/- .000
 OAL = ±.060

**All Sizes on
 3/16"
 Shanks
 for Strength**



T6-400 4 Flute Stub Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	3/16"	1/8"	2-1/2"	T6-400-02	T6-400-02-T	T6-400-02-C	T6-400-02-A	T6-400-02-DLC
5/64"	3/16"	5/32"	2-1/2"	T6-400-02.5	T6-400-02.5-T	T6-400-02.5-C	T6-400-02.5-A	T6-400-02.5-DLC
3/32"	3/16"	5/32"	2-1/2"	T6-400-03	T6-400-03-T	T6-400-03-C	T6-400-03-A	T6-400-03-DLC
7/64"	3/16"	3/16"	2-1/2"	T6-400-03.5	T6-400-03.5-T	T6-400-03.5-C	T6-400-03.5-A	T6-400-03.5-DLC
1/8"	3/16"	3/16"	2-1/2"	T6-400-04	T6-400-04-T	T6-400-04-C	T6-400-04-A	T6-400-04-DLC
9/64"	3/16"	7/32"	2-1/2"	T6-400-04.5	T6-400-04.5-T	T6-400-04.5-C	T6-400-04.5-A	T6-400-04.5-DLC
5/32"	3/16"	9/32"	2-1/2"	T6-400-05	T6-400-05-T	T6-400-05-C	T6-400-05-A	T6-400-05-DLC
11/64"	3/16"	9/32"	2-1/2"	T6-400-05.5	T6-400-05.5-T	T6-400-05.5-C	T6-400-05.5-A	T6-400-05.5-DLC
3/16"	3/16"	3/8"	2"	T6-400-06*	T6-400-06-T*	T6-400-06-C*	T6-400-06-A*	T6-400-06-DLC*

*Single End only to allow plus/minus tolerance



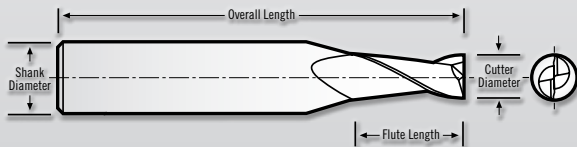
T6-402 4 Flute Standard Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	3/16"	3/16"	2-1/2"	T6-402-02	T6-402-02-T	T6-402-02-C	T6-402-02-A	T6-402-02-DLC
5/64"	3/16"	5/16"	2-1/2"	T6-402-02.5	T6-402-02.5-T	T6-402-02.5-C	T6-402-02.5-A	T6-402-02.5-DLC
3/32"	3/16"	3/8"	2-1/2"	T6-402-03	T6-402-03-T	T6-402-03-C	T6-402-03-A	T6-402-03-DLC
7/64"	3/16"	3/8"	2-1/2"	T6-402-03.5	T6-402-03.5-T	T6-402-03.5-C	T6-402-03.5-A	T6-402-03.5-DLC
1/8"	3/16"	3/8"	2-1/2"	T6-402-04	T6-402-04-T	T6-402-04-C	T6-402-04-A	T6-402-04-DLC
9/64"	3/16"	7/16"	2-1/2"	T6-402-04.5	T6-402-04.5-T	T6-402-04.5-C	T6-402-04.5-A	T6-402-04.5-DLC
5/32"	3/16"	7/16"	2-1/2"	T6-402-05	T6-402-05-T	T6-402-05-C	T6-402-05-A	T6-402-05-DLC
11/64"	3/16"	7/16"	2-1/2"	T6-402-05.5	T6-402-05.5-T	T6-402-05.5-C	T6-402-05.5-A	T6-402-05.5-DLC
3/16"	3/16"	1/2"	2"	T6-402-06*	T6-402-06-T*	T6-402-06-C*	T6-402-06-A*	T6-402-06-DLC*

*Single End only to allow plus/minus tolerance

2 Flute Tuffy Grade Carbide End Mills T12



T12 Series Tolerances

Cutting Dia. = +.001/- .000
 Shank Dia. = -.0001/- .0002
 Flute Length (1/8" to 5/16") = +.030/- .000
 (21/64" to 3/4") = +.060/- .000
 OAL = ±.060

T12 Series
 Comes in
64th
 Sizes

All Sizes
 Smaller than 3/8" on
3/8"
 Shanks
 for Strength

Multiple Applications



T12-201 2 Flute Stub Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/8"	3/8"	1/4"	2-1/2"	T12-201-04	T12-201-04-T	T12-201-04-C	T12-201-04-A	T12-201-04-DLC
5/32"	3/8"	1/4"	2-1/2"	T12-201-05	T12-201-05-T	T12-201-05-C	T12-201-05-A	T12-201-05-DLC
3/16"	3/8"	5/16"	2-1/2"	T12-201-06	T12-201-06-T	T12-201-06-C	T12-201-06-A	T12-201-06-DLC
7/32"	3/8"	5/16"	2-1/2"	T12-201-07	T12-201-07-T	T12-201-07-C	T12-201-07-A	T12-201-07-DLC
1/4"	3/8"	5/16"	2-1/2"	T12-201-08	T12-201-08-T	T12-201-08-C	T12-201-08-A	T12-201-08-DLC
9/32"	3/8"	7/16"	2-1/2"	T12-201-09	T12-201-09-T	T12-201-09-C	T12-201-09-A	T12-201-09-DLC
5/16"	3/8"	7/16"	2-1/2"	T12-201-10	T12-201-10-T	T12-201-10-C	T12-201-10-A	T12-201-10-DLC
3/8"	3/8"	1/2"	2-1/2"	T12-201-12	T12-201-12-T	T12-201-12-C	T12-201-12-A	T12-201-12-DLC
7/16"	1/2"	5/8"	3"	T12-201-14	T12-201-14-T	T12-201-14-C	T12-201-14-A	T12-201-14-DLC
1/2"	1/2"	5/8"	3"	T12-201-16	T12-201-16-T	T12-201-16-C	T12-201-16-A	T12-201-16-DLC
5/8"	5/8"	7/8"	3-1/4"	T12-201-20	T12-201-20-T	T12-201-20-C	T12-201-20-A	T12-201-20-DLC
3/4"	3/4"	1"	3-1/2"	T12-201-24	T12-201-24-T	T12-201-24-C	T12-201-24-A	T12-201-24-DLC



T12-203 2 Flute Standard Length Tuffy Grade



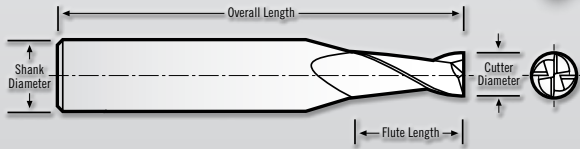
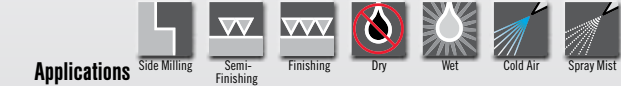
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/8"	3/8"	1/2"	2-1/2"	T12-203-04	T12-203-04-T	T12-203-04-C	T12-203-04-A	T12-203-04-DLC
9/64"	3/8"	1/2"	2-1/2"	T12-203-04.5	T12-203-04.5-T	T12-203-04.5-C	T12-203-04.5-A	T12-203-04.5-DLC
5/32"	3/8"	9/16"	2-1/2"	T12-203-05	T12-203-05-T	T12-203-05-C	T12-203-05-A	T12-203-05-DLC
11/64"	3/8"	9/16"	2-1/2"	T12-203-05.5	T12-203-05.5-T	T12-203-05.5-C	T12-203-05.5-A	T12-203-05.5-DLC
3/16"	3/8"	5/8"	2-1/2"	T12-203-06	T12-203-06-T	T12-203-06-C	T12-203-06-A	T12-203-06-DLC
13/64"	3/8"	5/8"	2-1/2"	T12-203-06.5	T12-203-06.5-T	T12-203-06.5-C	T12-203-06.5-A	T12-203-06.5-DLC
7/32"	3/8"	5/8"	2-1/2"	T12-203-07	T12-203-07-T	T12-203-07-C	T12-203-07-A	T12-203-07-DLC
15/64"	3/8"	5/8"	2-1/2"	T12-203-07.5	T12-203-07.5-T	T12-203-07.5-C	T12-203-07.5-A	T12-203-07.5-DLC
1/4"	3/8"	3/4"	2-1/2"	T12-203-08	T12-203-08-T	T12-203-08-C	T12-203-08-A	T12-203-08-DLC
17/64"	3/8"	3/4"	2-1/2"	T12-203-08.5	T12-203-08.5-T	T12-203-08.5-C	T12-203-08.5-A	T12-203-08.5-DLC
9/32"	3/8"	3/4"	2-1/2"	T12-203-09	T12-203-09-T	T12-203-09-C	T12-203-09-A	T12-203-09-DLC
19/64"	3/8"	3/4"	2-1/2"	T12-203-09.5	T12-203-09.5-T	T12-203-09.5-C	T12-203-09.5-A	T12-203-09.5-DLC
5/16"	3/8"	13/16"	2-1/2"	T12-203-10	T12-203-10-T	T12-203-10-C	T12-203-10-A	T12-203-10-DLC
21/64"	3/8"	13/16"	2-1/2"	T12-203-10.5	T12-203-10.5-T	T12-203-10.5-C	T12-203-10.5-A	T12-203-10.5-DLC
11/32"	3/8"	13/16"	2-1/2"	T12-203-11	T12-203-11-T	T12-203-11-C	T12-203-11-A	T12-203-11-DLC
23/64"	3/8"	13/16"	2-1/2"	T12-203-11.5	T12-203-11.5-T	T12-203-11.5-C	T12-203-11.5-A	T12-203-11.5-DLC
3/8"	3/8"	7/8"	2-1/2"	T12-203-12	T12-203-12-T	T12-203-12-C	T12-203-12-A	T12-203-12-DLC
13/32"	1/2"	1"	3"	T12-203-13	T12-203-13-T	T12-203-13-C	T12-203-13-A	T12-203-13-DLC
7/16"	1/2"	1"	3"	T12-203-14	T12-203-14-T	T12-203-14-C	T12-203-14-A	T12-203-14-DLC
15/32"	1/2"	1"	3"	T12-203-15	T12-203-15-T	T12-203-15-C	T12-203-15-A	T12-203-15-DLC
1/2"	1/2"	1"	3"	T12-203-16	T12-203-16-T	T12-203-16-C	T12-203-16-A	T12-203-16-DLC

T12 4 Flute Tuffy Grade Carbide End Mills

Need WITHOUT Flats?
Order any tool without flats by adding "NF" to the end of the tool number.

T12 Series Comes in **64th** Sizes

All Sizes Smaller than 3/8" on **3/8" Shanks** for Strength



T12 Series Tolerances

Cutting Dia.	= +.001/- .000
Shank Dia.	= -.0001/- .0002
Flute Length (1/8" to 5/16")	= +.030/- .000
(21/64" to 3/4")	= +.060/- .000
OAL	= ±.060

Multiple Applications



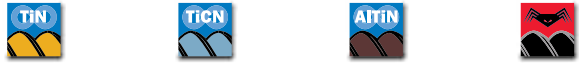
T12-403 4 Flute Stub Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/8"	3/8"	1/4"	2-1/2"	T12-403-04	T12-403-04-T	T12-403-04-C	T12-403-04-A	T12-403-04-DLC
5/32"	3/8"	1/4"	2-1/2"	T12-403-05	T12-403-05-T	T12-403-05-C	T12-403-05-A	T12-403-05-DLC
3/16"	3/8"	5/16"	2-1/2"	T12-403-06	T12-403-06-T	T12-403-06-C	T12-403-06-A	T12-403-06-DLC
7/32"	3/8"	5/16"	2-1/2"	T12-403-07	T12-403-07-T	T12-403-07-C	T12-403-07-A	T12-403-07-DLC
1/4"	3/8"	5/16"	2-1/2"	T12-403-08	T12-403-08-T	T12-403-08-C	T12-403-08-A	T12-403-08-DLC
9/32"	3/8"	7/16"	2-1/2"	T12-403-09	T12-403-09-T	T12-403-09-C	T12-403-09-A	T12-403-09-DLC
5/16"	3/8"	7/16"	2-1/2"	T12-403-10	T12-403-10-T	T12-403-10-C	T12-403-10-A	T12-403-10-DLC
3/8"	3/8"	1/2"	2-1/2"	T12-403-12	T12-403-12-T	T12-403-12-C	T12-403-12-A	T12-403-12-DLC
7/16"	1/2"	5/8"	3"	T12-403-14	T12-403-14-T	T12-403-14-C	T12-403-14-A	T12-403-14-DLC
1/2"	1/2"	5/8"	3"	T12-403-16	T12-403-16-T	T12-403-16-C	T12-403-16-A	T12-403-16-DLC
5/8"	5/8"	7/8"	3-1/2"	T12-403-20	T12-403-20-T	T12-403-20-C	T12-403-20-A	T12-403-20-DLC
3/4"	3/4"	1"	3-1/2"	T12-403-24	T12-403-24-T	T12-403-24-C	T12-403-24-A	T12-403-24-DLC



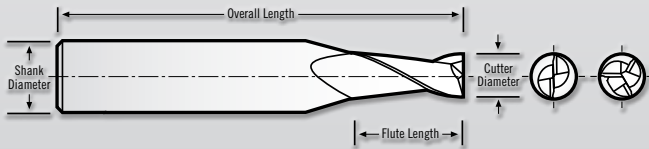
T12-405 4 Flute Standard Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/8"	3/8"	1/2"	2-1/2"	T12-405-04	T12-405-04-T	T12-405-04-C	T12-405-04-A	T12-405-04-DLC
9/64"	3/8"	1/2"	2-1/2"	T12-405-04.5	T12-405-04.5-T	T12-405-04.5-C	T12-405-04.5-A	T12-405-04.5-DLC
5/32"	3/8"	9/16"	2-1/2"	T12-405-05	T12-405-05-T	T12-405-05-C	T12-405-05-A	T12-405-05-DLC
11/64"	3/8"	9/16"	2-1/2"	T12-405-05.5	T12-405-05.5-T	T12-405-05.5-C	T12-405-05.5-A	T12-405-05.5-DLC
3/16"	3/8"	5/8"	2-1/2"	T12-405-06	T12-405-06-T	T12-405-06-C	T12-405-06-A	T12-405-06-DLC
13/64"	3/8"	5/8"	2-1/2"	T12-405-06.5	T12-405-06.5-T	T12-405-06.5-C	T12-405-06.5-A	T12-405-06.5-DLC
7/32"	3/8"	5/8"	2-1/2"	T12-405-07	T12-405-07-T	T12-405-07-C	T12-405-07-A	T12-405-07-DLC
15/64"	3/8"	5/8"	2-1/2"	T12-405-07.5	T12-405-07.5-T	T12-405-07.5-C	T12-405-07.5-A	T12-405-07.5-DLC
1/4"	3/8"	3/4"	2-1/2"	T12-405-08	T12-405-08-T	T12-405-08-C	T12-405-08-A	T12-405-08-DLC
17/64"	3/8"	3/4"	2-1/2"	T12-405-08.5	T12-405-08.5-T	T12-405-08.5-C	T12-405-08.5-A	T12-405-08.5-DLC
9/32"	3/8"	3/4"	2-1/2"	T12-405-09	T12-405-09-T	T12-405-09-C	T12-405-09-A	T12-405-09-DLC
19/64"	3/8"	3/4"	2-1/2"	T12-405-09.5	T12-405-09.5-T	T12-405-09.5-C	T12-405-09.5-A	T12-405-09.5-DLC
5/16"	3/8"	13/16"	2-1/2"	T12-405-10	T12-405-10-T	T12-405-10-C	T12-405-10-A	T12-405-10-DLC
21/64"	3/8"	13/16"	2-1/2"	T12-405-10.5	T12-405-10.5-T	T12-405-10.5-C	T12-405-10.5-A	T12-405-10.5-DLC
11/32"	3/8"	13/16"	2-1/2"	T12-405-11	T12-405-11-T	T12-405-11-C	T12-405-11-A	T12-405-11-DLC
23/64"	3/8"	13/16"	2-1/2"	T12-405-11.5	T12-405-11.5-T	T12-405-11.5-C	T12-405-11.5-A	T12-405-11.5-DLC
3/8"	3/8"	7/8"	2-1/2"	T12-405-12	T12-405-12-T	T12-405-12-C	T12-405-12-A	T12-405-12-DLC
13/32"	1/2"	1"	3"	T12-405-13	T12-405-13-T	T12-405-13-C	T12-405-13-A	T12-405-13-DLC
7/16"	1/2"	1"	3"	T12-405-14	T12-405-14-T	T12-405-14-C	T12-405-14-A	T12-405-14-DLC
15/32"	1/2"	1"	3"	T12-405-15	T12-405-15-T	T12-405-15-C	T12-405-15-A	T12-405-15-DLC
1/2"	1/2"	1"	3"	T12-405-16	T12-405-16-T	T12-405-16-C	T12-405-16-A	T12-405-16-DLC

C-2 Grade Carbide End Mills **C8**

Multiple Applications



C8 Series Tolerances
 Cutting Dia. = +.000/-.002
 Shank Dia. = -.0001/-.0002
 Flute Length = +.030/-.000
 OAL = ±.060

**All Sizes on
 1/4"
 Shanks
 for Strength**



C8-201 2 Flute Stub Length C-2 Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/4"	1/8"	2"	C8-201-02	C8-201-02-DLC
1/8"	1/4"	1/4"	2"	C8-201-04	C8-201-04-DLC
3/16"	1/4"	3/8"	2"	C8-201-06	C8-201-06-DLC
1/4"	1/4"	1/2"	2"	C8-201-08	C8-201-08-DLC



C8-203 2 Flute Standard Length C-2 Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/4"	1/4"	2-1/2"	C8-203-02	C8-203-02-DLC
1/8"	1/4"	1/2"	2-1/2"	C8-203-04	C8-203-04-DLC
3/16"	1/4"	5/8"	2-1/2"	C8-203-06	C8-203-06-DLC
1/4"	1/4"	3/4"	2-1/2"	C8-203-08	C8-203-08-DLC



C8-301 3 Flute Stub Length C-2 Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/8"	1/4"	1/4"	2"	C8-301-04	C8-301-04-DLC
3/16"	1/4"	3/8"	2"	C8-301-06	C8-301-06-DLC
1/4"	1/4"	1/2"	2"	C8-301-08	C8-301-08-DLC

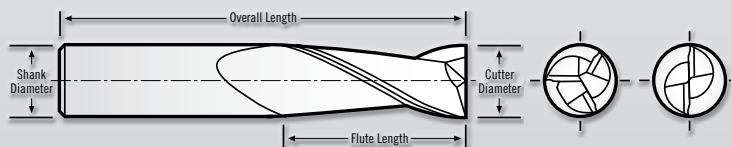
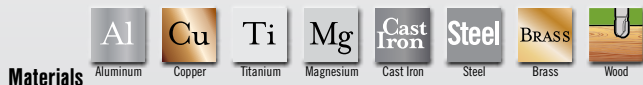


C8-303 3 Flute Standard Length C-2 Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/8"	1/4"	1/2"	2-1/2"	C8-303-04	C8-303-04-DLC
3/16"	1/4"	5/8"	2-1/2"	C8-303-06	C8-303-06-DLC
1/4"	1/4"	3/4"	2-1/2"	C8-303-08	C8-303-08-DLC

TS 2 & 3 Flute Tuffy Grade Carbide End Mills

Multiple Applications



TS Tolerances
 Cutting Dia. (1/16" to 1/4") = +.000/-0.002
 (5/16" to 3/4") = +.000/-0.003
 Shank Dia. = -.0001/-0.0002
 Flute Length (1/16" to 5/16") = +.030/-0.000
 (3/8" to 3/4") = +.060/-0.000
 OAL = ±.060

MTS Tolerances
 Cutting Dia. = +.000/-0.075mm
 Shank Dia. = -.002/-0.005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm



TS-201 2 Flute Stub Length Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number Coated
1/16"	1/8"	1/8"	1-1/2"	TS-201-02	TS-201-02-T	TS-201-02-C	TS-201-02-A	TS-201-02-DLC
3/32"	1/8"	3/16"	1-1/2"	TS-201-03	TS-201-03-T	TS-201-03-C	TS-201-03-A	TS-201-03-DLC
1/8"	1/8"	1/4"	1-1/2"	TS-201-04	TS-201-04-T	TS-201-04-C	TS-201-04-A	TS-201-04-DLC
3/16"	3/16"	3/8"	2"	TS-201-06	TS-201-06-T	TS-201-06-C	TS-201-06-A	TS-201-06-DLC
1/4"	1/4"	1/2"	2"	TS-201-08	TS-201-08-T	TS-201-08-C	TS-201-08-A	TS-201-08-DLC
5/16"	5/16"	1/2"	2-1/2"	TS-201-10	TS-201-10-T	TS-201-10-C	TS-201-10-A	TS-201-10-DLC
3/8"	3/8"	5/8"	2-1/2"	TS-201-12	TS-201-12-T	TS-201-12-C	TS-201-12-A	TS-201-12-DLC
7/16"	7/16"	5/8"	2-3/4"	TS-201-14	TS-201-14-T	TS-201-14-C	TS-201-14-A	TS-201-14-DLC
1/2"	1/2"	5/8"	3"	TS-201-16	TS-201-16-T	TS-201-16-C	TS-201-16-A	TS-201-16-DLC
5/8"	5/8"	7/8"	3-1/2"	TS-201-20	TS-201-20-T	TS-201-20-C	TS-201-20-A	TS-201-20-DLC
3/4"	3/4"	1"	4"	TS-201-24	TS-201-24-T	TS-201-24-C	TS-201-24-A	TS-201-24-DLC

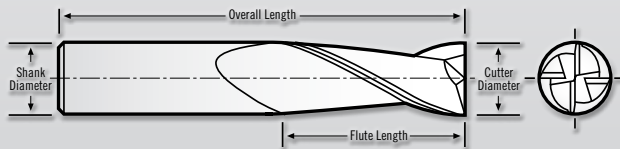


TS-301 3 Flute Stub Length Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	1/8"	1/8"	1-1/2"	TS-301-02	TS-301-02-T	TS-301-02-C	TS-301-02-A	TS-301-02-DLC
3/32"	1/8"	3/16"	1-1/2"	TS-301-03	TS-301-03-T	TS-301-03-C	TS-301-03-A	TS-301-03-DLC
1/8"	1/8"	1/4"	1-1/2"	TS-301-04	TS-301-04-T	TS-301-04-C	TS-301-04-A	TS-301-04-DLC
3/16"	3/16"	3/8"	2"	TS-301-06	TS-301-06-T	TS-301-06-C	TS-301-06-A	TS-301-06-DLC
1/4"	1/4"	1/2"	2"	TS-301-08	TS-301-08-T	TS-301-08-C	TS-301-08-A	TS-301-08-DLC
5/16"	5/16"	1/2"	2-1/2"	TS-301-10	TS-301-10-T	TS-301-10-C	TS-301-10-A	TS-301-10-DLC
3/8"	3/8"	5/8"	2-1/2"	TS-301-12	TS-301-12-T	TS-301-12-C	TS-301-12-A	TS-301-12-DLC
7/16"	7/16"	5/8"	2-3/4"	TS-301-14	TS-301-14-T	TS-301-14-C	TS-301-14-A	TS-301-14-DLC
1/2"	1/2"	5/8"	3"	TS-301-16	TS-301-16-T	TS-301-16-C	TS-301-16-A	TS-301-16-DLC

4 Flute Tuffy Grade Carbide End Mills

TS/MTS



TS Tolerances

Cutting Dia. (1/16" to 1/4") = +.000/- .002
 (5/16" to 3/4") = +.000/- .003
 Shank Dia. = -.0001/- .0002
 Flute Length (1/16" to 5/16") = +.030/- .000
 (3/8" to 3/4") = +.060/- .000
 OAL = ±.060

MTS Tolerances

Cutting Dia. = +.000/- .075mm
 Shank Dia. = -.002/- .005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm



TS-401 4 Flute Stub Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	1/8"	1/8"	1-1/2"	TS-401-02	TS-401-02-T	TS-401-02-C	TS-401-02-A	TS-401-02-DLC
3/32"	1/8"	3/16"	1-1/2"	TS-401-03	TS-401-03-T	TS-401-03-C	TS-401-03-A	TS-401-03-DLC
1/8"	1/8"	1/4"	1-1/2"	TS-401-04	TS-401-04-T	TS-401-04-C	TS-401-04-A	TS-401-04-DLC
3/16"	3/16"	3/8"	2"	TS-401-06	TS-401-06-T	TS-401-06-C	TS-401-06-A	TS-401-06-DLC
1/4"	1/4"	1/2"	2"	TS-401-08	TS-401-08-T	TS-401-08-C	TS-401-08-A	TS-401-08-DLC
5/16"	5/16"	1/2"	2-1/2"	TS-401-10	TS-401-10-T	TS-401-10-C	TS-401-10-A	TS-401-10-DLC
3/8"	3/8"	5/8"	2-1/2"	TS-401-12	TS-401-12-T	TS-401-12-C	TS-401-12-A	TS-401-12-DLC
7/16"	7/16"	5/8"	2-3/4"	TS-401-14	TS-401-14-T	TS-401-14-C	TS-401-14-A	TS-401-14-DLC
1/2"	1/2"	5/8"	3"	TS-401-16	TS-401-16-T	TS-401-16-C	TS-401-16-A	TS-401-16-DLC
5/8"	5/8"	7/8"	3-1/2"	TS-401-20	TS-401-20-T	TS-401-20-C	TS-401-20-A	TS-401-20-DLC
3/4"	3/4"	1"	4"	TS-401-24	TS-401-24-T	TS-401-24-C	TS-401-24-A	TS-401-24-DLC



METRIC



MTS-401 4 Flute Stub Length Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
2mm	3mm	5mm	38mm	MTS-401-02	MTS-401-02-T	MTS-401-02-C	MTS-401-02-A	MTS-401-02-DLC
3mm	3mm	6mm	38mm	MTS-401-03	MTS-401-03-T	MTS-401-03-C	MTS-401-03-A	MTS-401-03-DLC
4mm	4mm	8mm	50mm	MTS-401-04	MTS-401-04-T	MTS-401-04-C	MTS-401-04-A	MTS-401-04-DLC
5mm	5mm	8mm	50mm	MTS-401-05	MTS-401-05-T	MTS-401-05-C	MTS-401-05-A	MTS-401-05-DLC
6mm	6mm	8mm	50mm	MTS-401-06	MTS-401-06-T	MTS-401-06-C	MTS-401-06-A	MTS-401-06-DLC
8mm	8mm	12mm	58mm	MTS-401-08	MTS-401-08-T	MTS-401-08-C	MTS-401-08-A	MTS-401-08-DLC
10mm	10mm	14mm	66mm	MTS-401-10	MTS-401-10-T	MTS-401-10-C	MTS-401-10-A	MTS-401-10-DLC
12mm	12mm	16mm	73mm	MTS-401-12	MTS-401-12-T	MTS-401-12-C	MTS-401-12-A	MTS-401-12-DLC
16mm	16mm	20mm	82mm	MTS-401-16	MTS-401-16-T	MTS-401-16-C	MTS-401-16-A	MTS-401-16-DLC
20mm	20mm	25mm	92mm	MTS-401-20	MTS-401-20-T	MTS-401-20-C	MTS-401-20-A	MTS-401-20-DLC

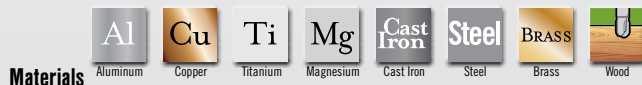
TR 3 Flute Tuffy Grade Carbide End Mills



Characteristics



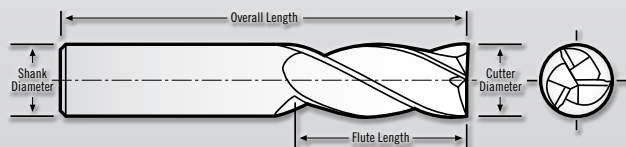
Applications



Materials



Coatings



TR-303 Tolerances

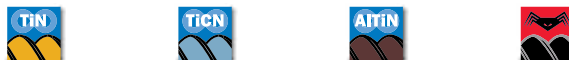
Cutting Dia. = $+0.001/-0.000$
 Shank Dia. = $-0.0001/-0.0002$
 Flute Length (1/8" to 5/16") = $+0.030/-0.000$
 (3/8" to 3/4") = $+0.060/-0.000$
 OAL = ± 0.060



Multiple Applications



TR-303 3 Flute Standard Length Tuffy Grade



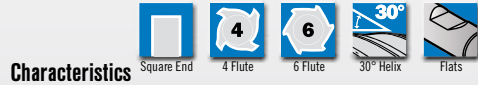
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/8"	1/8"	1/2"	1-1/2"	TR-303-04*	TR-303-04-T*	TR-303-04-C*	TR-303-04-A*	TR-303-04-DLC*
5/32"	3/16"	9/16"	2"	TR-303-05*	TR-303-05-T*	TR-303-05-C*	TR-303-05-A*	TR-303-05-DLC*
3/16"	3/16"	5/8"	2"	TR-303-06*	TR-303-06-T*	TR-303-06-C*	TR-303-06-A*	TR-303-06-DLC*
7/32"	1/4"	5/8"	2-1/2"	TR-303-07*	TR-303-07-T*	TR-303-07-C*	TR-303-07-A*	TR-303-07-DLC*
1/4"	1/4"	3/4"	2-1/2"	TR-303-08*	TR-303-08-T*	TR-303-08-C*	TR-303-08-A*	TR-303-08-DLC*
9/32"	5/16"	3/4"	2-1/2"	TR-303-09*	TR-303-09-T*	TR-303-09-C*	TR-303-09-A*	TR-303-09-DLC*
5/16"	5/16"	13/16"	2-1/2"	TR-303-10*	TR-303-10-T*	TR-303-10-C*	TR-303-10-A*	TR-303-10-DLC*
3/8"	3/8"	7/8"	2-1/2"	TR-303-12	TR-303-12-T	TR-303-12-C	TR-303-12-A	TR-303-12-DLC
7/16"	7/16"	1"	2-3/4"	TR-303-14*	TR-303-14-T*	TR-303-14-C*	TR-303-14-A*	TR-303-14-DLC*
1/2"	1/2"	1"	3"	TR-303-16	TR-303-16-T	TR-303-16-C	TR-303-16-A	TR-303-16-DLC
9/16"	9/16"	1-1/4"	3-1/2"	TR-303-18*	TR-303-18-T*	TR-303-18-C*	TR-303-18-A*	TR-303-18-DLC*
5/8"	5/8"	1-1/4"	3-1/2"	TR-303-20	TR-303-20-T	TR-303-20-C	TR-303-20-A	TR-303-20-DLC
3/4"	3/4"	1-1/2"	4"	TR-303-24	TR-303-24-T	TR-303-24-C	TR-303-24-A	TR-303-24-DLC

*Does not come with flats.

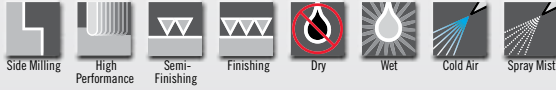


4/6 Flute Tuffy Grade Carbide End Mills **TR**

Multiple Applications



Characteristics



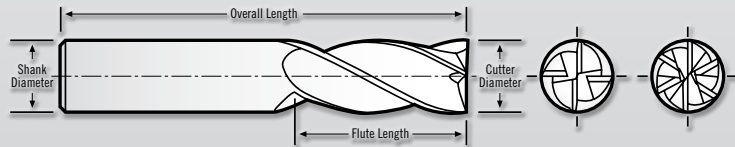
Applications



Materials



Coatings



TR-404 Tolerances

Cutting Dia. = +.001/- .000
 Shank Dia. = -.0001/- .0002
 Flute Length (1/8" to 5/16") = +.030/- .000
 (3/8" to 3/4") = +.060/- .000
 OAL = ±.060

TR-606 Tolerances

Cutting Dia. = +.001/- .000
 Shank Dia. = -.0001/- .0002
 Flute Length = +.060/- .000
 OAL = ±.060



TR-404 4 Flute Standard Length Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/8"	1/8"	1/2"	1-1/2"	TR-404-04*	TR-404-04-T*	TR-404-04-C*	TR-404-04-A*	TR-404-04-DLC*
5/32"	3/16"	9/16"	2"	TR-404-05*	TR-404-05-T*	TR-404-05-C*	TR-404-05-A*	TR-404-05-DLC*
3/16"	3/16"	5/8"	2"	TR-404-06*	TR-404-06-T*	TR-404-06-C*	TR-404-06-A*	TR-404-06-DLC*
7/32"	1/4"	5/8"	2-1/2"	TR-404-07*	TR-404-07-T*	TR-404-07-C*	TR-404-07-A*	TR-404-07-DLC*
1/4"	1/4"	3/4"	2-1/2"	TR-404-08*	TR-404-08-T*	TR-404-08-C*	TR-404-08-A*	TR-404-08-DLC*
9/32"	5/16"	3/4"	2-1/2"	TR-404-09*	TR-404-09-T*	TR-404-09-C*	TR-404-09-A*	TR-404-09-DLC*
5/16"	5/16"	13/16"	2-1/2"	TR-404-10*	TR-404-10-T*	TR-404-10-C*	TR-404-10-A*	TR-404-10-DLC*
3/8"	3/8"	7/8"	2-1/2"	TR-404-12	TR-404-12-T	TR-404-12-C	TR-404-12-A	TR-404-12-DLC
7/16"	7/16"	1"	2-3/4"	TR-404-14*	TR-404-14-T*	TR-404-14-C*	TR-404-14-A*	TR-404-14-DLC*
1/2"	1/2"	1"	3"	TR-404-16	TR-404-16-T	TR-404-16-C	TR-404-16-A	TR-404-16-DLC
9/16"	9/16"	1-1/4"	3-1/2"	TR-404-18*	TR-404-18-T*	TR-404-18-C*	TR-404-18-A*	TR-404-18-DLC*
5/8"	5/8"	1-1/4"	3-1/2"	TR-404-20	TR-404-20-T	TR-404-20-C	TR-404-20-A	TR-404-20-DLC
3/4"	3/4"	1-1/2"	4"	TR-404-24	TR-404-24-T	TR-404-24-C	TR-404-24-A	TR-404-24-DLC

*Does not come with flats.



TR-606 6 Flute Standard Length Tuffy Grade

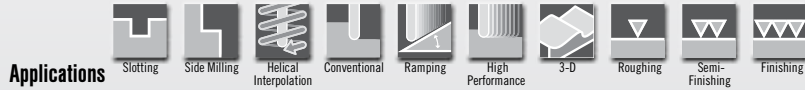
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1"	1"	2-1/2"	5"	TR-606-32	TR-606-32-T	TR-606-32-C	TR-606-32-A	TR-606-32-DLC

SB/MSB 2 Flute Tuffy Grade Carbide Ball End Mills

Multiple Applications



Characteristics



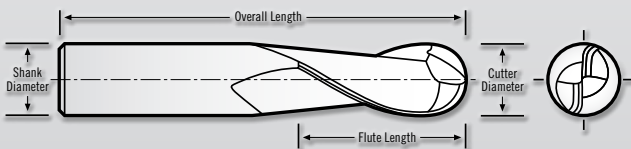
Applications



Materials



Coatings



SB Series Tolerances

Cutting Dia. (1/16" to 1/4") = +.000/- .002
 (9/32" to 3/4") = +.000/- .003
 Shank Dia. = -.0001/- .0002
 Flute Length (1/16" to 5/16") = +.030/- .000
 (3/8" to 3/4") = +.060/- .000
 OAL = ±.060

MSB Tolerances

Cutting Dia. = +.000/- .075mm
 Shank Dia. = -.002/- .005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm



SB-201 2 Flute Ball End Stub Length Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	1/8"	1/8"	1-1/2"	SB-201-02	SB-201-02-T	SB-201-02-C	SB-201-02-A	SB-201-02-DLC
3/32"	1/8"	3/16"	1-1/2"	SB-201-03	SB-201-03-T	SB-201-03-C	SB-201-03-A	SB-201-03-DLC
1/8"	1/8"	1/4"	1-1/2"	SB-201-04	SB-201-04-T	SB-201-04-C	SB-201-04-A	SB-201-04-DLC
5/32"	3/16"	1/4"	2"	SB-201-05	SB-201-05-T	SB-201-05-C	SB-201-05-A	SB-201-05-DLC
3/16"	3/16"	5/16"	2"	SB-201-06	SB-201-06-T	SB-201-06-C	SB-201-06-A	SB-201-06-DLC
7/32"	1/4"	5/16"	2-1/2"	SB-201-07	SB-201-07-T	SB-201-07-C	SB-201-07-A	SB-201-07-DLC
1/4"	1/4"	5/16"	2-1/2"	SB-201-08	SB-201-08-T	SB-201-08-C	SB-201-08-A	SB-201-08-DLC
9/32"	5/16"	7/16"	2-1/2"	SB-201-09	SB-201-09-T	SB-201-09-C	SB-201-09-A	SB-201-09-DLC
5/16"	5/16"	7/16"	2-1/2"	SB-201-10	SB-201-10-T	SB-201-10-C	SB-201-10-A	SB-201-10-DLC
3/8"	3/8"	1/2"	2-1/2"	SB-201-12	SB-201-12-T	SB-201-12-C	SB-201-12-A	SB-201-12-DLC
7/16"	7/16"	5/8"	2-3/4"	SB-201-14	SB-201-14-T	SB-201-14-C	SB-201-14-A	SB-201-14-DLC
1/2"	1/2"	5/8"	3"	SB-201-16	SB-201-16-T	SB-201-16-C	SB-201-16-A	SB-201-16-DLC
5/8"	5/8"	7/8"	3-1/2"	SB-201-20	SB-201-20-T	SB-201-20-C	SB-201-20-A	SB-201-20-DLC
3/4"	3/4"	1"	4"	SB-201-24	SB-201-24-T	SB-201-24-C	SB-201-24-A	SB-201-24-DLC



METRIC

MSB-201 2 Flute Ball End Stub Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
2mm	3mm	5mm	38mm	MSB-201-02	MSB-201-02-T	MSB-201-02-C	MSB-201-02-A	MSB-201-02-DLC
3mm	3mm	6mm	38mm	MSB-201-03	MSB-201-03-T	MSB-201-03-C	MSB-201-03-A	MSB-201-03-DLC
4mm	4mm	8mm	50mm	MSB-201-04	MSB-201-04-T	MSB-201-04-C	MSB-201-04-A	MSB-201-04-DLC
5mm	5mm	8mm	50mm	MSB-201-05	MSB-201-05-T	MSB-201-05-C	MSB-201-05-A	MSB-201-05-DLC
6mm	6mm	8mm	50mm	MSB-201-06	MSB-201-06-T	MSB-201-06-C	MSB-201-06-A	MSB-201-06-DLC
8mm	8mm	12mm	58mm	MSB-201-08	MSB-201-08-T	MSB-201-08-C	MSB-201-08-A	MSB-201-08-DLC
10mm	10mm	14mm	66mm	MSB-201-10	MSB-201-10-T	MSB-201-10-C	MSB-201-10-A	MSB-201-10-DLC
12mm	12mm	16mm	73mm	MSB-201-12	MSB-201-12-T	MSB-201-12-C	MSB-201-12-A	MSB-201-12-DLC
16mm	16mm	20mm	82mm	MSB-201-16	MSB-201-16-T	MSB-201-16-C	MSB-201-16-A	MSB-201-16-DLC
20mm	20mm	25mm	92mm	MSB-201-20	MSB-201-20-T	MSB-201-20-C	MSB-201-20-A	MSB-201-20-DLC

2 Flute Tuffy Grade Carbide Ball End Mills **B/MB**



B-203 2 Flute Ball End Standard Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	1/8"	3/16"	1-1/2"	B-203-02	B-203-02-T	B-203-02-C	B-203-02-A	B-203-02-DLC
3/32"	1/8"	3/8"	1-1/2"	B-203-03	B-203-03-T	B-203-03-C	B-203-03-A	B-203-03-DLC
1/8"	1/8"	1/2"	1-1/2"	B-203-04	B-203-04-T	B-203-04-C	B-203-04-A	B-203-04-DLC
5/32"	3/16"	9/16"	2"	B-203-05	B-203-05-T	B-203-05-C	B-203-05-A	B-203-05-DLC
3/16"	3/16"	5/8"	2"	B-203-06	B-203-06-T	B-203-06-C	B-203-06-A	B-203-06-DLC
7/32"	1/4"	5/8"	2-1/2"	B-203-07	B-203-07-T	B-203-07-C	B-203-07-A	B-203-07-DLC
1/4"	1/4"	3/4"	2-1/2"	B-203-08	B-203-08-T	B-203-08-C	B-203-08-A	B-203-08-DLC
9/32"	5/16"	3/4"	2-1/2"	B-203-09	B-203-09-T	B-203-09-C	B-203-09-A	B-203-09-DLC
5/16"	5/16"	13/16"	2-1/2"	B-203-10	B-203-10-T	B-203-10-C	B-203-10-A	B-203-10-DLC
3/8"	3/8"	7/8"	2-1/2"	B-203-12	B-203-12-T	B-203-12-C	B-203-12-A	B-203-12-DLC
7/16"	7/16"	1"	2-3/4"	B-203-14	B-203-14-T	B-203-14-C	B-203-14-A	B-203-14-DLC
1/2"	1/2"	1"	3"	B-203-16	B-203-16-T	B-203-16-C	B-203-16-A	B-203-16-DLC
5/8"	5/8"	1-1/4"	3-1/2"	B-203-20	B-203-20-T	B-203-20-C	B-203-20-A	B-203-20-DLC
3/4"	3/4"	1-1/2"	4"	B-203-24	B-203-24-T	B-203-24-C	B-203-24-A	B-203-24-DLC



METRIC

MB-203 2 Flute Ball End Standard Length Tuffy Grade

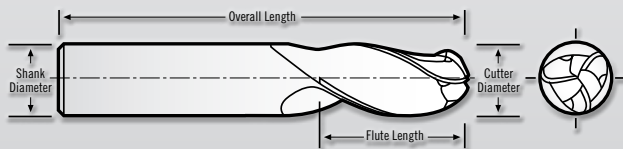


Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
2mm	3mm	8mm	38mm	MB-203-02	MB-203-02-T	MB-203-02-C	MB-203-02-A	MB-203-02-DLC
3mm	3mm	12mm	38mm	MB-203-03	MB-203-03-T	MB-203-03-C	MB-203-03-A	MB-203-03-DLC
4mm	4mm	12mm	50mm	MB-203-04	MB-203-04-T	MB-203-04-C	MB-203-04-A	MB-203-04-DLC
5mm	5mm	14mm	50mm	MB-203-05	MB-203-05-T	MB-203-05-C	MB-203-05-A	MB-203-05-DLC
6mm	6mm	14mm	57mm	MB-203-06	MB-203-06-T	MB-203-06-C	MB-203-06-A	MB-203-06-DLC
8mm	8mm	16mm	63mm	MB-203-08	MB-203-08-T	MB-203-08-C	MB-203-08-A	MB-203-08-DLC
10mm	10mm	20mm	72mm	MB-203-10	MB-203-10-T	MB-203-10-C	MB-203-10-A	MB-203-10-DLC
12mm	12mm	25mm	83mm	MB-203-12	MB-203-12-T	MB-203-12-C	MB-203-12-A	MB-203-12-DLC
16mm	16mm	32mm	92mm	MB-203-16	MB-203-16-T	MB-203-16-C	MB-203-16-A	MB-203-16-DLC
20mm	20mm	38mm	104mm	MB-203-20	MB-203-20-T	MB-203-20-C	MB-203-20-A	MB-203-20-DLC

Multiple Applications

SB/MSB 3 Flute Tuffy Grade Carbide Ball End Mills

Multiple Applications



SB/B Series Tolerances

Cutting Dia. (1/16" to 1/4") = +.000/-0.002
 (9/32" to 3/4") = +.000/-0.003
 Shank Dia. = -.0001/-0.0002
 Flute Length (1/16" to 5/16") = +.030/-0.000
 (3/8" to 1") = +.060/-0.000
 OAL = ±0.060

MB Tolerances

Cutting Dia. = +.000/-0.075mm
 Shank Dia. = -.002/-0.005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm



SB-301 3 Flute Ball End Stub Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	1/8"	1/8"	1-1/2"	SB-301-02	SB-301-02-T	SB-301-02-C	SB-301-02-A	SB-301-02-DLC
3/32"	1/8"	3/16"	1-1/2"	SB-301-03	SB-301-03-T	SB-301-03-C	SB-301-03-A	SB-301-03-DLC
1/8"	1/8"	1/4"	1-1/2"	SB-301-04	SB-301-04-T	SB-301-04-C	SB-301-04-A	SB-301-04-DLC
5/32"	3/16"	1/4"	2"	SB-301-05	SB-301-05-T	SB-301-05-C	SB-301-05-A	SB-301-05-DLC
3/16"	3/16"	5/16"	2"	SB-301-06	SB-301-06-T	SB-301-06-C	SB-301-06-A	SB-301-06-DLC
7/32"	1/4"	5/16"	2-1/2"	SB-301-07	SB-301-07-T	SB-301-07-C	SB-301-07-A	SB-301-07-DLC
1/4"	1/4"	5/16"	2-1/2"	SB-301-08	SB-301-08-T	SB-301-08-C	SB-301-08-A	SB-301-08-DLC
9/32"	5/16"	7/16"	2-1/2"	SB-301-09	SB-301-09-T	SB-301-09-C	SB-301-09-A	SB-301-09-DLC
5/16"	5/16"	7/16"	2-1/2"	SB-301-10	SB-301-10-T	SB-301-10-C	SB-301-10-A	SB-301-10-DLC
3/8"	3/8"	1/2"	2-1/2"	SB-301-12	SB-301-12-T	SB-301-12-C	SB-301-12-A	SB-301-12-DLC
7/16"	7/16"	5/8"	2-3/4"	SB-301-14	SB-301-14-T	SB-301-14-C	SB-301-14-A	SB-301-14-DLC
1/2"	1/2"	5/8"	3"	SB-301-16	SB-301-16-T	SB-301-16-C	SB-301-16-A	SB-301-16-DLC
5/8"	5/8"	7/8"	3-1/2"	SB-301-20	SB-301-20-T	SB-301-20-C	SB-301-20-A	SB-301-20-DLC
3/4"	3/4"	1"	4"	SB-301-24	SB-301-24-T	SB-301-24-C	SB-301-24-A	SB-301-24-DLC



METRIC

MSB-301 3 Flute Ball End Stub Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1.5mm	3mm	3mm	38mm	MSB-301-1.5	MSB-301-1.5-T	MSB-301-1.5-C	MSB-301-1.5-A	MSB-301-1.5-DLC
2mm	3mm	5mm	38mm	MSB-301-02	MSB-301-02-T	MSB-301-02-C	MSB-301-02-A	MSB-301-02-DLC
3mm	3mm	6mm	38mm	MSB-301-03	MSB-301-03-T	MSB-301-03-C	MSB-301-03-A	MSB-301-03-DLC
4mm	4mm	8mm	50mm	MSB-301-04	MSB-301-04-T	MSB-301-04-C	MSB-301-04-A	MSB-301-04-DLC
5mm	5mm	8mm	50mm	MSB-301-05	MSB-301-05-T	MSB-301-05-C	MSB-301-05-A	MSB-301-05-DLC
6mm	6mm	8mm	50mm	MSB-301-06	MSB-301-06-T	MSB-301-06-C	MSB-301-06-A	MSB-301-06-DLC
8mm	8mm	12mm	58mm	MSB-301-08	MSB-301-08-T	MSB-301-08-C	MSB-301-08-A	MSB-301-08-DLC
10mm	10mm	14mm	66mm	MSB-301-10	MSB-301-10-T	MSB-301-10-C	MSB-301-10-A	MSB-301-10-DLC
12mm	12mm	16mm	73mm	MSB-301-12	MSB-301-12-T	MSB-301-12-C	MSB-301-12-A	MSB-301-12-DLC
16mm	16mm	20mm	82mm	MSB-301-16	MSB-301-16-T	MSB-301-16-C	MSB-301-16-A	MSB-301-16-DLC
20mm	20mm	25mm	92mm	MSB-301-20	MSB-301-20-T	MSB-301-20-C	MSB-301-20-A	MSB-301-20-DLC

3 Flute Tuffy Grade Carbide Ball End Mills **B/MB**



B-333 3 Flute Ball End Standard Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	1/8"	3/16"	1-1/2"	B-333-02	B-333-02-T	B-333-02-C	B-333-02-A	B-333-02-DLC
3/32"	1/8"	3/8"	1-1/2"	B-333-03	B-333-03-T	B-333-03-C	B-333-03-A	B-333-03-DLC
1/8"	1/8"	1/2"	1-1/2"	B-333-04	B-333-04-T	B-333-04-C	B-333-04-A	B-333-04-DLC
5/32"	3/16"	9/16"	2"	B-333-05	B-333-05-T	B-333-05-C	B-333-05-A	B-333-05-DLC
3/16"	3/16"	5/8"	2"	B-333-06	B-333-06-T	B-333-06-C	B-333-06-A	B-333-06-DLC
7/32"	1/4"	5/8"	2-1/2"	B-333-07	B-333-07-T	B-333-07-C	B-333-07-A	B-333-07-DLC
1/4"	1/4"	3/4"	2-1/2"	B-333-08	B-333-08-T	B-333-08-C	B-333-08-A	B-333-08-DLC
9/32"	5/16"	3/4"	2-1/2"	B-333-09	B-333-09-T	B-333-09-C	B-333-09-A	B-333-09-DLC
5/16"	5/16"	13/16"	2-1/2"	B-333-10	B-333-10-T	B-333-10-C	B-333-10-A	B-333-10-DLC
3/8"	3/8"	7/8"	2-1/2"	B-333-12	B-333-12-T	B-333-12-C	B-333-12-A	B-333-12-DLC
7/16"	7/16"	1"	2-3/4"	B-333-14	B-333-14-T	B-333-14-C	B-333-14-A	B-333-14-DLC
1/2"	1/2"	1"	3"	B-333-16	B-333-16-T	B-333-16-C	B-333-16-A	B-333-16-DLC
5/8"	5/8"	1-1/4"	3-1/2"	B-333-20	B-333-20-T	B-333-20-C	B-333-20-A	B-333-20-DLC
3/4"	3/4"	1-1/2"	4"	B-333-24	B-333-24-T	B-333-24-C	B-333-24-A	B-333-24-DLC
1"	1"	2"	5"	B-333-32	B-333-32-T	B-333-32-C	B-333-32-A	B-333-32-DLC
1"	1"	2-1/2"	5"	BL-333-32	BL-333-32-T	BL-333-32-C	BL-333-32-A	BL-333-32-DLC
1"	1"	4"	7"	BX-333-32	BX-333-32-T	BX-333-32-C	BX-333-32-A	BX-333-32-DLC

Multiple Applications



METRIC

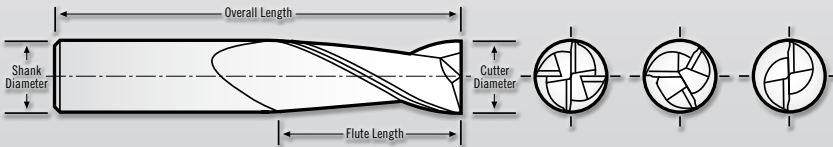
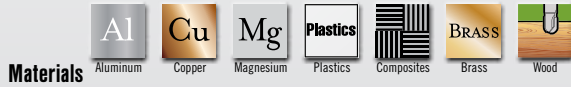
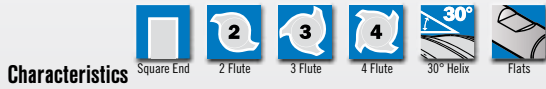
MB-333 3 Flute Ball End Standard Length Tuffy Grade



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1.5mm	3mm	6mm	38mm	MB-333-1.5	MB-333-1.5-T	MB-333-1.5-C	MB-333-1.5-A	MB-333-1.5-DLC
2mm	3mm	8mm	38mm	MB-333-02	MB-333-02-T	MB-333-02-C	MB-333-02-A	MB-333-02-DLC
3mm	3mm	12mm	38mm	MB-333-03	MB-333-03-T	MB-333-03-C	MB-333-03-A	MB-333-03-DLC
4mm	4mm	12mm	50mm	MB-333-04	MB-333-04-T	MB-333-04-C	MB-333-04-A	MB-333-04-DLC
5mm	5mm	14mm	50mm	MB-333-05	MB-333-05-T	MB-333-05-C	MB-333-05-A	MB-333-05-DLC
6mm	6mm	14mm	57mm	MB-333-06	MB-333-06-T	MB-333-06-C	MB-333-06-A	MB-333-06-DLC
8mm	8mm	16mm	63mm	MB-333-08	MB-333-08-T	MB-333-08-C	MB-333-08-A	MB-333-08-DLC
10mm	10mm	20mm	72mm	MB-333-10	MB-333-10-T	MB-333-10-C	MB-333-10-A	MB-333-10-DLC
12mm	12mm	25mm	83mm	MB-333-12	MB-333-12-T	MB-333-12-C	MB-333-12-A	MB-333-12-DLC
16mm	16mm	32mm	92mm	MB-333-16	MB-333-16-T	MB-333-16-C	MB-333-16-A	MB-333-16-DLC
20mm	20mm	38mm	104mm	MB-333-20	MB-333-20-T	MB-333-20-C	MB-333-20-A	MB-333-20-DLC

NR C-2 Grade Carbide End Mills

Multiple Applications



NR Series Tolerances

Cutting Dia. = +.001/-.000
 Shank Dia. = -.0001/-.0002
 Flute Length (1/16" to 5/16") = +.030/-.000
 (21/64" to 1) = +.060/-.000
 OAL = ±.060

MNR Tolerances

Cutting Dia. = +.025/-.000mm
 Shank Dia. = -.002/-.005mm
 Flute Length = +0.500/+1.500mm
 OAL = ±10mm



NR-204 2 Flute Standard Length C-2 Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, Uncoated	Tool Number No Flats, Uncoated	Tool Number Flats, DLC Coated	Tool Number No Flats, DLC Coated
1/16"	1/8"	3/16"	1-1/2"	-	NR-204-02	-	NR-204-02-DLC
5/64"	1/8"	1/4"	1-1/2"	-	NR-204-02.5	-	NR-204-02.5-DLC
3/32"	1/8"	3/8"	1-1/2"	-	NR-204-03	-	NR-204-03-DLC
7/64"	1/8"	7/16"	1-1/2"	-	NR-204-03.5	-	NR-204-03.5-DLC
1/8"	1/8"	1/2"	1-1/2"	-	NR-204-04	-	NR-204-04-DLC
9/64"	3/16"	1/2"	2"	-	NR-204-04.5	-	NR-204-04.5-DLC
5/32"	3/16"	9/16"	2"	-	NR-204-05	-	NR-204-05-DLC
11/64"	3/16"	5/8"	2"	-	NR-204-05.5	-	NR-204-05.5-DLC
3/16"	3/16"	5/8"	2"	-	NR-204-06	-	NR-204-06-DLC
13/64"	1/4"	5/8"	2-1/2"	-	NR-204-06.5	-	NR-204-06.5-DLC
7/32"	1/4"	5/8"	2-1/2"	-	NR-204-07	-	NR-204-07-DLC
15/64"	1/4"	5/8"	2-1/2"	-	NR-204-07.5	-	NR-204-07.5-DLC
1/4"	1/4"	3/4"	2-1/2"	-	NR-204-08	-	NR-204-08-DLC
17/64"	5/16"	3/4"	2-1/2"	-	NR-204-08.5	-	NR-204-08.5-DLC
9/32"	5/16"	3/4"	2-1/2"	-	NR-204-09	-	NR-204-09-DLC
19/64"	5/16"	3/4"	2-1/2"	-	NR-204-09.5	-	NR-204-09.5-DLC
5/16"	5/16"	13/16"	2-1/2"	-	NR-204-10	-	NR-204-10-DLC
21/64"	3/8"	13/16"	2-1/2"	NR-204-10.5	NR-204-10.5-NF	NR-204-10.5-DLC	NR-204-10.5-NF-DLC
11/32"	3/8"	13/16"	2-1/2"	NR-204-11	NR-204-11-NF	NR-204-11-DLC	NR-204-11-NF-DLC
23/64"	3/8"	7/8"	2-1/2"	NR-204-11.5	NR-204-11.5-NF	NR-204-11.5-DLC	NR-204-11.5-NF-DLC
3/8"	3/8"	7/8"	2-1/2"	NR-204-12	NR-204-12-NF	NR-204-12-DLC	NR-204-12-NF-DLC
25/64"	7/16"	1"	2-3/4"	-	NR-204-12.5	-	NR-204-12.5-DLC
13/32"	7/16"	1"	2-3/4"	-	NR-204-13	-	NR-204-13-DLC
27/64"	7/16"	1"	2-3/4"	-	NR-204-13.5	-	NR-204-13.5-DLC
7/16"	7/16"	1"	2-3/4"	-	NR-204-14	-	NR-204-14-DLC
29/64"	1/2"	1"	3"	NR-204-14.5	NR-204-14.5-NF	NR-204-14.5-DLC	NR-204-14.5-NF-DLC
15/32"	1/2"	1"	3"	NR-204-15	NR-204-15-NF	NR-204-15-DLC	NR-204-15-NF-DLC
31/64"	1/2"	1"	3"	NR-204-15.5	NR-204-15.5-NF	NR-204-15.5-DLC	NR-204-15.5-NF-DLC
1/2"	1/2"	1"	3"	NR-204-16	NR-204-16-NF	NR-204-16-DLC	NR-204-16-NF-DLC
33/64"	1/2"	1"	3"	NR-204-16.5	NR-204-16.5-NF	NR-204-16.5-DLC	NR-204-16.5-NF-DLC
9/16"	9/16"	1-1/4"	3-1/2"	-	NR-204-18	-	NR-204-18-DLC
5/8"	5/8"	1-1/4"	3-1/2"	NR-204-20	NR-204-20-NF	NR-204-20-DLC	NR-204-20-NF-DLC
3/4"	3/4"	1-1/2"	4"	NR-204-24	NR-204-24-NF	NR-204-24-DLC	NR-204-24-NF-DLC
1"	1"	1-1/2"	4"	NR-204-32	NR-204-32-NF	NR-204-32-DLC	NR-204-32-NF-DLC

C-2 Grade Carbide End Mills

NR/MNR



MNR-204 Metric 2 Flute C-2 Grade Standard Length **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, Uncoated	Tool Number No Flats, Uncoated	Tool Number Flats, DLC Coated	Tool Number No Flats, DLC Coated
2mm	3mm	8mm	38mm	—	MNR-204-02	—	MNR-204-02-DLC
3mm	3mm	12mm	38mm	—	MNR-204-03	—	MNR-204-03-DLC
4mm	4mm	12mm	50mm	—	MNR-204-04	—	MNR-204-04-DLC
5mm	5mm	14mm	50mm	—	MNR-204-05	—	MNR-204-05-DLC
6mm	6mm	14mm	57mm	—	MNR-204-06	—	MNR-204-06-DLC
8mm	8mm	16mm	63mm	—	MNR-204-08	—	MNR-204-08-DLC
10mm	10mm	20mm	72mm	—	MNR-204-10	—	MNR-204-10-DLC
12mm	12mm	25mm	83mm	—	MNR-204-12	—	MNR-204-12-DLC
16mm	16mm	32mm	92mm	—	MNR-204-16	—	MNR-204-16-DLC
20mm	20mm	38mm	104mm	—	MNR-204-20	—	MNR-204-20-DLC
25mm	25mm	38mm	104mm	—	MNR-204-25	—	MNR-204-25-DLC

NOTE: Metric tools do not have flats.



Flats!



NR-303 3 Flute Standard Length C-2 Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, Uncoated	Tool Number No Flats, Uncoated	Tool Number Flats, DLC Coated	Tool Number No Flats, DLC Coated
1/16"	1/8"	3/16"	1-1/2"	—	NR-303-02	—	NR-303-02-DLC
5/64"	1/8"	1/4"	1-1/2"	Flats!	NR-303-02.5	—	NR-303-02.5-DLC
3/32"	1/8"	3/8"	1-1/2"		NR-303-03	—	NR-303-03-DLC
7/64"	1/8"	7/16"	1-1/2"	—	NR-303-03.5	—	NR-303-03.5-DLC
1/8"	1/8"	1/2"	1-1/2"	—	NR-303-04	—	NR-303-04-DLC
5/32"	3/16"	9/16"	2"	—	NR-303-05	—	NR-303-05-DLC
3/16"	3/16"	5/8"	2"	—	NR-303-06	—	NR-303-06-DLC
7/32"	1/4"	5/8"	2-1/2"	—	NR-303-07	—	NR-303-07-DLC
1/4"	1/4"	3/4"	2-1/2"	—	NR-303-08	—	NR-303-08-DLC
9/32"	5/16"	3/4"	2-1/2"	—	NR-303-09	—	NR-303-09-DLC
5/16"	5/16"	13/16"	2-1/2"	—	NR-303-10	—	NR-303-10-DLC
3/8"	3/8"	7/8"	2-1/2"	NR-303-12	NR-303-12-NF	NR-303-12-DLC	NR-303-12-NF-DLC
7/16"	7/16"	1"	2-3/4"	—	NR-303-14	—	NR-303-14-DLC
1/2"	1/2"	1"	3"	NR-303-16	NR-303-16-NF	NR-303-16-DLC	NR-303-16-NF-DLC
9/16"	9/16"	1-1/4"	3-1/2"	—	NR-303-18	—	NR-303-18-DLC
5/8"	5/8"	1-1/4"	3-1/2"	NR-303-20	NR-303-20-NF	NR-303-20-DLC	NR-303-20-NF-DLC
3/4"	3/4"	1-1/2"	4"	NR-303-24	NR-303-24-NF	NR-303-24-DLC	NR-303-24-NF-DLC

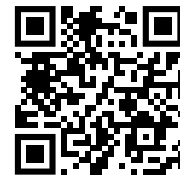


MNR-303 3 Flute Standard Length C-2 Grade **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, Uncoated	Tool Number No Flats, Uncoated	Tool Number Flats, DLC Coated	Tool Number No Flats, DLC Coated
2mm	3mm	8mm	38mm	—	MNR-303-02	—	MNR-303-02-DLC
3mm	3mm	12mm	38mm	—	MNR-303-03	—	MNR-303-03-DLC
4mm	4mm	12mm	50mm	—	MNR-303-04	—	MNR-303-04-DLC
5mm	5mm	14mm	50mm	—	MNR-303-05	—	MNR-303-05-DLC
6mm	6mm	14mm	57mm	—	MNR-303-06	—	MNR-303-06-DLC
8mm	8mm	16mm	63mm	—	MNR-303-08	—	MNR-303-08-DLC
10mm	10mm	20mm	72mm	—	MNR-303-10	—	MNR-303-10-DLC
12mm	12mm	25mm	83mm	—	MNR-303-12	—	MNR-303-12-DLC
16mm	16mm	32mm	92mm	—	MNR-303-16	—	MNR-303-16-DLC
20mm	20mm	38mm	104mm	—	MNR-303-20	—	MNR-303-20-DLC
25mm	25mm	38mm	104mm	—	MNR-303-25	—	MNR-303-25-DLC

NOTE: Metric tools do not have flats.

Multiple Applications



NR C-2 Grade Carbide End Mills

Flats!

NR-404 4 Flute Standard Length C-2 Grade



Flats!

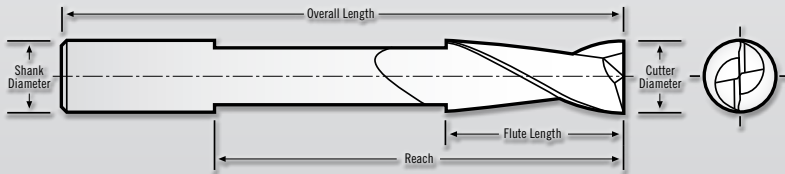
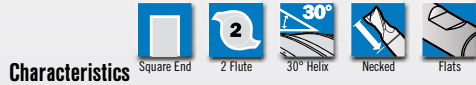


Multiple Applications

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, Uncoated	Tool Number No Flats, Uncoated	Tool Number Flats, DLC Coated	Tool Number No Flats, DLC Coated
1/16"	1/8"	3/16"	1-1/2"	—	NR-404-02	—	NR-404-02-DLC
5/64"	1/8"	1/4"	1-1/2"	—	NR-404-02.5	—	NR-404-02.5-DLC
3/32"	1/8"	3/8"	1-1/2"	—	NR-404-03	—	NR-404-03-DLC
7/64"	1/8"	7/16"	1-1/2"	—	NR-404-03.5	—	NR-404-03.5-DLC
1/8"	1/8"	1/2"	1-1/2"	—	NR-404-04	—	NR-404-04-DLC
9/64"	3/16"	1/2"	2"	—	NR-404-04.5	—	NR-404-04.5-DLC
5/32"	3/16"	9/16"	2"	—	NR-404-05	—	NR-404-05-DLC
11/64"	3/16"	5/8"	2"	—	NR-404-05.5	—	NR-404-05.5-DLC
3/16"	3/16"	5/8"	2"	—	NR-404-06	—	NR-404-06-DLC
13/64"	1/4"	5/8"	2-1/2"	—	NR-404-06.5	—	NR-404-06.5-DLC
7/32"	1/4"	5/8"	2-1/2"	—	NR-404-07	—	NR-404-07-DLC
15/64"	1/4"	5/8"	2-1/2"	—	NR-404-07.5	—	NR-404-07.5-DLC
1/4"	1/4"	3/4"	2-1/2"	—	NR-404-08	—	NR-404-08-DLC
17/64"	5/16"	3/4"	2-1/2"	—	NR-404-08.5	—	NR-404-08.5-DLC
9/32"	5/16"	3/4"	2-1/2"	—	NR-404-09	—	NR-404-09-DLC
19/64"	5/16"	3/4"	2-1/2"	—	NR-404-09.5	—	NR-404-09.5-DLC
5/16"	5/16"	13/16"	2-1/2"	—	NR-404-10	—	NR-404-10-DLC
21/64"	3/8"	13/16"	2-1/2"	NR-404-10.5	NR-404-10.5-NF	NR-404-10.5-DLC	NR-404-10.5-NF-DLC
11/32"	3/8"	13/16"	2-1/2"	NR-404-11	NR-404-11-NF	NR-404-11-DLC	NR-404-11-NF-DLC
23/64"	3/8"	7/8"	2-1/2"	NR-404-11.5	NR-404-11.5-NF	NR-404-11.5-DLC	NR-404-11.5-NF-DLC
3/8"	3/8"	7/8"	2-1/2"	NR-404-12	NR-404-12-NF	NR-404-12-DLC	NR-404-12-NF-DLC
25/64"	7/16"	1"	2-3/4"	—	NR-404-12.5	—	NR-404-12.5-DLC
13/32"	7/16"	1"	2-3/4"	—	NR-404-13	—	NR-404-13-DLC
27/64"	7/16"	1"	2-3/4"	—	NR-404-13.5	—	NR-404-13.5-DLC
7/16"	7/16"	1"	2-3/4"	—	NR-404-14	—	NR-404-14-DLC
29/64"	1/2"	1"	3"	NR-404-14.5	NR-404-14.5-NF	NR-404-14.5-DLC	NR-404-14.5-NF-DLC
15/32"	1/2"	1"	3"	NR-404-15	NR-404-15-NF	NR-404-15-DLC	NR-404-15-NF-DLC
31/64"	1/2"	1"	3"	NR-404-15.5	NR-404-15.5-NF	NR-404-15.5-DLC	NR-404-15.5-NF-DLC
1/2"	1/2"	1"	3"	NR-404-16	NR-404-16-NF	NR-404-16-DLC	NR-404-16-NF-DLC
33/64"	1/2"	1"	3"	NR-404-16.5	NR-404-16.5-NF	NR-404-16.5-DLC	NR-404-16.5-NF-DLC
9/16"	9/16"	1-1/4"	3-1/2"	—	NR-404-18	—	NR-404-18-DLC
5/8"	5/8"	1-1/4"	3-1/2"	NR-404-20	NR-404-20-NF	NR-404-20-DLC	NR-404-20-NF-DLC
3/4"	3/4"	1-1/2"	4"	NR-404-24	NR-404-24-NF	NR-404-24-DLC	NR-404-24-NF-DLC
1"	1"	1-1/2"	4"	NR-404-32	NR-404-32-NF	NR-404-32-DLC	NR-404-32-NF-DLC

Tuffy Grade Carbide End Mills **EX**

Multiple Applications



EX Series Tolerances
 Cutting Dia. (1/8") = $-.001/-0.002$
 (3/16" to 1) = $+.001/-0.000$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+.060/-0.000$
 OAL = ± 0.060



EX-204 2 Flute Extra Length Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Reach	Overall Length	Tool Number Flats	Tool Number No Flats
1/8"	1/8"	3/8"	2"	3"	—	EX-204-04
3/16"	3/16"	1/2"	2"	3"	—	EX-204-06
1/4"	1/4"	5/8"	2"	3"	—	EX-204-08
5/16"	5/16"	3/4"	2-1/8"	3-1/8"	—	EX-204-10
3/8"	3/8"	3/4"	2"	3-1/2"	EX-204-12	EX-204-12-NF
7/16"	7/16"	3/4"	2-1/4"	3-3/4"	—	EX-204-14
1/2"	1/2"	1"	2-1/2"	4"	EX-204-16	EX-204-16-NF



EX-206 2 Flute Extra Length Extended Reach Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Reach	Overall Length	Tool Number
1/2"	1/2"	1"	4"	6"	EX-206-16
5/8"	5/8"	1-3/8"	4"	6"	EX-206-20
3/4"	3/4"	1-5/8"	4"	6"	EX-206-24
1"	1"	2"	4"	6"	EX-206-32

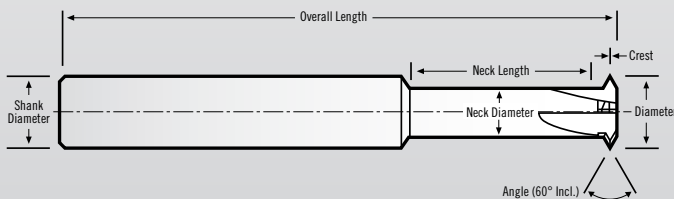
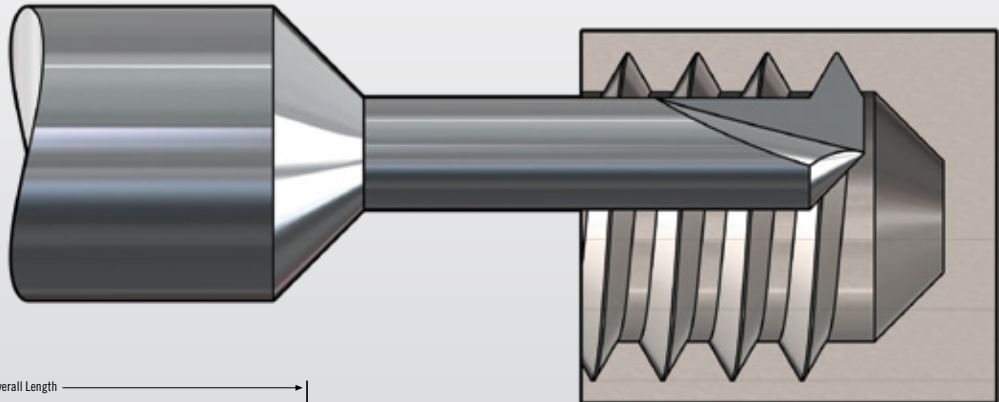


THR Solid Carbide Thread Mills

NEW!

RobbJack's solid carbide thread mills are used to produce precision threads at common thread pitches or custom thread pitches if needed with the same standard tool. Superior threads are produced versus tapping operations. Can be used to cut internal or external 60 degree threads. If you need to use relief at the bottom of the internal threaded hole use the RTHR series relief mill.

Will make COARSE, FINE or Custom Threads



Suggested Starting Speeds and feeds
 Ferrous 150/300 SFM; .0002/.001 IPT
 Non-Ferrous 500/1000 SFM; .0005/.0015 IPT
 Interpolate helix from bottom up.

Multiple Applications

THR 1/2/3/4/6 Flute Thread Mill for Inch and Metric Threads



Thread Size		Cut Diameter	Crest	Neck Diam.	Neck Length	Shank Diam.	Overall Length	Number of Flutes	Uncoated	AlTiN Coated	DLC Coated
Inch	Metric										
#3	2mm	0.072	0.001	0.040	0.160	3/16"	2"	1	THR-3	THR-3-A	THR-3-DLC
#4/#5	3mm/3.5mm	0.083	0.001	0.045	0.190	3/16"	2"	1	THR-4	THR-4-A	THR-4-DLC
#5	3.5mm	0.083	0.001	0.045	0.190	3/16"	2"	1	THR-5	THR-5-A	THR-5-DLC
#6	4mm	0.099	0.002	0.055	0.260	3/16"	2"	2	THR-6	THR-6-A	THR-6-DLC
#8	4.5mm	0.128	0.002	0.083	0.320	3/16"	2"	3	THR-8	THR-8-A	THR-8-DLC
#10	5mm	0.139	0.003	0.081	0.380	3/16"	2"	3	THR-10	THR-10-A	THR-10-DLC
1/4"	6mm	0.188	0.003	0.124	0.400	1/4"	2"	4	THR-1/4	THR-1/4-A	THR-1/4-DLC
5/16"	8mm	0.247	0.003	0.175	0.500	3/8"	2-1/2"	4	THR-5/16	THR-5/16-A	THR-5/16-DLC
3/8"	10mm	0.300	0.003	0.218	0.600	3/8"	2-1/2"	4	THR-3/8	THR-3/8-A	THR-3/8-DLC
1/2"	16mm	0.420	0.004	0.300	0.800	1/2"	2-1/2"	6	THR-1/2	THR-1/2-A	THR-1/2-DLC
5/8"	20mm	0.500	0.003	0.307	1	5/8"	3-1/2"	6	THR-5/8	THR-5/8-A	THR-5/8-DLC
3/4"	24mm	5/8"	0.003	0.416	1.25	3/4"	4"	6	THR-3/4	THR-3/4-A	THR-3/4-DLC

*Necks ground longer on request

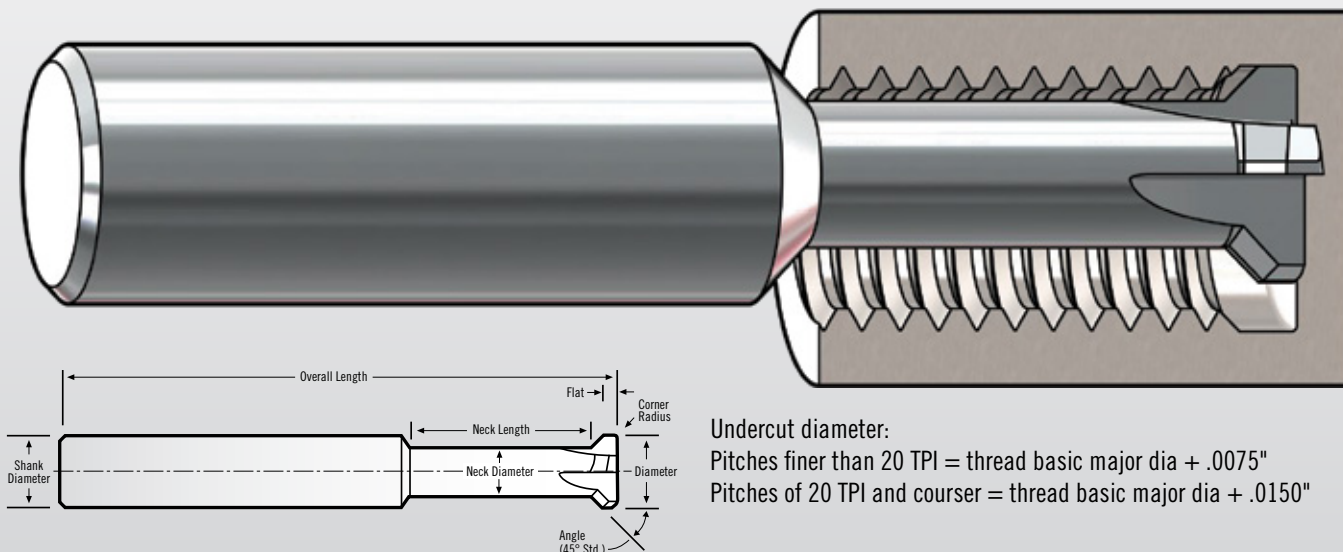


NEW!

Solid Carbide Internal Thread Relief Mills **RTHR**

RobbJack's internal thread relief tool will flatten the bottom of a threaded hole and will actually strengthen the performance of the threads as well. This tool will also eliminate any burrs or partial threads. This tool is best applied to blind holes. This tool is used when using RobbJack's THR Series internal thread mill.

Multiple Applications



RTHR 2/3/4/6 Flute Internal Thread Relief End Mill

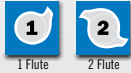


Diameter	Flat	Corner Radius	Neck Diam.	Neck Length	Shank Diam.	Overall Length	Number of Flutes	Uncoated	AlTiN Coated	DLC Coated
0.072	0.021	0.005	0.032	0.180	3/16"	2"	2	RTHR-3-48	RTHR-3-48-A	RTHR-3-48-DLC
0.080	0.025	0.005	0.032	0.210	3/16"	2"	2	RTHR-4-40	RTHR-4-40-A	RTHR-4-40-DLC
0.099	0.031	0.010	0.047	0.290	3/16"	2"	2	RTHR-6-32	RTHR-6-32-A	RTHR-6-32-DLC
0.128	0.031	0.010	0.076	0.330	3/16"	2"	3	RTHR-8-32	RTHR-8-32-A	RTHR-8-32-DLC
0.139	0.042	0.012	0.073	0.410	3/16"	2"	3	RTHR-10-24	RTHR-10-24-A	RTHR-10-24-DLC
0.188	0.050	0.012	0.108	0.435	1/4"	2"	4	RTHR-1/4-20	RTHR-1/4-20-A	RTHR-1/4-20-DLC
0.247	0.056	0.012	0.159	0.538	3/8"	2-1/2"	4	RTHR-5/16-18	RTHR-5/16-18-A	RTHR-5/16-18-DLC
0.300	0.063	0.012	0.202	0.641	3/8"	2-1/2"	4	RTHR-3/8-16	RTHR-3/8-16-A	RTHR-3/8-16-DLC
0.420	0.077	0.012	0.284	0.848	1/2"	2-1/2"	6	RTHR-1/2-13	RTHR-1/2-13-A	RTHR-1/2-13-DLC

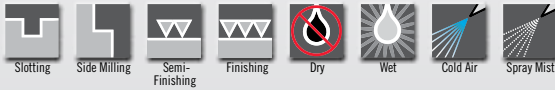
*Necks ground longer on request



ET Engraving Tools



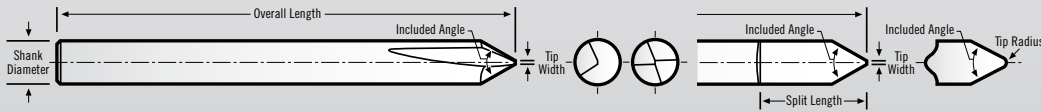
Characteristics



Applications



Materials



Multiple Applications



ET2 Plunge Tip for Drill and Engrave Engraving Tool

Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Uncoated
.010"	1/4"	60°	—	2	ET2-01060
.020"	1/4"	60°	—	2	ET2-02060
.010"	1/4"	90°	—	2	ET2-01090
.020"	1/4"	90°	—	2	ET2-02090

NOTE: Two flute tool serves as a multipurpose tool, which can be used for engraving, chamfering, spot-drilling and countersinking.



ET3 Ball Tip Engraving Tool

Tip Radius	Shank Diameter	Included Angle	Split Length	Overall Length	Uncoated
.005"	1/4"	30°	.650"	2"	ET3-00530
.010"	1/4"	30°	.650"	2"	ET3-01030
.020"	1/4"	30°	.650"	2"	ET3-02030
.030"	1/4"	30°	.650"	2"	ET3-03030
.005"	1/4"	60°	.650"	2"	ET3-00560
.010"	1/4"	60°	.650"	2"	ET3-01060
.020"	1/4"	60°	.650"	2"	ET3-02060
.030"	1/4"	60°	.650"	2"	ET3-03060

NOTE: Ball shaped radius on the tip, excellent results for high speed engraving and 3D engraving applications



ET4 Standard Engraving Tool for Most Applications

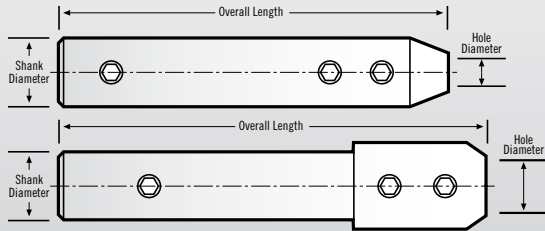
Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Uncoated
.010"	1/4"	60°	.650"	2"	ET4-01060
.020"	1/4"	60°	.650"	2"	ET4-02060
.030"	1/4"	60°	.650"	2"	ET4-03060
.050"	1/4"	60°	.650"	2"	ET4-05060
.060"	1/4"	60°	.650"	2"	ET4-06060
.010"	1/4"	90°	.650"	2"	ET4-01090
.020"	1/4"	90°	.650"	2"	ET4-02090
.030"	1/4"	90°	.650"	2"	ET4-03090
.050"	1/4"	90°	.650"	2"	ET4-05090
.060"	1/4"	90°	.650"	2"	ET4-06090

NOTE: Utilized in a wide variety of machines, including top loading engraving machines, CNC milling machines and industrial engraving marking systems.

ET SPEEDS & FEEDS

Material	5000 RPM	7500 RPM	10,000 RPM
	in/min	in/min	in/min
NON-FERROUS METALS			
Aluminum/Aluminum Alloys	10 ipm	15 ipm	20 ipm
Brass/Bronze	10 ipm	15 ipm	20 ipm
Copper/Copper Alloys	10 ipm	15 ipm	20 ipm
Magnesium	10 ipm	15 ipm	20 ipm
COMPOSITES			
G10 Fiberglass	15 ipm	22.5 ipm	30 ipm
Graphite	15 ipm	22.5 ipm	30 ipm
Carbon Fiber	15 ipm	22.5 ipm	30 ipm
Plastics	15 ipm	22.5 ipm	30 ipm
FERROUS METALS			
Cast Iron	5 ipm	7.5 ipm	10 ipm
Steel, Low Carbon	5 ipm	7.5 ipm	10 ipm
Steel, Medium Carbon	7.5 ipm	11.25 ipm	15 ipm
Steel, Hardened	2.5 ipm	3.75 ipm	5 ipm
Stainless Steel, Soft	5 ipm	7.5 ipm	10 ipm
Stainless Steel, Hard	2.5 ipm	3.75 ipm	5 ipm
Inconel	4 ipm	6 ipm	8 ipm
Titanium, Soft	5 ipm	7.5 ipm	10 ipm
Titanium, Hard	2.5 ipm	3.75 ipm	5 ipm

Accuhold End Mill Extension Holder **ACH/MAH**



ACH Tolerances

Hole Dia. = +.00015/-0.0000
 Shank Dia. = -.0001/-0.0003
 OAL = ±.060

MAH Tolerances

Hole Dia. = +.004/-0.000 mm
 Shank Dia. = +.000/-0.007 mm
 OAL = ±1.5 mm



ACH Accuhold End Mill Ultra Precision Extension Holder

Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3/32"	3/8"	2-1/8"	5-40	ACH-03
1/8"	3/8"	3-1/4"	8-32	ACH-04
1/8"	3/8"	6"	8-32	ACH-04-L
5/32"	1/2"	3-1/2"	8-32	ACH-05
3/16"	1/2"	3-1/2"	8-32	ACH-06
3/16"	1/2"	5"	8-32	ACH-06-L
1/4"	5/8"	4-1/4"	10-32	ACH-08
1/4"	5/8"	6"	10-32	ACH-08-L
5/16"	3/4"	4-1/2"	1/4-28	ACH-10
3/8"	3/4"	4-1/2"	5/16-24	ACH-12
3/8"	3/4"	6"	5/16-24	ACH-12-L
7/16"	3/4"	4-1/2"	5/16-24	ACH-14
1/2"	3/4"	4-3/4"	3/8-24	ACH-16*
1/2"	1"	4-3/4"	3/8-24	ACH-16L
1/2"	1"	6"	3/8-24	ACH-16-32-L
9/16"	1"	5-1/4"	3/8-24	ACH-18
5/8"	1"	5-1/2"	3/8-24	ACH-20
3/4"	1"	5-1/4"	7/16-20	ACH-24**
3/4"	1-1/4"	6"	7/16-20	ACH-24-1.25
1"	1"	5-1/2"	7/16-20	ACH-32**

* 1" Diameter x 1.5" Long Head

**ACH-24 & ACH-32 have a 1-1/4" diameter x 2-1/4" long head and hole depth of only 2" deep

Metric End Mill Extension Holder with Inch Shank.

Use this precision end mill extension holder to convert your inch tool holder to be able to hold onto metric shanks. This is the tightest tolerance end mill extension used to reach into parts that need longer length. Precision end mills need precision holders to eliminate runout (TIR) and reduce tool breakage. Convert your inch tool holder to metric sizes.



METRIC



MAH Precision Extension Holder for Metric Size End Mill

Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3mm	10mm	82.5mm		MAH-03
4mm	12mm	110mm		MAH-04
5mm	12mm	110mm		MAH-05
6mm	16mm	125mm		MAH-06
8mm	20mm	135mm		MAH-08
10mm	20mm	135mm		MAH-10
12mm	25mm	150mm		MAH-12*

* 1" Diameter x 1.5" Long Head



Metric to Inch

NEW!



ACH-M Metric to Inch End Mill Ultra Precision Extension Holder

Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3mm	3/8"	3.25	6-32	ACH-M3
4mm	1/2"	3-1/2"	8-32	ACH-M4
5mm	1/2"	3-1/2"	10-32	ACH-M5
6mm	5/8"	4-1/4"	10-32	ACH-M6
7mm	5/8"	4-1/4"	10-32	ACH-M7
8mm	3/4"	4-1/2"	1/4-28	ACH-M8
9mm	3/4"	4-1/2"	5/16-24	ACH-M9
10mm	3/4"	4-1/2"	5/16-24	ACH-M10
11mm	3/4"	4-1/2"	5/16-24	ACH-M11
12mm	3/4"	4-3/4"	3/8-24	ACH-M12*
12mm	1"	4-3/4"	3/8-24	ACH-M12-1
13mm	1"	4-3/4"	3/8-24	ACH-M13
14mm	1"	5-1/2"	3/8-24	ACH-M14
15mm	1"	5-1/2"	3/8-24	ACH-M15
16mm	1"	5-1/2"	3/8-24	ACH-M16
18mm	1"	5-1/4"	7/16-20	ACH-M18**
20mm	1"	6"	7/16-20	ACH-M20-1
20mm	1-1/4"	6"	7/16-20	ACH-M20
25mm	1"	6-1/2"	7/16-20	ACH-M25**

*ACH-M12 has a 1" diameter x 1.5" long head

**ACH-M18 & ACH-M25 have a 1-1/4" diameter x 2-1/4" long head and hole depth of only 2" deep

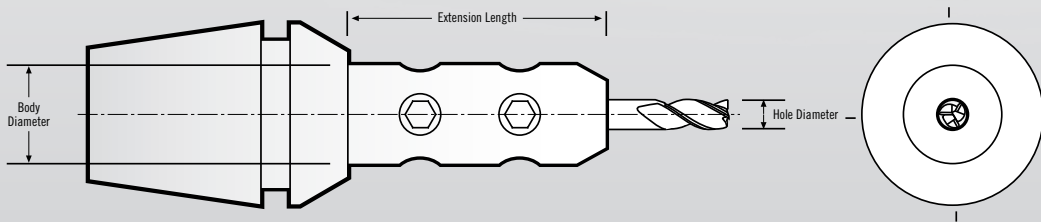
ER Solid ER-Mill Extensions

- Enables micro tools to clear fixturing
- Maintains exceptional TIR at extended length
- Solves deflection and chatter issues
- Coolant-thru versions for ER16 sizes now available
- TIR <.0002in at full extension

NEW!



Multiple Applications



Coolant-Thru Versions Available For ER16!

ER8 Solid Mill Extension



Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	10mm	7mm	8	ER8-M3-S
3mm	15mm	7mm	8	ER8-M3-L
1/8"	0.394"	0.276"	8	ER8-04-S

NOTE: ER8 Holders Include a special M10x.75 clamping nut.

ER16 Solid Mill Extension



Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	16mm	9.5mm	16	ER16-M3-S
3mm	25mm	9.5mm	16	ER16-M3-L
3mm	25mm	9.5mm	16	ER16-M3-L-TC*
1/8"	5/8"	3/8"	16	ER16-04-S
1/8"	1"	3/8"	16	ER16-04-M
1/8"	1"	3/8"	16	ER16-04-M-TC*
4mm	16mm	9.5mm	16	ER16-M4-S
4mm	25mm	9.5mm	16	ER16-M4-L
3/16"	5/8"	3/8"	16	ER16-06-S
3/16"	1"	3/8"	16	ER16-06-L
5mm	16mm	9.5mm	16	ER16-M5-S
5mm	25mm	9.5mm	16	ER16-M5-L

* Coolant-Thru Version

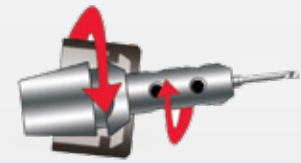
ER11 Solid Mill Extension



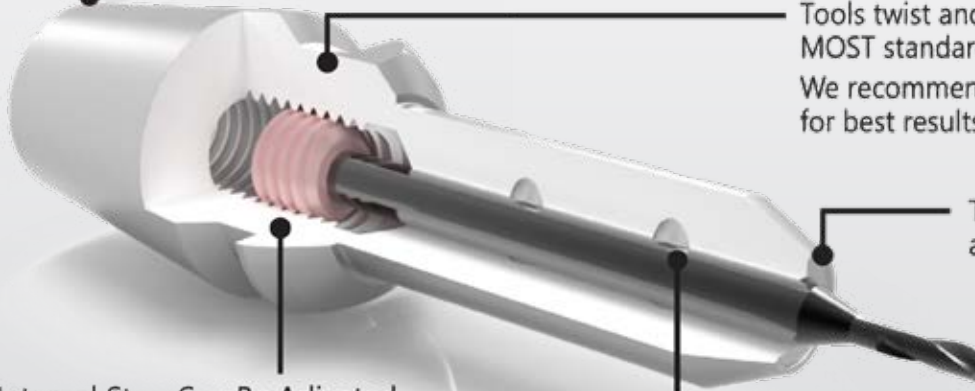
Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	10mm	8mm	11	ER11-M3-S
3mm	15mm	8mm	11	ER11-M3-SL
3mm	20mm	8mm	11	ER11-M3-L
1/8"	0.394"	0.315"	11	ER11-04-S
1/8"	0.59"	0.315"	11	ER11-04-SL
1/8"	0.787"	0.315"	11	ER11-04-L
4mm	15mm	8mm	11	ER11-M4-SL
4mm	20mm	8mm	11	ER11-M4-L



Precision Ground ER Taper
Now in ER8, ER11, ER16, ER20 & ER25 Sizes



Tools twist and snap into MOST standard ER clamping nuts. We recommend HiQ® by REGO-FIX for best results.



TIR < .0002in at extension

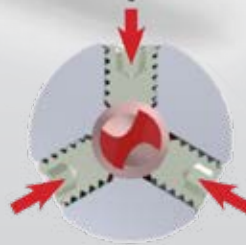
Internal Stop Can Be Adjusted From Both Ends Of The Holder Using a Standard Hex Key



Multiple Applications

NEW!

Set screws hold small shank tooling securely in a triangular arrangement for excellent accuracy



ER20 Solid Mill Extension

Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	14mm	9.5mm	20	ER20-M3-S
3mm	25mm	9.5mm	20	ER20-M3-L
1/8"	5/8"	3/8"	20	ER20-04-S
1/8"	1"	3/8"	20	ER20-04-L
4mm	16mm	9.5mm	20	ER20-M4-S
4mm	25mm	9.5mm	20	ER20-M4-L
3/16"	0.55"	0.45"	20	ER20-06-S
3/16"	5/8"	0.45"	20	ER20-06-SL
3/16"	1"	0.45"	20	ER20-06-L
5mm	14mm	11.4mm	20	ER20-M5-S
5mm	25mm	11.4mm	20	ER20-M5-L
6mm	14mm	12.5mm	20	ER20-M6-S
6mm	25mm	12.5mm	20	ER20-M6-L
1/4"	0.55"	0.492"	20	ER20-08-S
1/4"	1"	0.492"	20	ER20-08-L



ER25 Solid Mill Extension

Hole Diameter	Extension Length	Body Diameter	ER Size	Tool Number
3mm	25mm	10mm	25	ER25-M3
1/8"	1"	0.394"	25	ER25-04
4mm	25mm	10mm	25	ER25-M4
3/16"	1"	0.492"	25	ER25-06
5mm	25mm	12.5mm	25	ER25-M5
6mm	25mm	12.5mm	25	ER25-M6
1/4"	1"	0.492"	25	ER25-08
5/16"	1"	0.629"	25	ER25-10
8mm	25mm	16mm	25	ER25-M8

ER Replacement Set Screws

Size	Fits	Tool Number
M6	ER11	M6-ER-SCREW
M8	ER16 & 20	M8-ER-SCREW
M10	ER25	M10-ER-SCREW



ER Replacement Stop Screws

Size	Tool Number
M3	M3-ER-SCREW
M4	M4-ER-SCREW
M5	M5-ER-SCREW



Tools for **SAWING**



Saws

Scan this code to:

- Watch Videos
- How to Assemble a Saw and Arbor
- Tips and Tricks
- And More...

Featured Tools:

The **K-Series**

Solves ALL Your Saw Problems

*“The best saw we have ever used!
It solved all our problems.”*



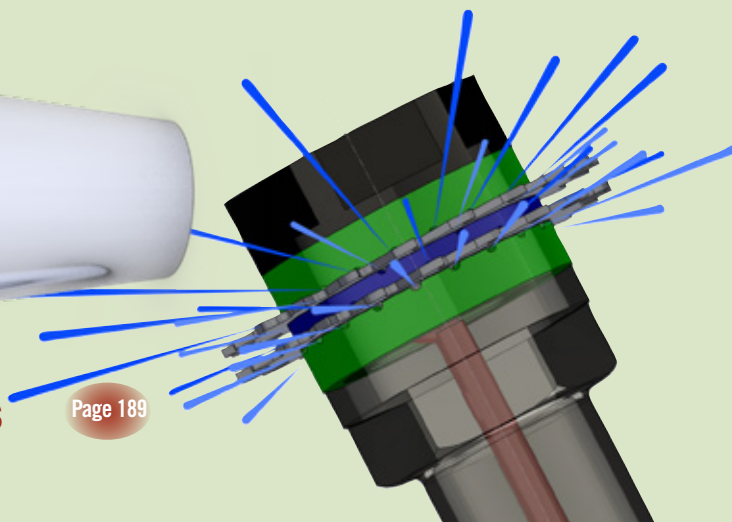
- Use any time the saw depth is more than 5x the saw thickness
- Double Concavity
- Alternate Tooth Chamfer
- Flat and Parallel Hubs















ALL NEW



SA-ER Solid Saw Arbors [Page 192](#)

CF Solid Carbide Thru-Coolant Saw Flanges [Page 189](#)



SAWS Standard	Coarse and Fine Pitch Solid Carbide Saws		177
SAWS Metric	Coarse and Fine Pitch Solid Carbide Saws		184
AB Saw Arbors	Ultra Precision Saw Arbors for Carbide Slitting Saws		188
MSA Saw Arbors	Ultra Precision Metric Saw Arbor for Carbide Slitting Saws		188
NAB Saw Arbors	 Ultra Precision Saw Arbor for Carbide Slitting Saws		188
CF-FLANGES	 Solid Carbide Thru-Coolant Saw Flanges		189
CSP Spacers	 Solid Carbide Thru-Coolant Saw Spacers		190
FLANGES	Arbor Flanges for Precision Slitting Saw Applications		191
CAPS	Replacement Saw Arbor Cap for AB Arbors		191
SA-ER Saw Arbors	 Collet Integrated Saw Arbors		192

Saw Quantity Discount

1-2 of a size	Net
3-6	Less 5%
7-24	Less 10%
25 or more	Less 15%

Quantity discounts apply to any standard slitting saws from .002" - .250" thickness

Saws made for gangs with special tolerances are priced on application.

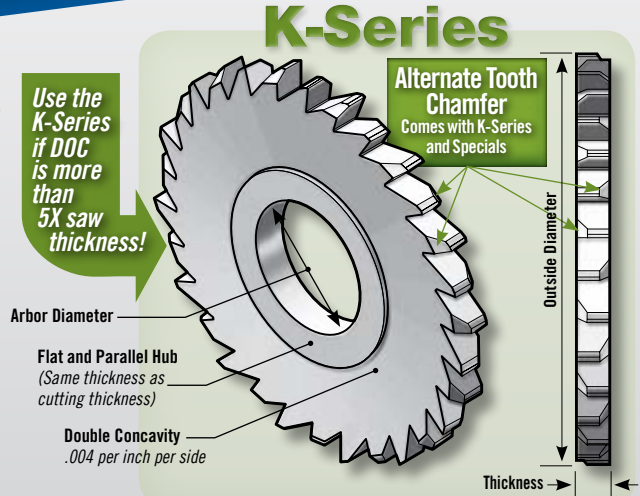
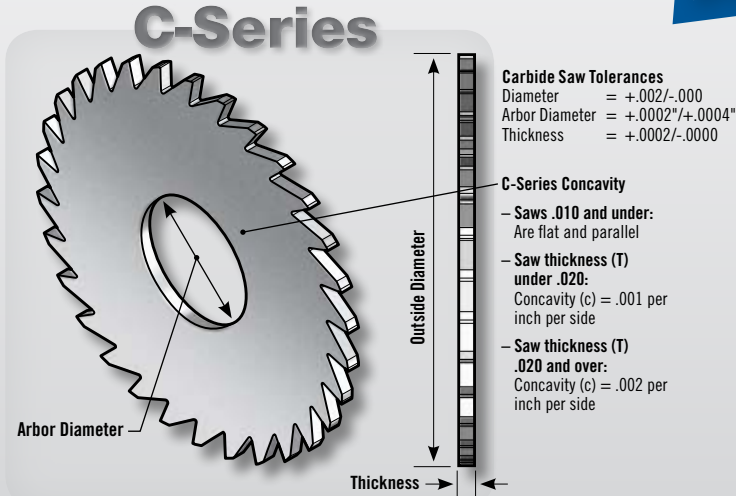
Note: Saws thinner than .0100" or 0.254MM thick are considered specials and may not be returned

Pricing Special Decimal Thicknesses

To price a saw thickness not listed in the catalog, use the price of the closest thicker standard saw.

SAWS

BEST PERFORMANCE!



Formulas

INCH SIZES	
Surface Feet per Minute	= RPM x .262 x Tool Diameter
RPM	= $\frac{\text{Surface Feet per Minute} \times 3.82}{\text{Tool Diameter}}$
Feed Rate (in/min.)	= RPM x Chip Load per Tooth x Number of Teeth
Chip Load Per Tooth	= $\frac{\text{in/min.}}{\text{RPM} \times \text{Number of Teeth}}$
in ³ /min	= Width x Depth x Inches per Minute
Horsepower	= 1.341 x kW

METRIC SIZES	
Surface Meters per Minute	= RPM x .00314 x Tool Diameter
RPM	= $\frac{\text{Surface Meters per Minute} \times 318.057}{\text{Tool Diameter}}$
Feed Rate (mm/min.)	= RPM x Chip Load per Tooth x Number of Teeth
Chip Load Per Tooth	= $\frac{\text{mm/min.}}{\text{RPM} \times \text{Number of Teeth}}$
cm ³ /min	= $\frac{\text{Width (mm)} \times \text{Depth (mm)} \times \text{mm per Minute}}{1000}$
Horsepower	= 1.341 x kW
kW	= .7457 x Horsepower

RobbJack Saw Features

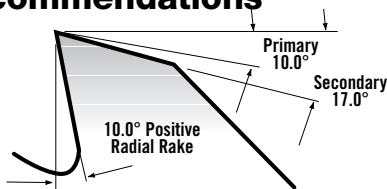
All RobbJack saws are designed for use individually and have concavity (dish). Saws which are to be assembled in gangs should have flat hubs (plus concavity to depth of cut) to assure spacing accuracy.

O.D. Tolerances:	+ .002"/- .000"
Concavity:	See drawing above
Coarse Pitch:	(10° rake) for non-ferrous material
Fine Pitch:	(5° rake) for ferrous material
Gang Saws:	With integral hubs available
I.D. Tolerance:	+ .0002"/+ .0004" to assure proper arbor fit and for reduced O.D. runout
48 Hour Availability:	Any thickness from .008" to .250"
Thickness Tolerance:	+ .0002"/- .000" to assure accuracy

Tooth Recommendations

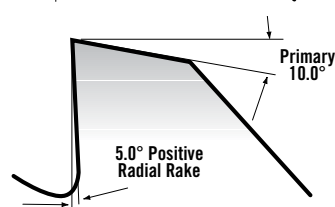
Coarse Pitch

Coarse Tooth recommended for use in non-ferrous materials.



Fine Pitch

Fine Tooth recommended for use in ferrous materials.

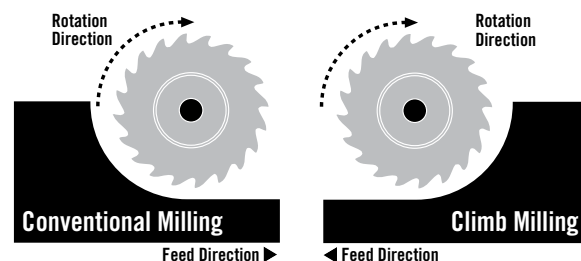


Application Guidelines

For standard side concavity:	See C-Series diagram above
If depth of cut exceeds 3 times saw thickness:	Use Double standard concavity (.004" per inch per side) or K-Series
If depth of cut exceeds 5 times saw thickness:	Use K-Series Saws
Saw diameter concentricity:	Should be within .001" when assembled on arbor
When using more than one saw at a time:	A flat and parallel hub is used to ensure proper spacing
If steel flanges are used:	Select the largest diameter possible (see page 124)
Keywords:	Generally not used with solid carbide slitting saws, but are available upon request

Conventional Milling vs. Climb Milling

RobbJack recommends Climb Milling (as opposed to Conventional Milling) for most applications (assuming back-lash control in the machine). Climb Milling generally allows better flute engagement in the material, resulting in more efficient machining and superior part finishes. Conventional Milling can lead to work hardening in some ferrous materials.



Saw Speeds & Feeds

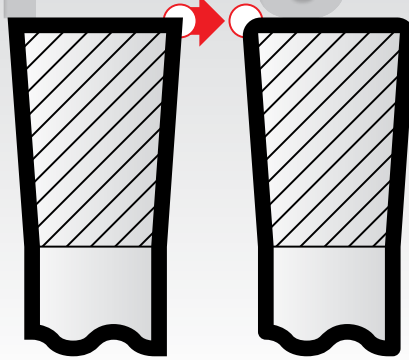
Material	Max Axial Depth/Pass Teeth (Times Thickness)		Inch				Metric			
			SFM Surface Feet/Minute	Chip Load per Tooth – Standard			SMM Surface Meters/Minute	Chip Load per Tooth – Metric		
				Saw Thickness .002-.031	Saw Thickness .031-.100	Saw Thickness >.100		Saw Thickness .05mm-1.0mm	Saw Thickness 1.0mm-3.0mm	Saw Thickness >3.0mm
Aluminum / Non-Ferrous										
Ferrous										
2024	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
6061 (T1-T3)	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
6061 (T4-T6)	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
7075	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
Non-Ferrous										
Brass	4	Coarse	750	.000234"/.000273"	.000273"/.00052"	0.00052"	230	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
Copper	4	Coarse	600	.000234"/.000273"	.000273"/.00052"	0.00052"	190	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
Magnesium	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
Titanium, Steel and High-Temp Alloys										
Titanium										
Commercially Pure	2	Fine	700	.00018"/.00021"	.00021"/.0004"	0.0004"	210	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
6AL-4V	2	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	105	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
6AL-6V	2	Fine	230	.00018"/.00021"	.00021"/.0004"	0.0004"	70	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
Steel										
1018-1020	4	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	110	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
4130	2	Fine	260	.00018"/.00021"	.00021"/.0004"	0.0004"	80	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
4140	2	Fine	220	.00018"/.00021"	.00021"/.0004"	0.0004"	70	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
4340	2	Fine	280	.00018"/.00021"	.00021"/.0004"	0.0004"	90	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
Tool Steel Annealed										
A2	2	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	110	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
D2	2	Fine	260	.00018"/.00021"	.00021"/.0004"	0.0004"	80	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
H13	2	Fine	230	.00018"/.00021"	.00021"/.0004"	0.0004"	70	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
P20	2	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	110	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
Stainless Steel										
303	2	Fine	500	.00018"/.00021"	.00021"/.0004"	0.0004"	150	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
304	2	Fine	200	.00018"/.00021"	.00021"/.0004"	0.0004"	70	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
316	2	Fine	240	.00018"/.00021"	.00021"/.0004"	0.0004"	75	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
15-5/17-4 PH	2	Fine	200	.00018"/.00021"	.00021"/.0004"	0.0004"	60	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
440C	2	Fine	200	.00018"/.00021"	.00021"/.0004"	0.0004"	60	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
Inconel										
625 / 718	2	Fine	100	.00018"/.00021"	.00021"/.0004"	0.0004"	30	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
Composites										
G10 Fiberglass/Polyester	4	Coarse	1000	.000234"/.000273"	.000273"/.00052"	0.00052"	300	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
Graphite	4	Coarse	1000	.000234"/.000273"	.000273"/.00052"	0.00052"	300	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
Graphite Fiber/Epoxy	4	Coarse	800	.000234"/.000273"	.000273"/.00052"	0.00052"	250	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
Other Material Applications										
Cast Iron										
Ductile Iron	2	Fine	350	.00018"/.00021"	.00021"/.0004"	0.0004"	110	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
Gray Cast Iron	2	Fine	500	.00018"/.00021"	.00021"/.0004"	0.0004"	150	.0046mm/.0053mm	.0053mm/.010mm	0.010mm
Wood & Plastics										
Wood	4	Coarse	3600	.000234"/.000273"	.000273"/.00052"	0.00052"	1100	.0059mm/.0069mm	.0069mm/.013mm	0.013mm
Plastics	4	Coarse	1600	.000234"/.000273"	.000273"/.00052"	0.00052"	400	.0059mm/.0069mm	.0069mm/.013mm	0.013mm

SAW MODIFICATIONS

Chipping?

T-Process

T-Process is a honed edge we put on a saw to help eliminate chipping.



Pros: T-Process strengthens the edge, helps eliminate chipping and gives a smooth edge.

Cons: T-Process will bring up a burr in certain materials, it is not for materials that like a sharp edge, such as aluminum and plastics.

To order a RobbJack saw with a **T-Process**, use the existing standard *Part Number*, and add *-TP*.

Example: A 4" saw with a T-Process is Part Number:

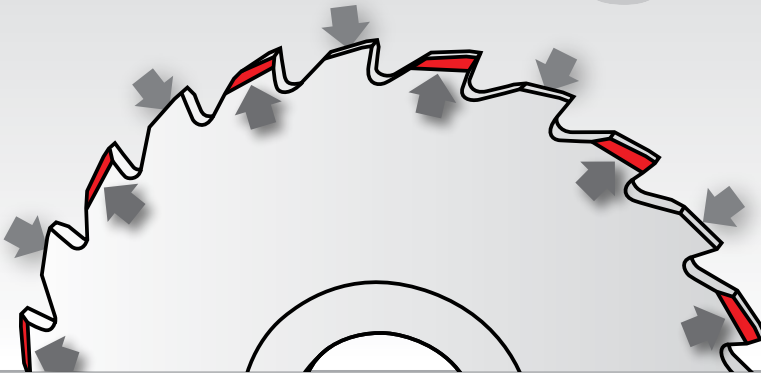
▶ **C40-0312-32-36-TP**
See price sheet for pricing

Binding?

Alternate Tooth Chamfer

Alternate Tooth Chamfer is an alternating 45° grind on the teeth of the saw. It helps the saw from binding and aids in chip evacuation. Alternate Tooth Chamfer should be used on saws when the depth of cut is more than 5× the saw thickness and the saw is thicker than .020"

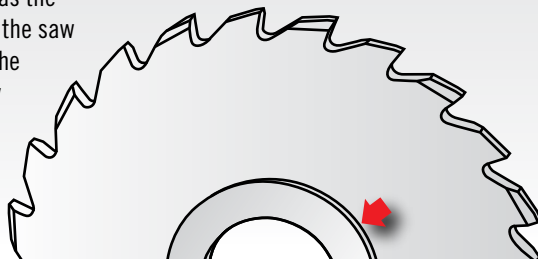
▶ **Use the New K-Series Part Number**
(Please see Saw Section)



Slippage?

A saw Hub is a section of the saw where there is no concavity. It is a flat and parallel area that is the same thickness as the tooth cutting near the ID of the saw where the flange contacts the saw. Should be used on any saw that is used in cuts deeper than 3× the saw thickness. If the depth

is more than 5× the saw thickness use with Alternate Tooth Chamfer, specify the K-Series Part Number.



Hub

Pros: Better surface contact with the flange of the arbor, saws run very true, reduces slippage problems

Cons: None

To order a RobbJack saw with a **Hub**, use the existing standard *Part Number*, and add *-H*, followed by *Hub Diameter*.

Example:
4" saw with a 2.000" diameter hub

▶ **C40-0312-32-36-H 2.000**
See price sheet for pricing

Saws with coatings or other modifications are non returnable.

Keyway

High Torque Cuts?

A saw Keyway not usually recommended on saws thinner than .125" thick. If there are slippage problems you may first want to try a hub if the thickness is less than .125" thick.

Pros: Helps eliminate slippage problems on thick saws in high torque cuts

Cons: Can cause stress risers and cracks in saws thinner than .125" thick

To order a RobbJack saw with a **Keyway**, use the existing standard *Part Number*, and add **-K**.

Example:

4" saw with a 1/4" keyway

▶ **C40-1250-32-36-K**
See price sheet for pricing



Thickness?

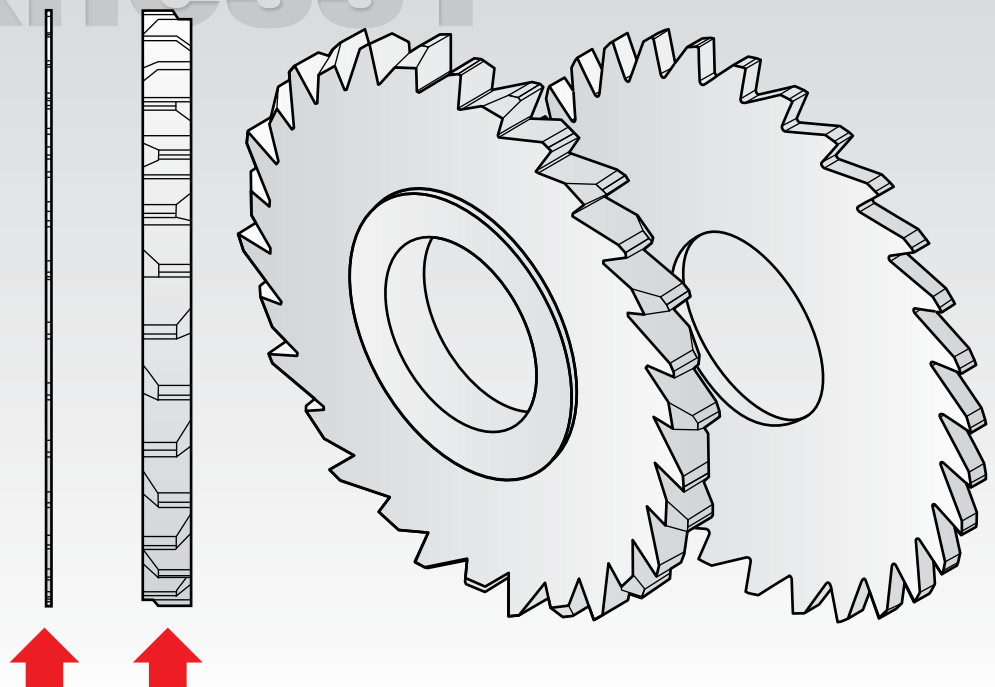
Saw Thickness

Any thickness from 0.0020" to 0.2500" is standard. To order any saw thickness in ten-thousandths of an inch, replace the middle 4 digits in the part number.

Example:

0.0567" saw thickness

▶ **C07-0567-08-20**
See price sheet for pricing



Saws with coatings or other modifications are non returnable.

SAW MODIFICATIONS



TiN PVD Coating Titanium Nitride

TiN is a general purpose coating for ferrous materials. Some prefer TiN coating in kovar material others prefer AlTiN coating in kovar.

To order a RobbJack saw with a **TiN Coating**, use the existing standard Part Number, and add **-T**.

Example:

▶ **K25-0625-32-56-T**
See price sheet for pricing



TiCN PVD Coating Titanium Carbo-Nitride

TiCN adds Carbon into the traditional TiN coating for added hardness and abrasion resistance.

To order a RobbJack saw with a **TiCN Coating**, use the existing standard Part Number, and add **-C**.

Example:

▶ **K25-0625-32-56-C**
See price sheet for pricing



AlTiN PVD Coating Aluminum Titanium Nitride

The best PVD coating for high heat applications due to its ability to resist high temperatures. Used for ferrous materials and difficult alloys such as inconel, titanium, stainless steel, very hard die mold materials up to 70 HRC, and other steel alloys. AlTiN coating has a unique ability to form an aluminum oxide heat shield during cutting that helps block heat from effecting the tool and pushes the heat into the chip. An excellent coating when dry machining of ferrous materials is needed.

To order a RobbJack saw with an **AlTiN Coating**, use the existing standard Part Number, and add **-A**.

Example:

▶ **K25-0625-32-56-A**
See price sheet for pricing



DLC PVD Coating Diamond-Like Carbon

DLC- Diamond Like Carbon coating also known as amorphous diamond is a very hard lubricous coating that works well in non-ferrous applications like aluminum, copper , and high silicon aluminum. DLC coating is the best coating when you have to cut aluminum and copper with no coolant or MQL (minimum quantity lubricant). It is recommended to use coolant in these applications but if the application does not allow coolant, DLC is still the best coating.

To order a RobbJack saw with a **DLC Coating**, use the existing standard Part Number, and add **-DLC**.

Example:

▶ **K25-0625-32-56-DLC**
See price sheet for pricing

Saws with coatings or other modifications are non returnable.

QUANTITY DISCOUNTS
Available at Qty 3, 7 and 25+

3/4" Diameter

1/4" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .075
Using NAB Arbor = .040



Use if DOC is more than 5X saw thickness

10 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 1/2" HUB Diameter
.0020"	C07-0020-08-10*	-
.0040"	C07-0040-08-10*	-
.0060"	C07-0060-08-10*	-
.0080"	C07-0080-08-10*	-
.0100"	C07-0100-08-10*	-
.0120"	C07-0120-08-10	-
.0140"	C07-0140-08-10	-
.0156"	C07-0156-08-10	-
.0180"	C07-0180-08-10	-
.0200"	C07-0200-08-10	K07-0200-08-10
.0230"	C07-0230-08-10	K07-0230-08-10
.0250"	C07-0250-08-10	K07-0250-08-10
.0280"	C07-0280-08-10	K07-0280-08-10
.0312"	C07-0312-08-10	K07-0312-08-10
.0350"	C07-0350-08-10	K07-0350-08-10
.0400"	C07-0400-08-10	K07-0400-08-10
.0468"	C07-0468-08-10	K07-0468-08-10
.0510"	C07-0510-08-10	K07-0510-08-10
.0625"	C07-0625-08-10	K07-0625-08-10
.0781"	C07-0781-08-10	K07-0781-08-10
.0937"	C07-0937-08-10	K07-0937-08-10
.1250"	C07-1250-08-10	K07-1250-08-10
.1562"	C07-1562-08-10	K07-1562-08-10
.1875"	C07-1875-08-10	K07-1875-08-10
.2500"	C07-2500-08-10	K07-2500-08-10

Any thickness in ten-thousandths of an inch from 0.0020" to 0.2500" is standard.
To order, replace the middle 4 digits in the part number.



Use if DOC is more than 5X saw thickness

20 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 1/2" HUB Diameter
.0020"	C07-0020-08-20*	-
.0040"	C07-0040-08-20*	-
.0060"	C07-0060-08-20*	-
.0080"	C07-0080-08-20*	-
.0100"	C07-0100-08-20*	-
.0120"	C07-0120-08-20	-
.0140"	C07-0140-08-20	-
.0156"	C07-0156-08-20	-
.0180"	C07-0180-08-20	-
.0200"	C07-0200-08-20	K07-0200-08-20
.0230"	C07-0230-08-20	K07-0230-08-20
.0250"	C07-0250-08-20	K07-0250-08-20
.0280"	C07-0280-08-20	K07-0280-08-20
.0312"	C07-0312-08-20	K07-0312-08-20
.0350"	C07-0350-08-20	K07-0350-08-20
.0400"	C07-0400-08-20	K07-0400-08-20
.0468"	C07-0468-08-20	K07-0468-08-20
.0510"	C07-0510-08-20	K07-0510-08-20
.0625"	C07-0625-08-20	K07-0625-08-20
.0781"	C07-0781-08-20	K07-0781-08-20
.0937"	C07-0937-08-20	K07-0937-08-20
.1250"	C07-1250-08-20	K07-1250-08-20
.1562"	C07-1562-08-20	K07-1562-08-20
.1875"	C07-1875-08-20	K07-1875-08-20
.2500"	C07-2500-08-20	K07-2500-08-20

Any Saw Thickness Available

Solid Carbide **SAWS**

1" Diameter

3/8" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .1375
Using NAB Arbor = .095



Use if DOC is more than 5X saw thickness

12 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 5/8" HUB Diameter
.0020"	C10-0020-12-12*	-
.0040"	C10-0040-12-12*	-
.0060"	C10-0060-12-12**	-
.0080"	C10-0080-12-12	-
.0100"	C10-0100-12-12*	-
.0120"	C10-0120-12-12	-
.0140"	C10-0140-12-12	-
.0156"	C10-0156-12-12	-
.0180"	C10-0180-12-12	-
.0200"	C10-0200-12-12	K10-0200-12-12
.0230"	C10-0230-12-12	K10-0230-12-12
.0250"	C10-0250-12-12	K10-0250-12-12
.0280"	C10-0280-12-12	K10-0280-12-12
.0312"	C10-0312-12-12	K10-0312-12-12
.0350"	C10-0350-12-12	K10-0350-12-12
.0400"	C10-0400-12-12	K10-0400-12-12
.0468"	C10-0468-12-12	K10-0468-12-12
.0510"	C10-0510-12-12	K10-0510-12-12
.0625"	C10-0625-12-12	K10-0625-12-12
.0781"	C10-0781-12-12	K10-0781-12-12
.0937"	C10-0937-12-12	K10-0937-12-12
.1250"	C10-1250-12-12	K10-1250-12-12
.1562"	C10-1562-12-12	K10-1562-12-12
.1875"	C10-1875-12-12	K10-1875-12-12
.2500"	C10-2500-12-12	K10-2500-12-12



Use if DOC is more than 5X saw thickness

24 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 5/8" HUB Diameter
.0020"	C10-0020-12-24*	-
.0040"	C10-0040-12-24*	-
.0060"	C10-0060-12-24*	-
.0080"	C10-0080-12-24*	-
.0100"	C10-0100-12-24*	-
.0120"	C10-0120-12-24	-
.0140"	C10-0140-12-24	-
.0156"	C10-0156-12-24	-
.0180"	C10-0180-12-24	-
.0200"	C10-0200-12-24	K10-0200-12-24
.0230"	C10-0230-12-24	K10-0230-12-24
.0250"	C10-0250-12-24	K10-0250-12-24
.0280"	C10-0280-12-24	K10-0280-12-24
.0312"	C10-0312-12-24	K10-0312-12-24
.0350"	C10-0350-12-24	K10-0350-12-24
.0400"	C10-0400-12-24	K10-0400-12-24
.0468"	C10-0468-12-24	K10-0468-12-24
.0510"	C10-0510-12-24	K10-0510-12-24
.0625"	C10-0625-12-24	K10-0625-12-24
.0781"	C10-0781-12-24	K10-0781-12-24
.0937"	C10-0937-12-24	K10-0937-12-24
.1250"	C10-1250-12-24	K10-1250-12-24
.1562"	C10-1562-12-24	K10-1562-12-24
.1875"	C10-1875-12-24	K10-1875-12-24
.2500"	C10-2500-12-24	K10-2500-12-24

Solid carbide spacers and flanges for 3/4" saws are available with 1/4" arbor holes in diameters ranging from .500" to .700" and thicknesses from .002" to .250". Call for price and delivery.

Solid carbide spacers and flanges for 1" saws are available with 3/8" arbor holes in diameters ranging from .650" to .950" and thicknesses from .002" to .250". Call for price and delivery.

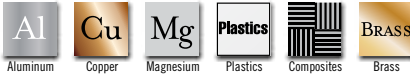
*All Saws under .010 are non-returnable.

SAWS Solid Carbide

QUANTITY DISCOUNTS
Available at Qty 3, 7 and 25+

1 1/4" Diameter 1/2" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .200
Using NAB Arbor = .1475



Use if DOC is more than 5X saw thickness

16 TEETH		Alternate Tooth Chamfer Double Concavity 3/4" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C12-0020-16-16*	—
.0040"	C12-0040-16-16*	—
.0060"	C12-0060-16-16*	—
.0080"	C12-0080-16-16*	—
.0100"	C12-0100-16-16*	—
.0120"	C12-0120-16-16	—
.0140"	C12-0140-16-16	—
.0156"	C12-0156-16-16	—
.0180"	C12-0180-16-16	—
.0200"	C12-0200-16-16	K12-0200-16-16
.0230"	C12-0230-16-16	K12-0230-16-16
.0250"	C12-0250-16-16	K12-0250-16-16
.0280"	C12-0280-16-16	K12-0280-16-16
.0312"	C12-0312-16-16	K12-0312-16-16
.0350"	C12-0350-16-16	K12-0350-16-16
.0400"	C12-0400-16-16	K12-0400-16-16
.0468"	C12-0468-16-16	K12-0468-16-16
.0510"	C12-0510-16-16	K12-0510-16-16
.0625"	C12-0625-16-16	K12-0625-16-16
.0781"	C12-0781-16-16	K12-0781-16-16
.0937"	C12-0937-16-16	K12-0937-16-16
.1250"	C12-1250-16-16	K12-1250-16-16
.1562"	C12-1562-16-16	K12-1562-16-16
.1875"	C12-1875-16-16	K12-1875-16-16
.2500"	C12-2500-16-16	K12-2500-16-16

Any Saw Thickness Available

1 1/2" Diameter 1/2" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .325
Using NAB Arbor = .2725



Use if DOC is more than 5X saw thickness

16 TEETH		Alternate Tooth Chamfer Double Concavity 3/4" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C15-0020-16-16*	—
.0040"	C15-0040-16-16*	—
.0060"	C15-0060-16-16*	—
.0080"	C15-0080-16-16*	—
.0100"	C15-0100-16-16*	—
.0120"	C15-0120-16-16	—
.0140"	C15-0140-16-16	—
.0156"	C15-0156-16-16	—
.0180"	C15-0180-16-16	—
.0200"	C15-0200-16-16	K15-0200-16-16
.0230"	C15-0230-16-16	K15-0230-16-16
.0250"	C15-0250-16-16	K15-0250-16-16
.0280"	C15-0280-16-16	K15-0280-16-16
.0312"	C15-0312-16-16	K15-0312-16-16
.0350"	C15-0350-16-16	K15-0350-16-16
.0400"	C15-0400-16-16	K15-0400-16-16
.0468"	C15-0468-16-16	K15-0468-16-16
.0510"	C15-0510-16-16	K15-0510-16-16
.0625"	C15-0625-16-16	K15-0625-16-16
.0781"	C15-0781-16-16	K15-0781-16-16
.0937"	C15-0937-16-16	K15-0937-16-16
.1250"	C15-1250-16-16	K15-1250-16-16
.1562"	C15-1562-16-16	K15-1562-16-16
.1875"	C15-1875-16-16	K15-1875-16-16
.2500"	C15-2500-16-16	K15-2500-16-16



Use if DOC is more than 5X saw thickness

36 TEETH		Alternate Tooth Chamfer Double Concavity 3/4" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C12-0020-16-36*	—
.0040"	C12-0040-16-36*	—
.0060"	C12-0060-16-36*	—
.0080"	C12-0080-16-36*	—
.0100"	C12-0100-16-36*	—
.0120"	C12-0120-16-36	—
.0140"	C12-0140-16-36	—
.0156"	C12-0156-16-36	—
.0180"	C12-0180-16-36	—
.0200"	C12-0200-16-36	K12-0200-16-36
.0230"	C12-0230-16-36	K12-0230-16-36
.0250"	C12-0250-16-36	K12-0250-16-36
.0280"	C12-0280-16-36	K12-0280-16-36
.0312"	C12-0312-16-36	K12-0312-16-36
.0350"	C12-0350-16-36	K12-0350-16-36
.0400"	C12-0400-16-36	K12-0400-16-36
.0468"	C12-0468-16-36	K12-0468-16-36
.0510"	C12-0510-16-36	K12-0510-16-36
.0625"	C12-0625-16-36	K12-0625-16-36
.0781"	C12-0781-16-36	K12-0781-16-36
.0937"	C12-0937-16-36	K12-0937-16-36
.1250"	C12-1250-16-36	K12-1250-16-36
.1562"	C12-1562-16-36	K12-1562-16-36
.1875"	C12-1875-16-36	K12-1875-16-36
.2500"	C12-2500-16-36	K12-2500-16-36

Any thickness in ten-thousandths of an inch from .00020" to .02500" is standard.
To order, replace the middle 4 digits in the part number.



Use if DOC is more than 5X saw thickness

36 TEETH		Alternate Tooth Chamfer Double Concavity 3/4" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C15-0020-16-36*	—
.0040"	C15-0040-16-36*	—
.0060"	C15-0060-16-36*	—
.0080"	C15-0080-16-36*	—
.0100"	C15-0100-16-36*	—
.0120"	C15-0120-16-36	—
.0140"	C15-0140-16-36	—
.0156"	C15-0156-16-36	—
.0180"	C15-0180-16-36	—
.0200"	C15-0200-16-36	K15-0200-16-36
.0230"	C15-0230-16-36	K15-0230-16-36
.0250"	C15-0250-16-36	K15-0250-16-36
.0280"	C15-0280-16-36	K15-0280-16-36
.0312"	C15-0312-16-36	K15-0312-16-36
.0350"	C15-0350-16-36	K15-0350-16-36
.0400"	C15-0400-16-36	K15-0400-16-36
.0468"	C15-0468-16-36	K15-0468-16-36
.0510"	C15-0510-16-36	K15-0510-16-36
.0625"	C15-0625-16-36	K15-0625-16-36
.0781"	C15-0781-16-36	K15-0781-16-36
.0937"	C15-0937-16-36	K15-0937-16-36
.1250"	C15-1250-16-36	K15-1250-16-36
.1562"	C15-1562-16-36	K15-1562-16-36
.1875"	C15-1875-16-36	K15-1875-16-36
.2500"	C15-2500-16-36	K15-2500-16-36

Solid carbide spacers and flanges for 1-1/4" saws are available with 1/2" arbor holes in diameters ranging from .750" to 1.200" and thicknesses from .002" to .250". Call for price and delivery.

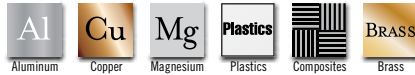
Solid carbide spacers and flanges for 1-1/2" saws are available with 1/2" arbor holes in diameters ranging from .750 to 1.400 and thicknesses from .002" to .250". Call for price and delivery.

*All Saws under .010 are non-returnable.

Solid Carbide SAWS

1 3/4" Diameter **1/2" Arbor**

Proper Max Depth of Cut:
Using AB Arbor = .450
Using NAB Arbor = .3975



Use if
DOC is
more
than
5X saw
thickness

24 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 3/4" HUB Diameter
.0020"	C17-0020-16-24*	—
.0040"	C17-0040-16-24*	—
.0060"	C17-0060-16-24*	—
.0080"	C17-0080-16-24*	—
.0100"	C17-0100-16-24*	—
.0120"	C17-0120-16-24	—
.0140"	C17-0140-16-24	—
.0156"	C17-0156-16-24	—
.0180"	C17-0180-16-24	—
.0200"	C17-0200-16-24	K17-0200-16-24
.0230"	C17-0230-16-24	K17-0230-16-24
.0250"	C17-0250-16-24	K17-0250-16-24
.0280"	C17-0280-16-24	K17-0280-16-24
.0312"	C17-0312-16-24	K17-0312-16-24
.0350"	C17-0350-16-24	K17-0350-16-24
.0400"	C17-0400-16-24	K17-0400-16-24
.0468"	C17-0468-16-24	K17-0468-16-24
.0510"	C17-0510-16-24	K17-0510-16-24
.0625"	C17-0625-16-24	K17-0625-16-24
.0781"	C17-0781-16-24	K17-0781-16-24
.0937"	C17-0937-16-24	K17-0937-16-24
.1250"	C17-1250-16-24	K17-1250-16-24
.1562"	C17-1562-16-24	K17-1562-16-24
.1875"	C17-1875-16-24	K17-1875-16-24
.2500"	C17-2500-16-24	K17-2500-16-24

Any Saw
Thickness
Available

1 3/4" Diameter **5/8" Arbor**

Proper Max Depth of Cut:
AB Arbor = .325
NAB Arbor = .2875



Use if
DOC is
more
than
5X saw
thickness

24 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 1" HUB Diameter
.0020"	C17-0020-20-24*	—
.0040"	C17-0040-20-24*	—
.0060"	C17-0060-20-24*	—
.0080"	C17-0080-20-24*	—
.0100"	C17-0100-20-24*	—
.0120"	C17-0120-20-24	—
.0140"	C17-0140-20-24	—
.0156"	C17-0156-20-24	—
.0180"	C17-0180-20-24	—
.0200"	C17-0200-20-24	K17-0200-20-24
.0230"	C17-0230-20-24	K17-0230-20-24
.0250"	C17-0250-20-24	K17-0250-20-24
.0280"	C17-0280-20-24	K17-0280-20-24
.0312"	C17-0312-20-24	K17-0312-20-24
.0350"	C17-0350-20-24	K17-0350-20-24
.0400"	C17-0400-20-24	K17-0400-20-24
.0468"	C17-0468-20-24	K17-0468-20-24
.0510"	C17-0510-20-24	K17-0510-20-24
.0625"	C17-0625-20-24	K17-0625-20-24
.0781"	C17-0781-20-24	K17-0781-20-24
.0937"	C17-0937-20-24	K17-0937-20-24
.1250"	C17-1250-20-24	K17-1250-20-24
.1562"	C17-1562-20-24	K17-1562-20-24
.1875"	C17-1875-20-24	K17-1875-20-24
.2500"	C17-2500-20-24	K17-2500-20-24



Use if
DOC is
more
than
5X saw
thickness

36 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 3/4" HUB Diameter
.0020"	C17-0020-16-36*	—
.0040"	C17-0040-16-36*	—
.0060"	C17-0060-16-36*	—
.0080"	C17-0080-16-36*	—
.0100"	C17-0100-16-36*	—
.0120"	C17-0120-16-36	—
.0140"	C17-0140-16-36	—
.0156"	C17-0156-16-36	—
.0180"	C17-0180-16-36	—
.0200"	C17-0200-16-36	K17-0200-16-36
.0230"	C17-0230-16-36	K17-0230-16-36
.0250"	C17-0250-16-36	K17-0250-16-36
.0280"	C17-0280-16-36	K17-0280-16-36
.0312"	C17-0312-16-36	K17-0312-16-36
.0350"	C17-0350-16-36	K17-0350-16-36
.0400"	C17-0400-16-36	K17-0400-16-36
.0468"	C17-0468-16-36	K17-0468-16-36
.0510"	C17-0510-16-36	K17-0510-16-36
.0625"	C17-0625-16-36	K17-0625-16-36
.0781"	C17-0781-16-36	K17-0781-16-36
.0937"	C17-0937-16-36	K17-0937-16-36
.1250"	C17-1250-16-36	K17-1250-16-36
.1562"	C17-1562-16-36	K17-1562-16-36
.1875"	C17-1875-16-36	K17-1875-16-36
.2500"	C17-2500-16-36	K17-2500-16-36

Any thickness in
ten-thousandths
of an inch from
0.0020" to 0.2500"
is standard.
To order, replace
the middle 4 digits
in the part number.



Use if
DOC is
more
than
5X saw
thickness

36 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 1" HUB Diameter
.0020"	C17-0020-20-36*	—
.0040"	C17-0040-20-36*	—
.0060"	C17-0060-20-36*	—
.0080"	C17-0080-20-36*	—
.0100"	C17-0100-20-36*	—
.0120"	C17-0120-20-36	—
.0140"	C17-0140-20-36	—
.0156"	C17-0156-20-36	—
.0180"	C17-0180-20-36	—
.0200"	C17-0200-20-36	K17-0200-20-36
.0230"	C17-0230-20-36	K17-0230-20-36
.0250"	C17-0250-20-36	K17-0250-20-36
.0280"	C17-0280-20-36	K17-0280-20-36
.0312"	C17-0312-20-36	K17-0312-20-36
.0350"	C17-0350-20-36	K17-0350-20-36
.0400"	C17-0400-20-36	K17-0400-20-36
.0468"	C17-0468-20-36	K17-0468-20-36
.0510"	C17-0510-20-36	K17-0510-20-36
.0625"	C17-0625-20-36	K17-0625-20-36
.0781"	C17-0781-20-36	K17-0781-20-36
.0937"	C17-0937-20-36	K17-0937-20-36
.1250"	C17-1250-20-36	K17-1250-20-36
.1562"	C17-1562-20-36	K17-1562-20-36
.1875"	C17-1875-20-36	K17-1875-20-36
.2500"	C17-2500-20-36	K17-2500-20-36

Solid carbide spacers and flanges for 1-3/4" saws are available with 1/2" arbor holes in diameters ranging from .750 to 1.650 and thicknesses from .002" to .250". Call for price and delivery.

Solid carbide spacers and flanges for 1-3/4" saws are available with 5/8" arbor holes in diameters ranging from .875" to 1.650" and thicknesses from .002" to .250". Call for price and delivery.

*All Saws under .010 are non-returnable.

Saws

SAWS Solid Carbide

Any Saw Thickness Available

1 3/4" Diameter 7/8" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .200
Using NAB Arbor = .108

2" Diameter 1/2" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .575
Using NAB Arbor = .525



Use if DOC is more than 5X saw thickness

24 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 1-1/4" HUB Diameter
.0020"	C17-0020-28-24*	—
.0040"	C17-0040-28-24*	—
.0060"	C17-0060-28-24*	—
.0080"	C17-0080-28-24*	—
.0100"	C17-0100-28-24*	—
.0120"	C17-0120-28-24	—
.0140"	C17-0140-28-24	—
.0156"	C17-0156-28-24	—
.0180"	C17-0180-28-24	—
.0200"	C17-0200-28-24	K17-0200-28-24
.0230"	C17-0230-28-24	K17-0230-28-24
.0250"	C17-0250-28-24	K17-0250-28-24
.0280"	C17-0280-28-24	K17-0280-28-24
.0312"	C17-0312-28-24	K17-0312-28-24
.0350"	C17-0350-28-24	K17-0350-28-24
.0400"	C17-0400-28-24	K17-0400-28-24
.0468"	C17-0468-28-24	K17-0468-28-24
.0510"	C17-0510-28-24	K17-0510-28-24
.0625"	C17-0625-28-24	K17-0625-28-24
.0781"	C17-0781-28-24	K17-0781-28-24
.0937"	C17-0937-28-24	K17-0937-28-24
.1250"	C17-1250-28-24	K17-1250-28-24
.1562"	C17-1562-28-24	K17-1562-28-24
.1875"	C17-1875-28-24	K17-1875-28-24
.2500"	C17-2500-28-24	K17-2500-28-24



Use if DOC is more than 5X saw thickness

24 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 3/4" HUB Diameter
.0020"	C20-0020-16-24*	—
.0040"	C20-0040-16-24*	—
.0060"	C20-0060-16-24*	—
.0080"	C20-0080-16-24*	—
.0100"	C20-0100-16-24*	—
.0120"	C20-0120-16-24	—
.0140"	C20-0140-16-24	—
.0156"	C20-0156-16-24	—
.0180"	C20-0180-16-24	—
.0200"	C20-0200-16-24	K20-0200-16-24
.0230"	C20-0230-16-24	K20-0230-16-24
.0250"	C20-0250-16-24	K20-0250-16-24
.0280"	C20-0280-16-24	K20-0280-16-24
.0312"	C20-0312-16-24	K20-0312-16-24
.0350"	C20-0350-16-24	K20-0350-16-24
.0400"	C20-0400-16-24	K20-0400-16-24
.0468"	C20-0468-16-24	K20-0468-16-24
.0510"	C20-0510-16-24	K20-0510-16-24
.0625"	C20-0625-16-24	K20-0625-16-24
.0781"	C20-0781-16-24	K20-0781-16-24
.0937"	C20-0937-16-24	K20-0937-16-24
.1250"	C20-1250-16-24	K20-1250-16-24
.1562"	C20-1562-16-24	K20-1562-16-24
.1875"	C20-1875-16-24	K20-1875-16-24
.2500"	C20-2500-16-24	K20-2500-16-24



Use if DOC is more than 5X saw thickness

36 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 1-1/4" HUB Diameter
.0020"	C17-0020-28-36*	—
.0040"	C17-0040-28-36*	—
.0060"	C17-0060-28-36*	—
.0080"	C17-0080-28-36*	—
.0100"	C17-0100-28-36*	—
.0120"	C17-0120-28-36	—
.0140"	C17-0140-28-36	—
.0156"	C17-0156-28-36	—
.0180"	C17-0180-28-36	—
.0200"	C17-0200-28-36	K17-0200-28-36
.0230"	C17-0230-28-36	K17-0230-28-36
.0250"	C17-0250-28-36	K17-0250-28-36
.0280"	C17-0280-28-36	K17-0280-28-36
.0312"	C17-0312-28-36	K17-0312-28-36
.0350"	C17-0350-28-36	K17-0350-28-36
.0400"	C17-0400-28-36	K17-0400-28-36
.0468"	C17-0468-28-36	K17-0468-28-36
.0510"	C17-0510-28-36	K17-0510-28-36
.0625"	C17-0625-28-36	K17-0625-28-36
.0781"	C17-0781-28-36	K17-0781-28-36
.0937"	C17-0937-28-36	K17-0937-28-36
.1250"	C17-1250-28-36	K17-1250-28-36
.1562"	C17-1562-28-36	K17-1562-28-36
.1875"	C17-1875-28-36	K17-1875-28-36
.2500"	C17-2500-28-36	K17-2500-28-36



Use if DOC is more than 5X saw thickness

48 TEETH		Alternate Tooth Chamfer
Saw Thickness	Standard Concavity	Double Concavity 3/4" HUB Diameter
.0020"	C20-0020-16-48*	—
.0040"	C20-0040-16-48*	—
.0060"	C20-0060-16-48*	—
.0080"	C20-0080-16-48*	—
.0100"	C20-0100-16-48*	—
.0120"	C20-0120-16-48	—
.0140"	C20-0140-16-48	—
.0156"	C20-0156-16-48	—
.0180"	C20-0180-16-48	—
.0200"	C20-0200-16-48	K20-0200-16-48
.0230"	C20-0230-16-48	K20-0230-16-48
.0250"	C20-0250-16-48	K20-0250-16-48
.0280"	C20-0280-16-48	K20-0280-16-48
.0312"	C20-0312-16-48	K20-0312-16-48
.0350"	C20-0350-16-48	K20-0350-16-48
.0400"	C20-0400-16-48	K20-0400-16-48
.0468"	C20-0468-16-48	K20-0468-16-48
.0510"	C20-0510-16-48	K20-0510-16-48
.0625"	C20-0625-16-48	K20-0625-16-48
.0781"	C20-0781-16-48	K20-0781-16-48
.0937"	C20-0937-16-48	K20-0937-16-48
.1250"	C20-1250-16-48	K20-1250-16-48
.1562"	C20-1562-16-48	K20-1562-16-48
.1875"	C20-1875-16-48	K20-1875-16-48
.2500"	C20-2500-16-48	K20-2500-16-48

Any thickness in ten-thousandths of an inch from 0.0020" to 0.2500" is standard. To order, replace the middle 4 digits in the part number.

Solid carbide spacers and flanges for 1-3/4" saws are available with 7/8" arbor holes in diameters ranging from 1.125 to 1.650 and thicknesses from .002 to .250. Call for price and delivery.

Solid carbide spacers and flanges for 2" saws are available with 1/2" arbor holes in diameters ranging from .750 to 1.900 and thicknesses from .004 to .250. Call for price and delivery.

*All Saws under .010 are non-returnable.

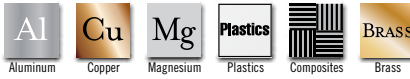
QUANTITY DISCOUNTS

Available at Qty 3, 7 and 25+

2" Diameter **1" Arbor**

Proper Max Depth of Cut:
Using AB Arbor = .200
Using NAB Arbor = .210

Any Saw Thickness Available



Use if DOC is more than 5X saw thickness

24 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C20-0020-32-24*	-
.0040"	C20-0040-32-24*	-
.0060"	C20-0060-32-24*	-
.0080"	C20-0080-32-24*	-
.0100"	C20-0100-32-24*	-
.0120"	C20-0120-32-24	-
.0140"	C20-0140-32-24	-
.0156"	C20-0156-32-24	-
.0180"	C20-0180-32-24	-
.0200"	C20-0200-32-24	K20-0200-32-24
.0230"	C20-0230-32-24	K20-0230-32-24
.0250"	C20-0250-32-24	K20-0250-32-24
.0280"	C20-0280-32-24	K20-0280-32-24
.0312"	C20-0312-32-24	K20-0312-32-24
.0350"	C20-0350-32-24	K20-0350-32-24
.0400"	C20-0400-32-24	K20-0400-32-24
.0468"	C20-0468-32-24	K20-0468-32-24
.0510"	C20-0510-32-24	K20-0510-32-24
.0625"	C20-0625-32-24	K20-0625-32-24
.0781"	C20-0781-32-24	K20-0781-32-24
.0937"	C20-0937-32-24	K20-0937-32-24
.1250"	C20-1250-32-24	K20-1250-32-24
.1562"	C20-1562-32-24	K20-1562-32-24
.1875"	C20-1875-32-24	K20-1875-32-24
.2500"	C20-2500-32-24	K20-2500-32-24



Use if DOC is more than 5X saw thickness

48 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C20-0020-32-48*	-
.0040"	C20-0040-32-48*	-
.0060"	C20-0060-32-48*	-
.0080"	C20-0080-32-48*	-
.0100"	C20-0100-32-48*	-
.0120"	C20-0120-32-48	-
.0140"	C20-0140-32-48	-
.0156"	C20-0156-32-48	-
.0180"	C20-0180-32-48	-
.0200"	C20-0200-32-48	K20-0200-32-48
.0230"	C20-0230-32-48	K20-0230-32-48
.0250"	C20-0250-32-48	K20-0250-32-48
.0280"	C20-0280-32-48	K20-0280-32-48
.0312"	C20-0312-32-48	K20-0312-32-48
.0350"	C20-0350-32-48	K20-0350-32-48
.0400"	C20-0400-32-48	K20-0400-32-48
.0468"	C20-0468-32-48	K20-0468-32-48
.0510"	C20-0510-32-48	K20-0510-32-48
.0625"	C20-0625-32-48	K20-0625-32-48
.0781"	C20-0781-32-48	K20-0781-32-48
.0937"	C20-0937-32-48	K20-0937-32-48
.1250"	C20-1250-32-48	K20-1250-32-48
.1562"	C20-1562-32-48	K20-1562-32-48
.1875"	C20-1875-32-48	K20-1875-32-48
.2500"	C20-2500-32-48	K20-2500-32-48

Any thickness in ten-thousandths of an inch from 0.0020" to 0.2500" is standard. To order, replace the middle 4 digits in the part number.

Solid carbide spacers and flanges for 2" saws are available with 1" arbor holes in diameters ranging from 1.250" to 1.900" and thicknesses from .004" to .250". Call for price and delivery.

Solid Carbide SAWS

2 1/4" Diameter **5/8" Arbor**

Proper Max Depth of Cut:
AB Arbor = .575
NAB Arbor = .5375



Use if DOC is more than 5X saw thickness

28 TEETH		Alternate Tooth Chamfer Double Concavity 1" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C22-0020-20-28*	-
.0040"	C22-0040-20-28*	-
.0060"	C22-0060-20-28*	-
.0080"	C22-0080-20-28*	-
.0100"	C22-0100-20-28*	-
.0120"	C22-0120-20-28	-
.0140"	C22-0140-20-28	-
.0156"	C22-0156-20-28	-
.0180"	C22-0180-20-28	-
.0200"	C22-0200-20-28	K22-0200-20-28
.0230"	C22-0230-20-28	K22-0230-20-28
.0250"	C22-0250-20-28	K22-0250-20-28
.0280"	C22-0280-20-28	K22-0280-20-28
.0312"	C22-0312-20-28	K22-0312-20-28
.0350"	C22-0350-20-28	K22-0350-20-28
.0400"	C22-0400-20-28	K22-0400-20-28
.0468"	C22-0468-20-28	K22-0468-20-28
.0510"	C22-0510-20-28	K22-0510-20-28
.0625"	C22-0625-20-28	K22-0625-20-28
.0781"	C22-0781-20-28	K22-0781-20-28
.0937"	C22-0937-20-28	K22-0937-20-28
.1250"	C22-1250-20-28	K22-1250-20-28
.1562"	C22-1562-20-28	K22-1562-20-28
.1875"	C22-1875-20-28	K22-1875-20-28
.2500"	C22-2500-20-28	K22-2500-20-28



Use if DOC is more than 5X saw thickness

56 TEETH		Alternate Tooth Chamfer Double Concavity 1" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C22-0020-20-56*	-
.0040"	C22-0040-20-56*	-
.0060"	C22-0060-20-56*	-
.0080"	C22-0080-20-56*	-
.0100"	C22-0100-20-56*	-
.0120"	C22-0120-20-56	-
.0140"	C22-0140-20-56	-
.0156"	C22-0156-20-56	-
.0180"	C22-0180-20-56	-
.0200"	C22-0200-20-56	K22-0200-20-56
.0230"	C22-0230-20-56	K22-0230-20-56
.0250"	C22-0250-20-56	K22-0250-20-56
.0280"	C22-0280-20-56	K22-0280-20-56
.0312"	C22-0312-20-56	K22-0312-20-56
.0350"	C22-0350-20-56	K22-0350-20-56
.0400"	C22-0400-20-56	K22-0400-20-56
.0468"	C22-0468-20-56	K22-0468-20-56
.0510"	C22-0510-20-56	K22-0510-20-56
.0625"	C22-0625-20-56	K22-0625-20-56
.0781"	C22-0781-20-56	K22-0781-20-56
.0937"	C22-0937-20-56	K22-0937-20-56
.1250"	C22-1250-20-56	K22-1250-20-56
.1562"	C22-1562-20-56	K22-1562-20-56
.1875"	C22-1875-20-56	K22-1875-20-56
.2500"	C22-2500-20-56	K22-2500-20-56

Solid carbide spacers and flanges for 2-1/4" saws are available with 5/8" arbor holes in diameters ranging from .875" to 2.150" and thicknesses from .004" to .250". Call for price and delivery.

*All Saws under .010 are non-returnable.

Saws

SAWS Solid Carbide

Any Saw Thickness Available

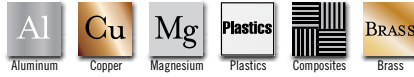
QUANTITY DISCOUNTS
Available at Qty 3, 7 and 25+

2 1/2" Diameter 1" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .450
Using NAB Arbor = .460

2 3/4" Diameter 1" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .575
Using NAB Arbor = .585



Use if DOC is more than 5X saw thickness

28 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C25-0020-32-28*	—
.0040"	C25-0040-32-28*	—
.0060"	C25-0060-32-28*	—
.0080"	C25-0080-32-28*	—
.0100"	C25-0100-32-28*	—
.0120"	C25-0120-32-28	—
.0140"	C25-0140-32-28	—
.0156"	C25-0156-32-28	—
.0180"	C25-0180-32-28	—
.0200"	C25-0200-32-28	K25-0200-32-28
.0230"	C25-0230-32-28	K25-0230-32-28
.0250"	C25-0250-32-28	K25-0250-32-28
.0280"	C25-0280-32-28	K25-0280-32-28
.0312"	C25-0312-32-28	K25-0312-32-28
.0350"	C25-0350-32-28	K25-0350-32-28
.0400"	C25-0400-32-28	K25-0400-32-28
.0468"	C25-0468-32-28	K25-0468-32-28
.0510"	C25-0510-32-28	K25-0510-32-28
.0625"	C25-0625-32-28	K25-0625-32-28
.0781"	C25-0781-32-28	K25-0781-32-28
.0937"	C25-0937-32-28	K25-0937-32-28
.1250"	C25-1250-32-28	K25-1250-32-28
.1562"	C25-1562-32-28	K25-1562-32-28
.1875"	C25-1875-32-28	K25-1875-32-28
.2500"	C25-2500-32-28	K25-2500-32-28



Use if DOC is more than 5X saw thickness

30 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C27-0020-32-30*	—
.0040"	C27-0040-32-30*	—
.0060"	C27-0060-32-30*	—
.0080"	C27-0080-32-30*	—
.0100"	C27-0100-32-30*	—
.0120"	C27-0120-32-30	—
.0140"	C27-0140-32-30	—
.0156"	C27-0156-32-30	—
.0180"	C27-0180-32-30	—
.0200"	C27-0200-32-30	K27-0200-32-30
.0230"	C27-0230-32-30	K27-0230-32-30
.0250"	C27-0250-32-30	K27-0250-32-30
.0280"	C27-0280-32-30	K27-0280-32-30
.0312"	C27-0312-32-30	K27-0312-32-30
.0350"	C27-0350-32-30	K27-0350-32-30
.0400"	C27-0400-32-30	K27-0400-32-30
.0468"	C27-0468-32-30	K27-0468-32-30
.0510"	C27-0510-32-30	K27-0510-32-30
.0625"	C27-0625-32-30	K27-0625-32-30
.0781"	C27-0781-32-30	K27-0781-32-30
.0937"	C27-0937-32-30	K27-0937-32-30
.1250"	C27-1250-32-30	K27-1250-32-30
.1562"	C27-1562-32-30	K27-1562-32-30
.1875"	C27-1875-32-30	K27-1875-32-30
.2500"	C27-2500-32-30	K27-2500-32-30



Use if DOC is more than 5X saw thickness

56 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C25-0020-32-56*	—
.0040"	C25-0040-32-56*	—
.0060"	C25-0060-32-56*	—
.0080"	C25-0080-32-56*	—
.0100"	C25-0100-32-56*	—
.0120"	C25-0120-32-56	—
.0140"	C25-0140-32-56	—
.0156"	C25-0156-32-56	—
.0180"	C25-0180-32-56	—
.0200"	C25-0200-32-56	K25-0200-32-56
.0230"	C25-0230-32-56	K25-0230-32-56
.0250"	C25-0250-32-56	K25-0250-32-56
.0280"	C25-0280-32-56	K25-0280-32-56
.0312"	C25-0312-32-56	K25-0312-32-56
.0350"	C25-0350-32-56	K25-0350-32-56
.0400"	C25-0400-32-56	K25-0400-32-56
.0468"	C25-0468-32-56	K25-0468-32-56
.0510"	C25-0510-32-56	K25-0510-32-56
.0625"	C25-0625-32-56	K25-0625-32-56
.0781"	C25-0781-32-56	K25-0781-32-56
.0937"	C25-0937-32-56	K25-0937-32-56
.1250"	C25-1250-32-56	K25-1250-32-56
.1562"	C25-1562-32-56	K25-1562-32-56
.1875"	C25-1875-32-56	K25-1875-32-56
.2500"	C25-2500-32-56	K25-2500-32-56



Use if DOC is more than 5X saw thickness

60 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C27-0020-32-60*	—
.0040"	C27-0040-32-60*	—
.0060"	C27-0060-32-60*	—
.0080"	C27-0080-32-60*	—
.0100"	C27-0100-32-60*	—
.0120"	C27-0120-32-60	—
.0140"	C27-0140-32-60	—
.0156"	C27-0156-32-60	—
.0180"	C27-0180-32-60	—
.0200"	C27-0200-32-60	K27-0200-32-60
.0230"	C27-0230-32-60	K27-0230-32-60
.0250"	C27-0250-32-60	K27-0250-32-60
.0280"	C27-0280-32-60	K27-0280-32-60
.0312"	C27-0312-32-60	K27-0312-32-60
.0350"	C27-0350-32-60	K27-0350-32-60
.0400"	C27-0400-32-60	K27-0400-32-60
.0468"	C27-0468-32-60	K27-0468-32-60
.0510"	C27-0510-32-60	K27-0510-32-60
.0625"	C27-0625-32-60	K27-0625-32-60
.0781"	C27-0781-32-60	K27-0781-32-60
.0937"	C27-0937-32-60	K27-0937-32-60
.1250"	C27-1250-32-60	K27-1250-32-60
.1562"	C27-1562-32-60	K27-1562-32-60
.1875"	C27-1875-32-60	K27-1875-32-60
.2500"	C27-2500-32-60	K27-2500-32-60

Any thickness in ten-thousandths of an inch from 0.0020" to 0.2500" is standard. To order, replace the middle 4 digits in the part number.

Solid carbide spacers and flanges for 2-1/2" saws are available with 1" arbor holes in diameters ranging from 1.250" to 2.400" and thicknesses from .004" to .250". Call for price and delivery.

Solid carbide spacers and flanges for 2-3/4" saws are available with 1" arbor holes in diameters ranging from 1.250" to 2.65" and thicknesses from .004" to .250". Call for price and delivery.

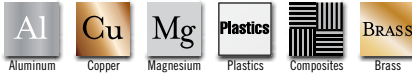
*All Saws under .010 are non-returnable.

Solid Carbide SAWS

3" Diameter 1" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .700
Using NAB Arbor = .710

Any Saw Thickness Available



Use if DOC is more than 5X saw thickness

30 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C30-0020-32-30*	-
.0040"	C30-0040-32-30*	-
.0060"	C30-0060-32-30*	-
.0080"	C30-0080-32-30*	-
.0100"	C30-0100-32-30*	-
.0120"	C30-0120-32-30	-
.0140"	C30-0140-32-30	-
.0156"	C30-0156-32-30	-
.0180"	C30-0180-32-30	-
.0200"	C30-0200-32-30	K30-0200-32-30
.0230"	C30-0230-32-30	K30-0230-32-30
.0250"	C30-0250-32-30	K30-0250-32-30
.0280"	C30-0280-32-30	K30-0280-32-30
.0312"	C30-0312-32-30	K30-0312-32-30
.0350"	C30-0350-32-30	K30-0350-32-30
.0400"	C30-0400-32-30	K30-0400-32-30
.0468"	C30-0468-32-30	K30-0468-32-30
.0510"	C30-0510-32-30	K30-0510-32-30
.0625"	C30-0625-32-30	K30-0625-32-30
.0781"	C30-0781-32-30	K30-0781-32-30
.0937"	C30-0937-32-30	K30-0937-32-30
.1250"	C30-1250-32-30	K30-1250-32-30
.1562"	C30-1562-32-30	K30-1562-32-30
.1875"	C30-1875-32-30	K30-1875-32-30
.2500"	C30-2500-32-30	K30-2500-32-30

4" Diameter 1" Arbor

Proper Max Depth of Cut:
Using AB Arbor = 1.200
Using NAB Arbor = 1.210



Use if DOC is more than 5X saw thickness

36 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C40-0020-32-36*	-
.0040"	C40-0040-32-36*	-
.0060"	C40-0060-32-36*	-
.0080"	C40-0080-32-36*	-
.0100"	C40-0100-32-36*	-
.0120"	C40-0120-32-36	-
.0140"	C40-0140-32-36	-
.0156"	C40-0156-32-36	-
.0180"	C40-0180-32-36	-
.0200"	C40-0200-32-36	K40-0200-32-36
.0230"	C40-0230-32-36	K40-0230-32-36
.0250"	C40-0250-32-36	K40-0250-32-36
.0280"	C40-0280-32-36	K40-0280-32-36
.0312"	C40-0312-32-36	K40-0312-32-36
.0350"	C40-0350-32-36	K40-0350-32-36
.0400"	C40-0400-32-36	K40-0400-32-36
.0468"	C40-0468-32-36	K40-0468-32-36
.0510"	C40-0510-32-36	K40-0510-32-36
.0625"	C40-0625-32-36	K40-0625-32-36
.0781"	C40-0781-32-36	K40-0781-32-36
.0937"	C40-0937-32-36	K40-0937-32-36
.1250"	C40-1250-32-36	K40-1250-32-36
.1562"	C40-1562-32-36	K40-1562-32-36
.1875"	C40-1875-32-36	K40-1875-32-36
.2500"	C40-2500-32-36	K40-2500-32-36

Saws



Use if DOC is more than 5X saw thickness

60 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C30-0020-32-60*	-
.0040"	C30-0040-32-60*	-
.0060"	C30-0060-32-60*	-
.0080"	C30-0080-32-60*	-
.0100"	C30-0100-32-60*	-
.0120"	C30-0120-32-60	-
.0140"	C30-0140-32-60	-
.0156"	C30-0156-32-60	-
.0180"	C30-0180-32-60	-
.0200"	C30-0200-32-60	K30-0200-32-60
.0230"	C30-0230-32-60	K30-0230-32-60
.0250"	C30-0250-32-60	K30-0250-32-60
.0280"	C30-0280-32-60	K30-0280-32-60
.0312"	C30-0312-32-60	K30-0312-32-60
.0350"	C30-0350-32-60	K30-0350-32-60
.0400"	C30-0400-32-60	K30-0400-32-60
.0468"	C30-0468-32-60	K30-0468-32-60
.0510"	C30-0510-32-60	K30-0510-32-60
.0625"	C30-0625-32-60	K30-0625-32-60
.0781"	C30-0781-32-60	K30-0781-32-60
.0937"	C30-0937-32-60	K30-0937-32-60
.1250"	C30-1250-32-60	K30-1250-32-60
.1562"	C30-1562-32-60	K30-1562-32-60
.1875"	C30-1875-32-60	K30-1875-32-60
.2500"	C30-2500-32-60	K30-2500-32-60



Use if DOC is more than 5X saw thickness

72 TEETH		Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C40-0020-32-72*	-
.0040"	C40-0040-32-72*	-
.0060"	C40-0060-32-72*	-
.0080"	C40-0080-32-72*	-
.0100"	C40-0100-32-72*	-
.0120"	C40-0120-32-72	-
.0140"	C40-0140-32-72	-
.0156"	C40-0156-32-72	-
.0180"	C40-0180-32-72	-
.0200"	C40-0200-32-72	K40-0200-32-72
.0230"	C40-0230-32-72	K40-0230-32-72
.0250"	C40-0250-32-72	K40-0250-32-72
.0280"	C40-0280-32-72	K40-0280-32-72
.0312"	C40-0312-32-72	K40-0312-32-72
.0350"	C40-0350-32-72	K40-0350-32-72
.0400"	C40-0400-32-72	K40-0400-32-72
.0468"	C40-0468-32-72	K40-0468-32-72
.0510"	C40-0510-32-72	K40-0510-32-72
.0625"	C40-0625-32-72	K40-0625-32-72
.0781"	C40-0781-32-72	K40-0781-32-72
.0937"	C40-0937-32-72	K40-0937-32-72
.1250"	C40-1250-32-72	K40-1250-32-72
.1562"	C40-1562-32-72	K40-1562-32-72
.1875"	C40-1875-32-72	K40-1875-32-72
.2500"	C40-2500-32-72	K40-2500-32-72

Any thickness in ten-thousandths of an inch from 0.0020" to 0.2500" is standard. To order, replace the middle 4 digits in the part number.

Solid carbide spacers and flanges for 3" saws are available with 1" arbor holes in diameters ranging from 1.250" to 2.900" and thicknesses from .006" to .250". Call for price and delivery.

Solid carbide spacers and flanges for 4" saws are available with 1" arbor holes in diameters ranging from 1.250" to 3.900" and thicknesses from .006" to .250". Call for price and delivery.

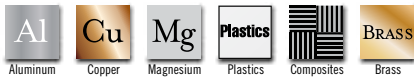
*All Saws under .010 are non-returnable.

SAWS Solid Carbide

Any Saw Thickness Available

20 mm Diameter **5** mm Arbor
Proper Max Depth of Cut:
Using MSA Arbor = 3.5 mm

25 mm Diameter **8** mm Arbor
Proper Max Depth of Cut:
Using MSA Arbor = 4.0 mm



Use if DOC is more than 5X saw thickness

10 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 12mm HUB Diameter
Saw Thickness	Standard Concavity	
.05 mm	M20-0050-05-10*	—
.10 mm	M20-0100-05-10*	—
.15 mm	M20-0150-05-10*	—
.20 mm	M20-0200-05-10*	—
.40 mm	M20-0400-05-10	—
.60 mm	M20-0600-05-10	MK20-0600-05-10
1 mm	M20-1000-05-10	MK20-1000-05-10
1.20 mm	M20-1200-05-10	MK20-1200-05-10
1.60 mm	M20-1600-05-10	MK20-1600-05-10
2.00 mm	M20-2000-05-10	MK20-2000-05-10
2.50 mm	M20-2500-05-10	MK20-2500-05-10
3.00 mm	M20-3000-05-10	MK20-3000-05-10
4.00 mm	M20-4000-05-10	MK20-4000-05-10
5.00 mm	M20-5000-05-10	MK20-5000-05-10
6.00 mm	M20-6000-05-10	MK20-6000-05-10



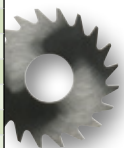
Use if DOC is more than 5X saw thickness

12 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 16mm HUB Diameter
Saw Thickness	Standard Concavity	
.05 mm	M25-0050-08-12*	—
.10 mm	M25-0100-08-12*	—
.15 mm	M25-0150-08-12*	—
.20 mm	M25-0200-08-12*	—
.40 mm	M25-0400-08-12	—
.60 mm	M25-0600-08-12	MK25-0600-08-12
1 mm	M25-1000-08-12	MK25-1000-08-12
1.20 mm	M25-1200-08-12	MK25-1200-08-12
1.60 mm	M25-1600-08-12	MK25-1600-08-12
2.00 mm	M25-2000-08-12	MK25-2000-08-12
2.50 mm	M25-2500-08-12	MK25-2500-08-12
3.00 mm	M25-3000-08-12	MK25-3000-08-12
4.00 mm	M25-4000-08-12	MK25-4000-08-12
5.00 mm	M25-5000-08-12	MK25-5000-08-12
6.00 mm	M25-6000-08-12	MK25-6000-08-12



Use if DOC is more than 5X saw thickness

20 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 12mm HUB Diameter
Saw Thickness	Standard Concavity	
.05 mm	M20-0050-05-20*	—
.10 mm	M20-0100-05-20*	—
.15 mm	M20-0150-05-20*	—
.20 mm	M20-0200-05-20*	—
.40 mm	M20-0400-05-20	—
.60 mm	M20-0600-05-20	MK20-0600-05-20
1 mm	M20-1000-05-20	MK20-1000-05-20
1.20 mm	M20-1200-05-20	MK20-1200-05-20
1.60 mm	M20-1600-05-20	MK20-1600-05-20
2.00 mm	M20-2000-05-20	MK20-2000-05-20
2.50 mm	M20-2500-05-20	MK20-2500-05-20
3.00 mm	M20-3000-05-20	MK20-3000-05-20
4.00 mm	M20-4000-05-20	MK20-4000-05-20
5.00 mm	M20-5000-05-20	MK20-5000-05-20
6.00 mm	M20-6000-05-20	MK20-6000-05-20



Use if DOC is more than 5X saw thickness

24 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 16mm HUB Diameter
Saw Thickness	Standard Concavity	
.05 mm	M25-0050-08-24*	—
.10 mm	M25-0100-08-24*	—
.15 mm	M25-0150-08-24*	—
.20 mm	M25-0200-08-24*	—
.40 mm	M25-0400-08-24	—
.60 mm	M25-0600-08-24	MK25-0600-08-24
1 mm	M25-1000-08-24	MK25-1000-08-24
1.20 mm	M25-1200-08-24	MK25-1200-08-24
1.60 mm	M25-1600-08-24	MK25-1600-08-24
2.00 mm	M25-2000-08-24	MK25-2000-08-24
2.50 mm	M25-2500-08-24	MK25-2500-08-24
3.00 mm	M25-3000-08-24	MK25-3000-08-24
4.00 mm	M25-4000-08-24	MK25-4000-08-24
5.00 mm	M25-5000-08-24	MK25-5000-08-24
6.00 mm	M25-6000-08-24	MK25-6000-08-24



Solid carbide spacers and flanges available. See back of Saws section.

Solid carbide spacers and flanges available. See back of Saws section.

NEW
Coatings Available!

Any Saw Thickness Available!

See Price Sheet for Quantity Discount

*All Saws under 0.254mm are non-returnable.

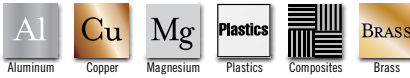
QUANTITY DISCOUNTS

Available at Qty 3, 7 and 25+

Any Saw Thickness Available

32 mm Diameter 8 mm Arbor

Proper Max Depth of Cut:
Using MSA Arbor = 7.5 mm



Use if DOC is more than 5X saw thickness

16 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 16mm HUB Diameter
Saw Thickness	Standard Concavity	
.10 mm	M32-0100-08-16*	-
.15 mm	M32-0150-08-16*	-
.20 mm	M32-0200-08-16*	-
.40 mm	M32-0400-08-16	-
.60 mm	M32-0600-08-16	MK32-0600-08-16
1 mm	M32-1000-08-16	MK32-1000-08-16
1.20 mm	M32-1200-08-16	MK32-1200-08-16
1.60 mm	M32-1600-08-16	MK32-1600-08-16
2.00 mm	M32-2000-08-16	MK32-2000-08-16
2.50 mm	M32-2500-08-16	MK32-2500-08-16
3.00 mm	M32-3000-08-16	MK32-3000-08-16
4.00 mm	M32-4000-08-16	MK32-4000-08-16
5.00 mm	M32-5000-08-16	MK32-5000-08-16
6.00 mm	M32-6000-08-16	MK32-6000-08-16



Solid Carbide SAWS

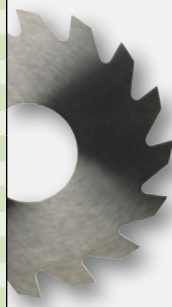
40 mm Diameter 10 mm Arbor

Proper Max Depth of Cut:
Using MSA Arbor = 10.5 mm



Use if DOC is more than 5X saw thickness

16 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 18mm HUB Diameter
Saw Thickness	Standard Concavity	
.10 mm	M40-0100-10-16*	-
.15 mm	M40-0150-10-16*	-
.20 mm	M40-0200-10-16*	-
.40 mm	M40-0400-10-16	-
.60 mm	M40-0600-10-16	MK40-0600-10-16
1 mm	M40-1000-10-16	MK40-1000-10-16
1.20 mm	M40-1200-10-16	MK40-1200-10-16
1.60 mm	M40-1600-10-16	MK40-1600-10-16
2.00 mm	M40-2000-10-16	MK40-2000-10-16
2.50 mm	M40-2500-10-16	MK40-2500-10-16
3.00 mm	M40-3000-10-16	MK40-3000-10-16
4.00 mm	M40-4000-10-16	MK40-4000-10-16
5.00 mm	M40-5000-10-16	MK40-5000-10-16
6.00 mm	M40-6000-10-16	MK40-6000-10-16

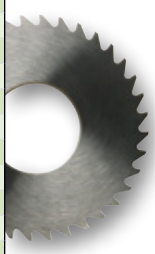


Saws



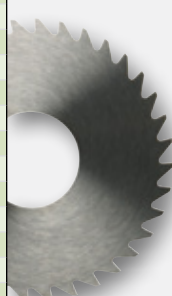
Use if DOC is more than 5X saw thickness

36 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 16mm HUB Diameter
Saw Thickness	Standard Concavity	
.10 mm	M32-0100-08-36*	-
.15 mm	M32-0150-08-36*	-
.20 mm	M32-0200-08-36*	-
.40 mm	M32-0400-08-36	-
.60 mm	M32-0600-08-36	MK32-0600-08-36
1 mm	M32-1000-08-36	MK32-1000-08-36
1.20 mm	M32-1200-08-36	MK32-1200-08-36
1.60 mm	M32-1600-08-36	MK32-1600-08-36
2.00 mm	M32-2000-08-36	MK32-2000-08-36
2.50 mm	M32-2500-08-36	MK32-2500-08-36
3.00 mm	M32-3000-08-36	MK32-3000-08-36
4.00 mm	M32-4000-08-36	MK32-4000-08-36
5.00 mm	M32-5000-08-36	MK32-5000-08-36
6.00 mm	M32-6000-08-36	MK32-6000-08-36



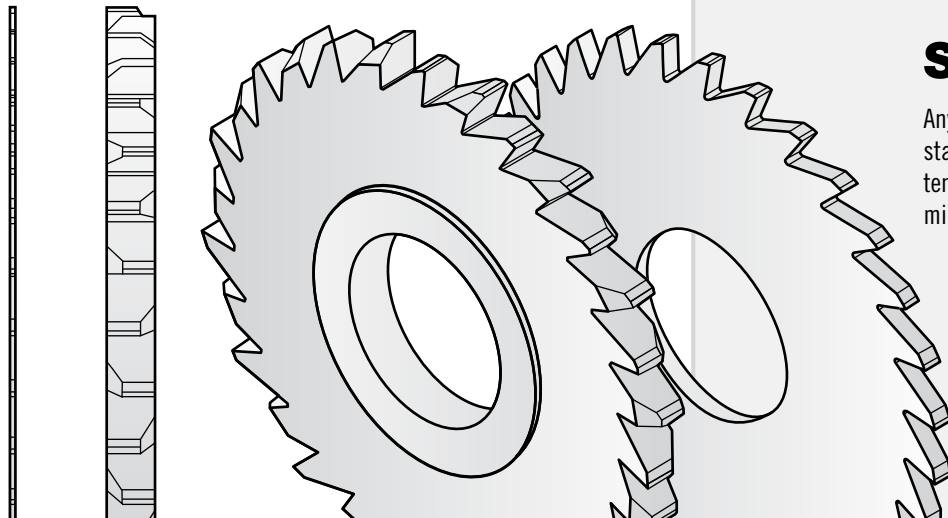
Use if DOC is more than 5X saw thickness

36 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 18mm HUB Diameter
Saw Thickness	Standard Concavity	
.10 mm	M40-0100-10-36*	-
.15 mm	M40-0150-10-36*	-
.20 mm	M40-0200-10-36*	-
.40 mm	M40-0400-10-36	-
.60 mm	M40-0600-10-36	MK40-0600-10-36
1 mm	M40-1000-10-36	MK40-1000-10-36
1.20 mm	M40-1200-10-36	MK40-1200-10-36
1.60 mm	M40-1600-10-36	MK40-1600-10-36
2.00 mm	M40-2000-10-36	MK40-2000-10-36
2.50 mm	M40-2500-10-36	MK40-2500-10-36
3.00 mm	M40-3000-10-36	MK40-3000-10-36
4.00 mm	M40-4000-10-36	MK40-4000-10-36
5.00 mm	M40-5000-10-36	MK40-5000-10-36
6.00 mm	M40-6000-10-36	MK40-6000-10-36



Solid carbide spacers and flanges available. See back of Saws section.

Solid carbide spacers and flanges available. See back of Saws section.



Saw Thickness

Any thickness from 0.10mm to 6.00mm is standard. To order any saw thickness in ten-thousandths of an inch, replace the middle 4 digits in the part number.

Example:

1.450mm saw thickness

M40-1450-10-36

See price sheet for pricing

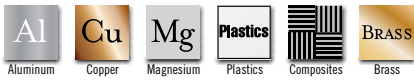
*All Saws under 0.254mm are non-returnable.

SAWS Solid Carbide

50 mm Diameter **13** mm Arbor Proper Max Depth of Cut: Using MSA Arbor = 14.5 mm

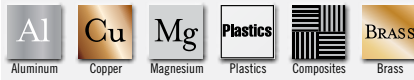
Any Saw Thickness Available

63 mm Diameter **16** mm Arbor Proper Max Depth of Cut: Using MSA Arbor = 18.5 mm



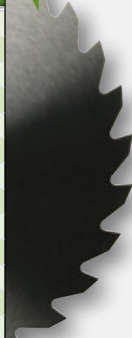
Use if DOC is more than 5X saw thickness

24 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 20mm HUB Diameter
Saw Thickness	Standard Concavity	
.15 mm	M50-0150-13-24*	—
.20 mm	M50-0200-13-24*	—
.40 mm	M50-0400-13-24	—
.60 mm	M50-0600-13-24	MK50-0600-13-24
1 mm	M50-1000-13-24	MK50-1000-13-24
1.20 mm	M50-1200-13-24	MK50-1200-13-24
1.60 mm	M50-1600-13-24	MK50-1600-13-24
2.00 mm	M50-2000-13-24	MK50-2000-13-24
2.50 mm	M50-2500-13-24	MK50-2500-13-24
3.00 mm	M50-3000-13-24	MK50-3000-13-24
4.00 mm	M50-4000-13-24	MK50-4000-13-24
5.00 mm	M50-5000-13-24	MK50-5000-13-24
6.00 mm	M50-6000-13-24	MK50-6000-13-24



Use if DOC is more than 5X saw thickness

28 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 25mm HUB Diameter
Saw Thickness	Standard Concavity	
.15 mm	M63-0150-16-28*	—
.20 mm	M63-0200-16-28*	—
.40 mm	M63-0400-16-28	—
.60 mm	M63-0600-16-28	MK63-0600-16-28
1 mm	M63-1000-16-28	MK63-1000-16-28
1.20 mm	M63-1200-16-28	MK63-1200-16-28
1.60 mm	M63-1600-16-28	MK63-1600-16-28
2.00 mm	M63-2000-16-28	MK63-2000-16-28
2.50 mm	M63-2500-16-28	MK63-2500-16-28
3.00 mm	M63-3000-16-28	MK63-3000-16-28
4.00 mm	M63-4000-16-28	MK63-4000-16-28
5.00 mm	M63-5000-16-28	MK63-5000-16-28
6.00 mm	M63-6000-16-28	MK63-6000-16-28



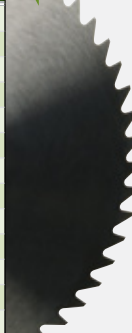
Use if DOC is more than 5X saw thickness

48 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 20mm HUB Diameter
Saw Thickness	Standard Concavity	
.15 mm	M50-0150-13-48*	—
.20 mm	M50-0200-13-48*	—
.40 mm	M50-0400-13-48	—
.60 mm	M50-0600-13-48	MK50-0600-13-48
1 mm	M50-1000-13-48	MK50-1000-13-48
1.20 mm	M50-1200-13-48	MK50-1200-13-48
1.60 mm	M50-1600-13-48	MK50-1600-13-48
2.00 mm	M50-2000-13-48	MK50-2000-13-48
2.50 mm	M50-2500-13-48	MK50-2500-13-48
3.00 mm	M50-3000-13-48	MK50-3000-13-48
4.00 mm	M50-4000-13-48	MK50-4000-13-48
5.00 mm	M50-5000-13-48	MK50-5000-13-48
6.00 mm	M50-6000-13-48	MK50-6000-13-48



Use if DOC is more than 5X saw thickness

56 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 25mm HUB Diameter
Saw Thickness	Standard Concavity	
.15 mm	M63-0150-16-56*	—
.20 mm	M63-0200-16-56*	—
.40 mm	M63-0400-16-56	—
.60 mm	M63-0600-16-56	MK63-0600-16-56
1 mm	M63-1000-16-56	MK63-1000-16-56
1.20 mm	M63-1200-16-56	MK63-1200-16-56
1.60 mm	M63-1600-16-56	MK63-1600-16-56
2.00 mm	M63-2000-16-56	MK63-2000-16-56
2.50 mm	M63-2500-16-56	MK63-2500-16-56
3.00 mm	M63-3000-16-56	MK63-3000-16-56
4.00 mm	M63-4000-16-56	MK63-4000-16-56
5.00 mm	M63-5000-16-56	MK63-5000-16-56
6.00 mm	M63-6000-16-56	MK63-6000-16-56



Solid carbide spacers and flanges available. See back of Saws section.

Solid carbide spacers and flanges available. See back of Saws section.

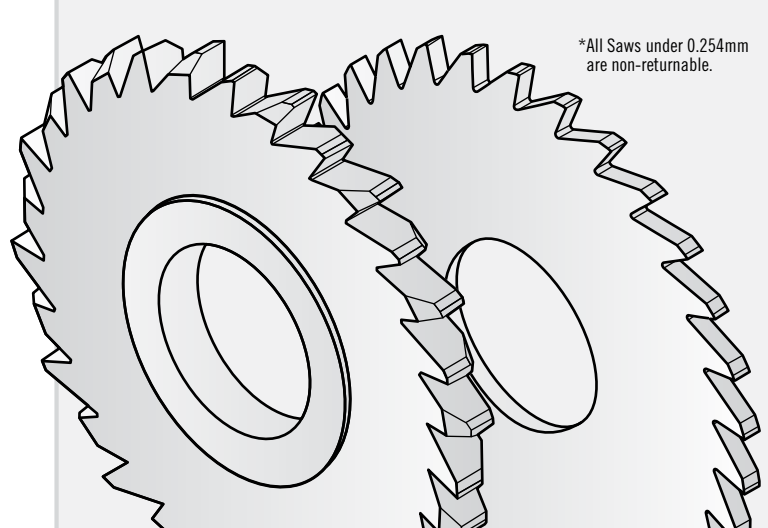
Saw Thickness

Any thickness from 0.10mm to 6.00mm is standard. To order any saw thickness in ten-thousandths of an inch, replace the middle 4 digits in the part number.

Example:

1.450mm saw thickness

▶ **M40-1450-10-36**
See price sheet for pricing



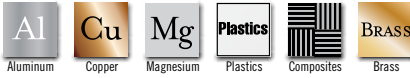
*All Saws under 0.254mm are non-returnable.

Solid Carbide SAWS

Any Saw Thickness Available

80 mm Diameter 22 mm Arbor

Proper Max Depth of Cut:
Using MSA Arbor = 21.5 mm



Use if DOC is more than 5X saw thickness

30 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 35mm HUB Diameter
Saw Thickness	Standard Concavity	
.20 mm	M80-0200-22-30*	-
.40 mm	M80-0400-22-30	-
.60 mm	M80-0600-22-30	MK80-0600-22-30
1 mm	M80-1000-22-30	MK80-1000-22-30
1.20 mm	M80-1200-22-30	MK80-1200-22-30
1.60 mm	M80-1600-22-30	MK80-1600-22-30
2.00 mm	M80-2000-22-30	MK80-2000-22-30
2.50 mm	M80-2500-22-30	MK80-2500-22-30
3.00 mm	M80-3000-22-30	MK80-3000-22-30
4.00 mm	M80-4000-22-30	MK80-4000-22-30
5.00 mm	M80-5000-22-30	MK80-5000-22-30
6.00 mm	M80-6000-22-30	MK80-6000-22-30

100 mm Diameter 22 mm Arbor

Proper Max Depth of Cut:
Using MSA Arbor = 31.5 mm



Use if DOC is more than 5X saw thickness

36 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 35mm HUB Diameter
Saw Thickness	Standard Concavity	
.20 mm	M100-0200-22-36*	-
.40 mm	M100-0400-22-36	-
.60 mm	M100-0600-22-36	MK100-0600-22-36
1 mm	M100-1000-22-36	MK100-1000-22-36
1.20 mm	M100-1200-22-36	MK100-1200-22-36
1.60 mm	M100-1600-22-36	MK100-1600-22-36
2.00 mm	M100-2000-22-36	MK100-2000-22-36
2.50 mm	M100-2500-22-36	MK100-2500-22-36
3.00 mm	M100-3000-22-36	MK100-3000-22-36
4.00 mm	M100-4000-22-36	MK100-4000-22-36
5.00 mm	M100-5000-22-36	MK100-5000-22-36
6.00 mm	M100-6000-22-36	MK100-6000-22-36

Saws



Use if DOC is more than 5X saw thickness

60 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 35mm HUB Diameter
Saw Thickness	Standard Concavity	
.20 mm	M80-0200-22-60*	-
.40 mm	M80-0400-22-60	-
.60 mm	M80-0600-22-60	MK80-0600-22-60
1 mm	M80-1000-22-60	MK80-1000-22-60
1.20 mm	M80-1200-22-60	MK80-1200-22-60
1.60 mm	M80-1600-22-60	MK80-1600-22-60
2.00 mm	M80-2000-22-60	MK80-2000-22-60
2.50 mm	M80-2500-22-60	MK80-2500-22-60
3.00 mm	M80-3000-22-60	MK80-3000-22-60
4.00 mm	M80-4000-22-60	MK80-4000-22-60
5.00 mm	M80-5000-22-60	MK80-5000-22-60
6.00 mm	M80-6000-22-60	MK80-6000-22-60

Solid carbide spacers and flanges available. See back of Saws section.



Use if DOC is more than 5X saw thickness

72 TEETH METRIC		Alternate Tooth Chamfer Double Concavity 35mm HUB Diameter
Saw Thickness	Standard Concavity	
.20 mm	M100-0200-22-72*	-
.40 mm	M100-0400-22-72	-
.60 mm	M100-0600-22-72	MK100-0600-22-72
1 mm	M100-1000-22-72	MK100-1000-22-72
1.20 mm	M100-1200-22-72	MK100-1200-22-72
1.60 mm	M100-1600-22-72	MK100-1600-22-72
2.00 mm	M100-2000-22-72	MK100-2000-22-72
2.50 mm	M100-2500-22-72	MK100-2500-22-72
3.00 mm	M100-3000-22-72	MK100-3000-22-72
4.00 mm	M100-4000-22-72	MK100-4000-22-72
5.00 mm	M100-5000-22-72	MK100-5000-22-72
6.00 mm	M100-6000-22-72	MK100-6000-22-72

Solid carbide spacers and flanges available. See back of Saws section.

NEW Coatings Available!

Any Saw Thickness Available!

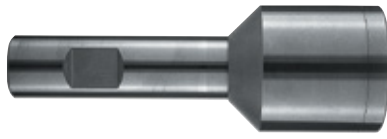
*All Saws under 0.254mm are non-returnable.

SAWS Arbors & Flanges for Saws

RobbJack Arbors are the tightest tolerances in the industry and solve many of the problems associated with using carbide slitting saws. RJ Arbors have less than .0002" Runout



AB Arbors

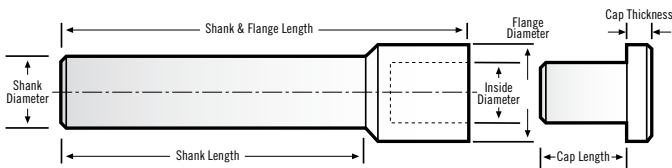


Arbor Size	Shank Diameter	Flange Diameter	Cap Length	Shank & Flange Length	Shank Length	Cap Thickness	Screw Size (Included)	Torque Specs	Hex Key Size (Included)	Part Number
1/4"	1/2"	1/2"	3/8"	2-7/8"	2-7/8"	3/16"	8-32 x 1" Flat-Head Socket Cap Screw	29 in-lb	3/32"	AB-250
3/8"	1/2"	5/8"	3/8"	2-7/8"	2-5/16"	1/4"	10-32 x 1.5" Flat-Head Socket Cap Screw	47 in-lb	1/8"	AB-375
1/2"	1/2"	3/4"	1/2"	2-7/8"	2"	1/4"	1/4-20 x 1.5" Flat-Head Socket Cap Screw	202 in-lb	5/32"	AB-500
5/8"	3/4"	1"	7/8"	4"	2-7/8"	1/4"	1/4-20 x 2" Socket head cap screw	202 in-lb	3/16"	AB-625
7/8"	3/4"	1-1/4"	1"	4"	2-1/2"	1/4"	5/16-18 x 2.5" Socket head cap screw	415 in-lb	1/4"	AB-875
1"	3/4"	1-1/2"	1"	4"	2-3/8"	1/4"	5/16-18 x 2.5" Socket head cap screw	415 in-lb	1/4"	AB-1000
1"	1"	1-1/2"	1"	5"	3-1/2"	1/4"	5/16-18 x 2.5" Socket head cap screw	415 in-lb	1/4"	AB-1000-1
1-1/4"	1"	1-3/4"	1-3/8"	5"	3-1/4"	1/4"	1/2-13 x 3" Socket head cap screw	600 in-lb	3/8"	AB-1250



MSA Arbors METRIC

Arbor Size	Shank Diameter	Flange Diameter	Cap Length	Shank & Flange Length	Shank Length	Cap Thickness	Screw Size (Included)	Torque Specs	Hex Key Size (Included)	Part Number
5mm	12mm	12mm	10mm	75mm	75mm	4.5mm	M3 x 25 Flat-Head Socket Cap Screw	1.25 nm	2mm	MSA-05
8mm	12mm	16mm	10mm	75mm	61mm	6mm	M3 x 25 Flat-Head Socket Cap Screw	1.25 nm	2mm	MSA-08
10mm	12mm	18mm	10mm	75mm	59.6mm	6mm	M5 x 30 Flat-Head Socket Cap Screw	6.9 nm	3mm	MSA-10
13mm	12mm	20mm	10mm	75mm	58.7mm	6mm	M5 x 30 Flat-Head Socket Cap Screw	6.9 nm	3mm	MSA-13
16mm	16mm	25mm	22mm	100mm	70.4mm	6mm	M5 x 45 Socket head cap screw	12 nm	4mm	MSA-16
22mm	20mm	35mm	22mm	100mm	67.4mm	6mm	M6 x 45 Socket head cap screw	20.3 nm	5mm	MSA-22



AB Arbor Tolerances

Inside Dia. = +.0001/+ .0003
 Flange Dia. = ±.003
 Shank Dia. = -.0001/- .0003
 OAL = ±.060
 Cap Dia. = +.0000/- .0002
 Cap Length = +.060/- .000
 Cap Thickness = +.060/- .000

MSA Arbor Tolerances

Inside Dia. = +.005/+ .008mm
 Flange Dia. = ±.076mm
 Shank Dia. = -.0025/- .0076mm
 OAL = ±1.5mm
 Cap Dia. = +.0000/- .005mm
 Cap Length = +1.5/- .000mm
 Cap Thickness = +1.5/- .000mm

Notes:

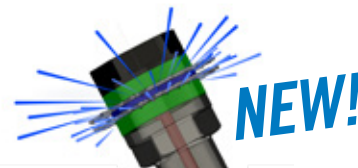
Total thickness of saws/spacers should not exceed 50% of Cap Length.
 Arbor caps with longer Cap Length dimension available. (Excludes Metric)

Inside Diameter concentric to Shank Diameter within .005mm

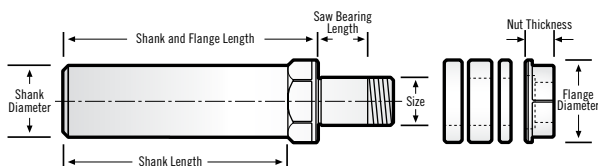
NEW! 15X Gripping Force



NAB Arbors



Arbor Size	Shank Diameter	Flange Diameter	Saw Bearing Length	Shank & Flange Length	Shank Length	Nut Thickness	Spacers Included	Torque Specs	Part Number	Thru-Coolant Saw Arbors	Keyway Size (Removable)
1/4"	1/2"	0.57	0.26	2.2	1.7"	.250	.0625" .125 .1875"	8 ft-lbs	NAB-250	NAB-250-TC	Special – available upon request
3/8"	5/8"	0.71	.375	2.4	2"	.280	.0625" .125 .1875"	25 ft-lbs	NAB-375	NAB-375-TC	
1/2"	3/4"	0.855	.5	3.0	2.5"	.325	.0625" .1875" .25	45 ft-lbs	NAB-500	NAB-500-TC	
5/8"	7/8"	1.075	.5	3.15	2.5"	.390	.0625" .1875" .25	45 ft-lbs	NAB-625	NAB-625-TC	
3/4"	1"	1.215	.5	3.4	2.8"	.440	.0625" .1875" .25	50 ft-lbs	NAB-750	NAB-750-TC	
7/8"	1"	1.434	.5	3.4	2.98"	.440	.0625" .1875" .25	50 ft-lbs	NAB-875	NAB-875-TC	
1"	1"	1.48	.5	3.5	3"	.440	.0625" .1875" .25	50 ft-lbs	NAB-1000	NAB-1000-TC	1/8"
1-1/4"	1-1/4"	2	.5	3.5	3.08"	.440	.0625" .1875" .25	50 ft-lbs	NAB-1250	NAB-1250-TC	1/8"
											1/4"
											5/16"



NAB Arbor Tolerances

Arbor Size = -.0001/- .0003
 Flange Dia. = ±.010
 Shank Dia. = -.0001/- .0004
 Shank & Flange Length = ±.015
 Saw Bearing Length = ±.015
 Nut Thickness = ±.010
 Runout = .0005 max

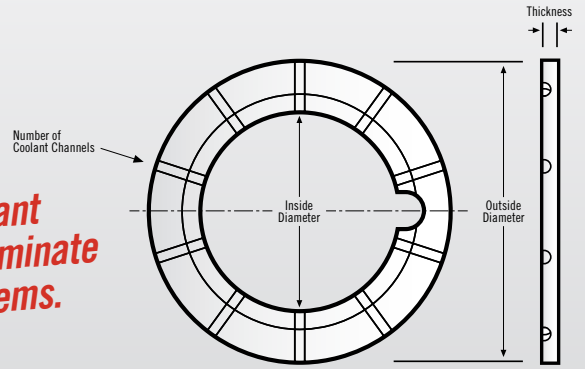
CF Thru-Coolant Flanges are required for Thru-Coolant Arbors



Solid Carbide Thru-Coolant Saw Flanges **CF**

Extremely ACCURATE & long lasting!

Solid carbide thru-coolant flanges and spacers eliminate burr and scratch problems.



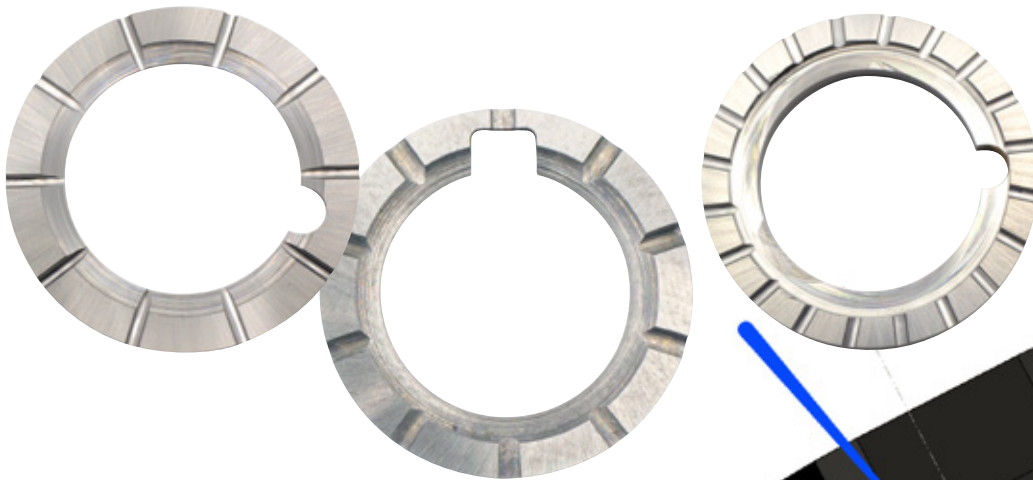
Must be used when using NAB Thru-Coolant saw arbor

CF Solid Carbide Thru-Coolant Saw Flanges

Inside Diameter	Thickness	Outside Diameter	# of coolant channels	Part Number
1/4"	0.06"	0.57"	10	CF-250-0600-10
3/8"	0.06"	0.71"	10	CF-375-0600-10
1/2"	0.06"	0.855"	14	CF-500-0600-14
5/8"	0.06"	1.075"	14	CF-625-0600-14
3/4"	0.06"	1.215"	16	CF-750-0600-16
7/8"	0.06"	1.434"	20	CF-875-0600-20
1"	0.06"	1.48"	20	CF-1000-0600-20
1-1/4"	0.06"	2"	24	CF-1250-0600-24

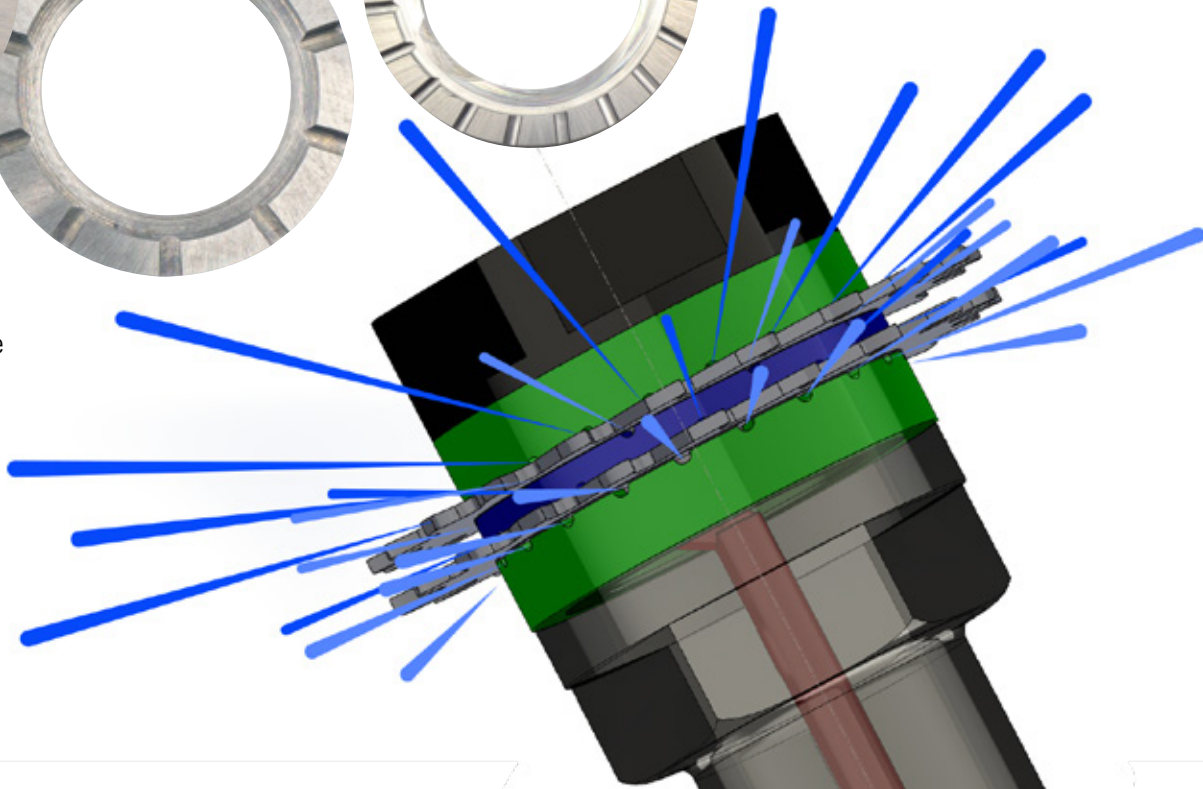
NEW!

*Two solid carbide coolant flanges are needed for Thru-Coolant arbors.
Sold in Pairs.*



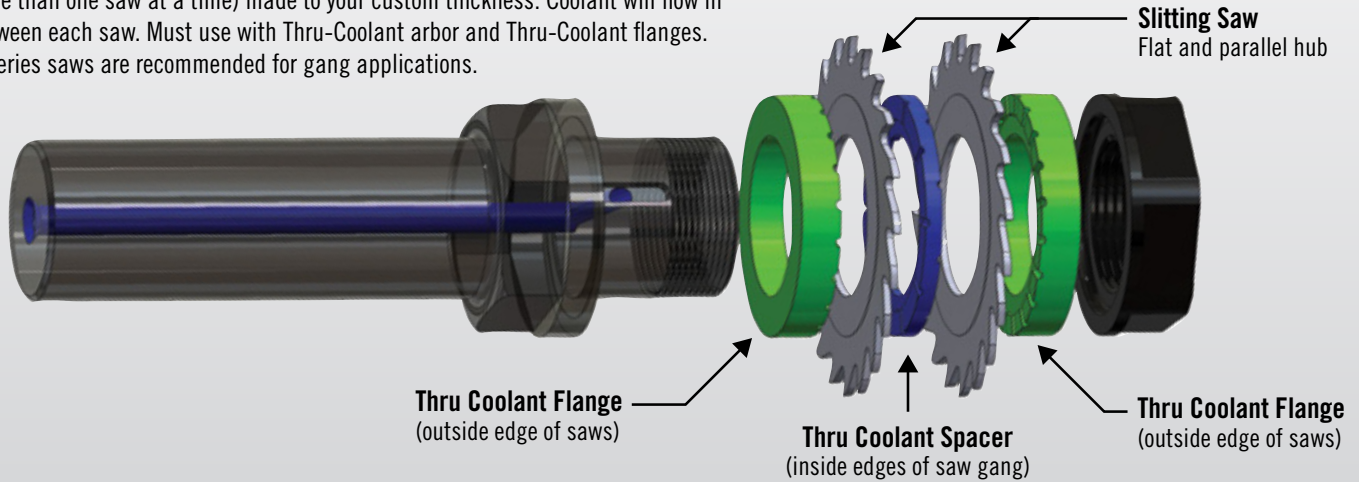
Keyways in images are not standard they are available upon request

Watch video on how to use and what is needed for thru coolant saw arbors



CSP Solid Carbide Thru-Coolant Saw Spacers

Solid Carbide Thru-Coolant Spacers are available for gang operations (stacking more than one saw at a time) made to your custom thickness. Coolant will flow in between each saw. Must use with Thru-Coolant arbor and Thru-Coolant flanges. K-series saws are recommended for gang applications.



Only needed when ganging multiple saws with Thru-Coolant. Must use NAB Thru-Coolant Arbor and CF Thru-Coolant Flanges.

Spacer Thickness

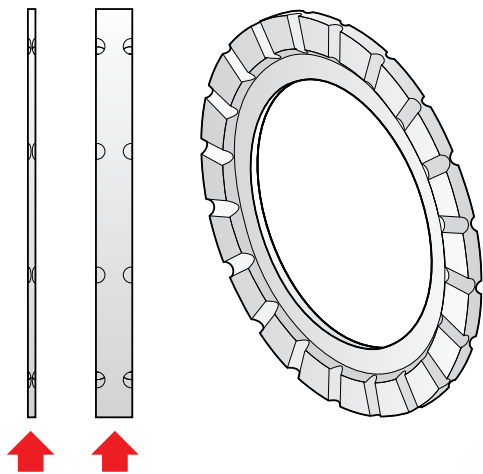
Any thickness from 0.0020" to 0.2500" is standard. To order any spacer thickness in ten thousandths of an inch, replace the 4 digits in the part number.

Example:

1 inside diameter spacer made to work with NAB-1000-TC at .0456 thickness

▶ **CSP-1000-0456-20**

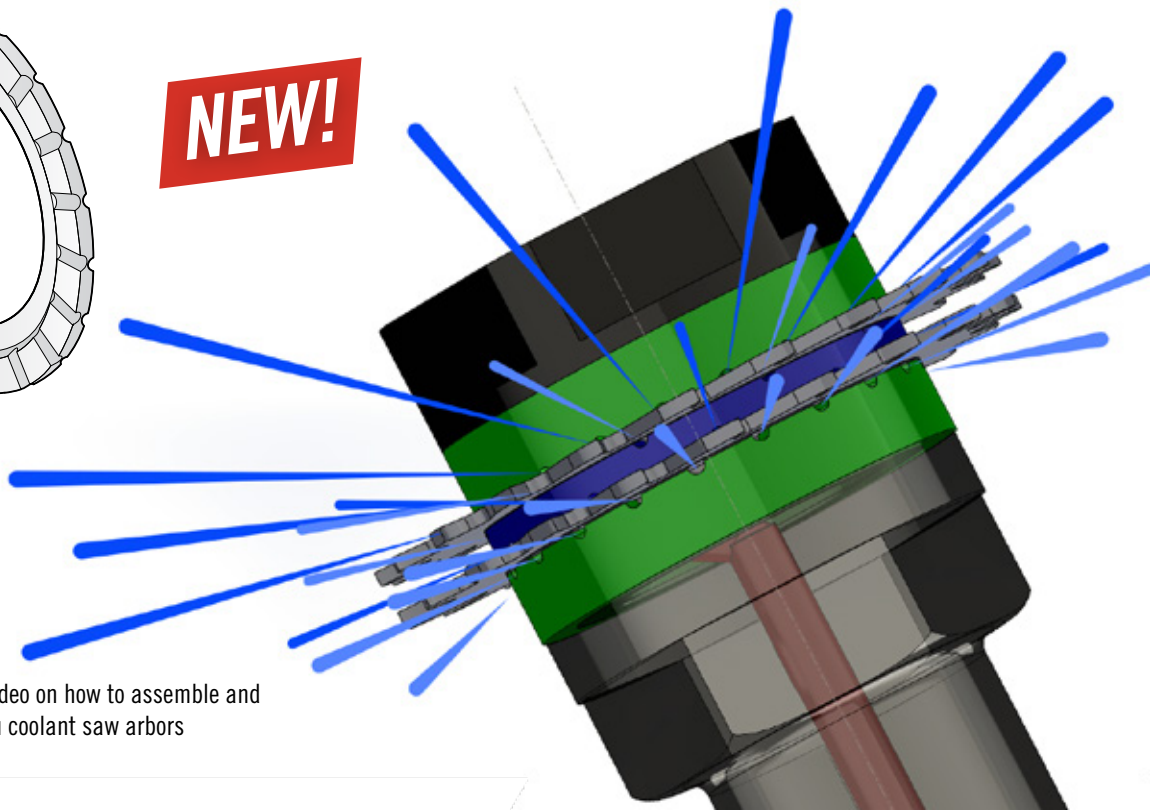
See price sheet for pricing



CSP Solid Carbide Thru-Coolant Saw Spacers

Inside Diameter	Thickness	Outside Diameter	# of coolant channels	Part Number
1/4"		0.57"	10	CSP-250-XXXX-10
3/8"		0.71"	10	CSP-375-XXXX-10
1/2"	Specify Thickness by replacing the red digits	0.855"	14	CSP-500-XXXX-14
5/8"		1.075"	14	CSP-625-XXXX-14
3/4"		1.215"	16	CSP-750-XXXX-16
7/8"		1.434"	20	CSP-875-XXXX-20
1"		1.48"	20	CSP-1000-XXXX-20
1-1/4"		2"	24	CSP-1250-XXXX-24

NEW!



Watch the video on how to assemble and set up a thru coolant saw arbors



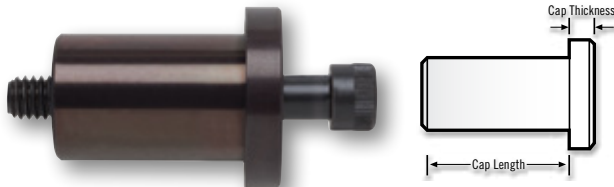
FLANGES (Any diameter between 2-4)

Flange Diameter	Flange Part Number
1.75-2	FLANGES-2
2.125-2.5	FLANGES-2.5
2.5-3	FLANGES-3
3-3.5	FLANGES-3.5
3.5-4	FLANGES-4

Flange Tolerances

Steel flanges are heat treated and ground flat and parallel within plus or minus .00005. All steel flanges have 1.000" inside diameter arbor hole. Steel flanges are custom ground as to diameter. Please specify exact diameter (see range).

Carbide spacers available.



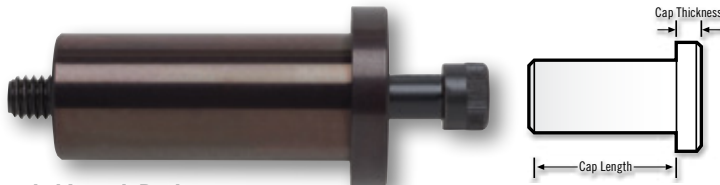
Notes:

Total thickness of saws/spacers should not exceed 50% of Cap Length.

Replacement caps with longer Cap Length dimension available.

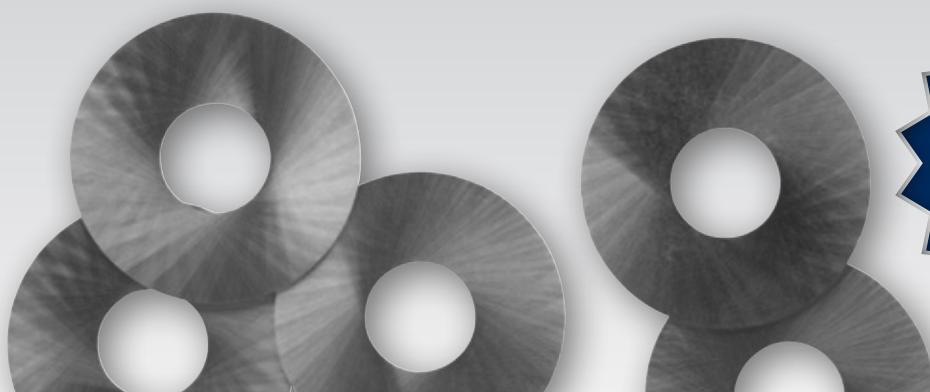
CAPS Standard Length Replacements

Arbor Number	Cap Length	Screw Size (Included)	Hex Key Size	Standard Cap Part Number
AB-250	3/8"	8-32 × 1 Flat head Socket head cap screw	0.0937"5	CP-AB-250
AB-375	3/8"	10-32 × 1.5 Flat head Socket head cap screw	0.125	CP-AB-375
AB-500	1/2"	1/4-20 × 1.5 Socket head cap screw	0.1563	CP-AB-500
AB-625	7/8"	1/4-20 × 2 Socket head cap screw	0.1875"	CP-AB-625
AB-875	1	5/16-18 × 2.5 Socket head cap screw	1/4"	CP-AB-875
AB-1000	1	5/16-18 × 2.5 Socket head cap screw	1/4"	CP-AB-1000
AB-1000-1	1	5/16-18 × 2.5 Socket head cap screw	1/4"	CP-AB-1000



CAPS Extended Length Replacements

Arbor Number	Cap Length	Screw Size (Included)	Hex Key Size	Extended Cap Part Number
AB-250	3/4"	8-32 × 1.5 Flat head Socket head cap screw	0.0937"5	XCP-AB-250
AB-375	7/8"	10-32 × 2 Flat head Socket head cap screw	0.125	XCP-AB-375
AB-500	3/4"	1/4-20 × 1.75 Socket head cap screw	0.1563	XCP-AB-500
AB-625	1-3/4"	1/4-20 × 2.5 Socket head cap screw	0.1875"	XCP-AB-625
AB-875	2	5/16-18 × 3 Socket head cap screw	1/4"	XCP-AB-875
AB-1000	2	5/16-18 × 3 Socket head cap screw	1/4"	XCP-AB-1000
AB-1000-1	2	5/16-18 × 3 Socket head cap screw	1/4"	XCP-AB-1000



Special Gang Carbide Spacers Available!

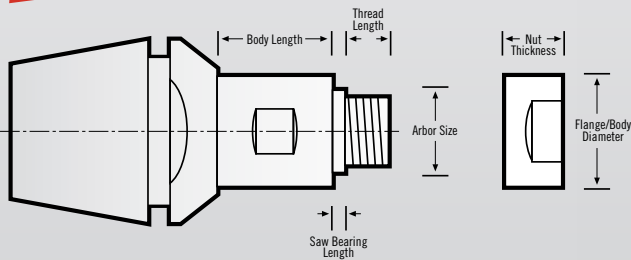
SA-ER Solid Saw Arbors

Taper-integrated small tooling provides unparalleled ease of use for advanced productivity!

- TIR Held to .0002 or Better
- Repeatable Positioning of Saw Edge
- Ground ER Taper and Saw Journal
- Integrated ER Taper For Maximum Rigidity



NEW!



Saws



ER11

SA-ER11 Collet Integrated Saw Arbor

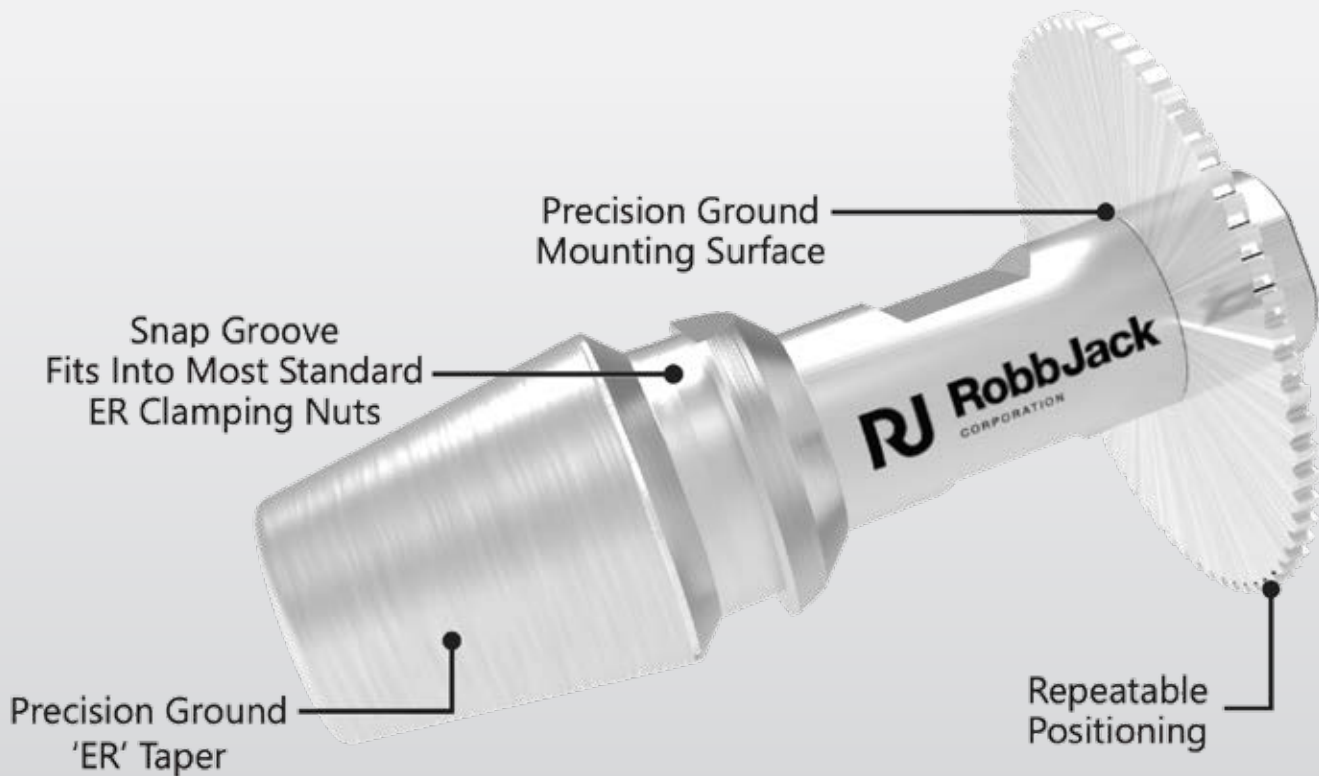
Arbor Size	Body Length	Saw Bearing Length	Nut Thickness	Thread Length	Flange/Body	Tool Number
5mm	10mm	1.27mm	5mm	6.35mm	8mm	SA-ER11-10-M5
5mm	14mm	1.27mm	5mm	6.35mm	8mm	SA-ER11-14-M5
5mm	19mm	1.27mm	5mm	6.35mm	8mm	SA-ER11-19-M5
5mm	25mm	1.27mm	5mm	6.35mm	8mm	SA-ER11-25-M5



ER16

SA-ER16 Collet Integrated Saw Arbor

Arbor Size	Body Length	Saw Bearing Length	Nut Thickness	Thread Length	Flange/Body	Tool Number
5mm	18mm	1.27mm	6.35mm	6.5mm	9.5mm	SA-ER16-S-M5
5mm	24mm	1.27mm	6.35mm	6.5mm	9.5mm	SA-ER16-L-M5
1/4"	0.708"	0.05"	1/4"	0.256"	3/8"	SA-ER16-S-O8
1/4"	0.945"	0.05"	1/4"	0.256"	3/8"	SA-ER16-L-O8
8mm	18mm	1.27mm	6.35mm	6.5mm	10mm	SA-ER16-S-M8
8mm	24mm	1.27mm	6.35mm	6.5mm	10mm	SA-ER16-L-M8



ER20

SA-ER20 Collet Integrated Saw Arbor

Arbor Size	Body Length	Saw Bearing Length	Nut Thickness	Thread Length	Flange/Body	Tool Number
5mm	30mm	1.27mm	6.35mm	7.75mm	9.5mm	SA-ER20-L-M5
5mm	18mm	1.27mm	6.35mm	7.75mm	9.5mm	SA-ER20-S-M5
1/4"	1.181"	0.05"	1/4"	0.305"	3/8"	SA-ER20-L-08
1/4"	0.709"	0.05"	1/4"	0.305"	3/8"	SA-ER20-S-08
8mm	30mm	1.27mm	6.35mm	7.75mm	10mm	SA-ER20-L-M8
8mm	18mm	1.27mm	6.35mm	7.75mm	10mm	SA-ER20-S-M8
3/8"	1.181"	0.05"	0.276"	0.354"	0.492"	SA-ER20-L-12
3/8"	0.709"	0.05"	0.276"	0.354"	0.492"	SA-ER20-S-12
10mm	30mm	1.27mm	7mm	9mm	12.5mm	SA-ER20-L-M10
10mm	18mm	1.27mm	7mm	9mm	12.5mm	SA-ER20-S-M10

All ER Saw Arbors Include
(2) Saw Clamping Nuts



Nut With Smaller
Width For Clamping
Thicker Saws



Standard Nut For
Clamping Standard
Saws

Call For Replacement Parts

Tools for WOOD & PLASTIC



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High-Performance tools for every project!

- Downshear routers and end mills
- Upshear routers and end mills
- Straight flute routers
- Herringbone/Compression routers
- Diamond PCD tools
- Slitting saws
- Roughers

Wood & Plastics



Miniatures

Shell Inlays and Inlay Pockets

Saws

Fret Slots Use K-Series Saws

WRU, WRD Series

Roughing

WU1 Series

Pocketing


















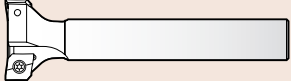
B Series

Ridge and Bridge Saddle Bodies and Shaping Neck and Carving

WD1 Series

Purfling and Binding

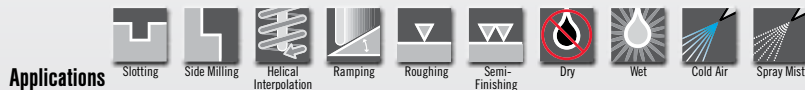
Made with meticulously engineered geometries and leading-edge coating technologies, our end mills, routers, drills, saws and engraving tools are supported by industry experts who help customers achieve optimal performance every time.

WU / WD / WTL 201/203/303	2 & 3 Flute Solid Carbide Routers		196
WRU / WRD 303	3 Flute Rougher Solid Carbide Routers		197
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MINIATURES	(See Miniatures Applications)		132
SAWS	(See Saws Applications)		170
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AIC / INS FaceMills	 Insertable Face Mill and Polished Inserts		72

W Precision Spiral Routers for CNC Production



Characteristics



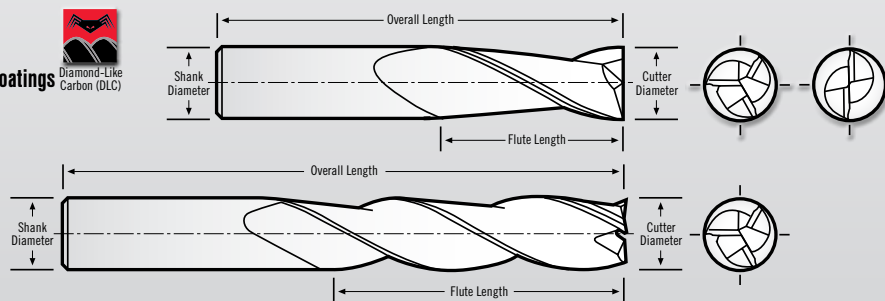
Applications



Materials



Coatings



WU/WD Tolerances

Cutting Dia. (1/16" to 1/4") = +.000/- .002
 (9/32" to 3/4") = +.000/- .003
 Shank Dia. = -.0001/- .0002
 Flute Length (1/16" to 5/16") = +.030/- .000
 (3/8" to 3/4") = +.060/- .000
 OAL = ±.060

WTL Tolerances

Cutting Dia. (1/8") = -.0001/- .0002
 (3/16" to 3/4") = -.000/+ .001
 Shank Dia. = -.0001/- .0002
 Flute Length (1/16" to 5/16") = +.030/- .000
 (3/8" to 3/4") = +.060/- .000
 OAL = ±.060



WU1-201 2 Flute Stub Length Solid Carbide Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
3/16"	3/16"	3/8"	2"	WU1-201-06
1/4"	1/4"	1/2"	2"	WU1-201-08
3/8"	3/8"	5/8"	2"	WU1-201-12
1/2"	1/2"	1-1/4"	3-1/4"	WU1-201-16
5/8"	5/8"	1-1/2"	3-1/2"	WU1-201-20
3/4"	3/4"	1-1/2"	4"	WU1-201-24



WD1-201 2 Flute Stub Length Solid Carbide Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
3/16"	3/16"	3/8"	2"	WD1-201-06
1/4"	1/4"	1/2"	2"	WD1-201-08
3/8"	3/8"	5/8"	2"	WD1-201-12
1/2"	1/2"	1-1/4"	3-1/4"	WD1-201-16
5/8"	5/8"	1-1/2"	3-1/2"	WD1-201-20
3/4"	3/4"	1-1/2"	4"	WD1-201-24



WU1-203 2 Flute Standard Length Solid Carbide Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/8"	1/2"	1-1/2"	WU1-203-04
3/16"	3/16"	5/8"	2"	WU1-203-06
1/4"	1/4"	3/4"	2-1/2"	WU1-203-08
3/8"	3/8"	1"	2-1/2"	WU1-203-12
1/2"	1/2"	1-1/2"	3-1/2"	WU1-203-16
16mm	16mm	55mm	118mm	WU1-203-16mm
5/8"	5/8"	2"	4-5/8"	WU1-203-20
3/4"	3/4"	2-3/16"	5-1/4"	WU1-203-24



WD1-203 2 Flute Standard Length Solid Carbide Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/8"	1/2"	1-1/2"	WD1-203-04
3/16"	3/16"	5/8"	2"	WD1-203-06
1/4"	1/4"	3/4"	2-1/2"	WD1-203-08
3/8"	3/8"	1"	2-1/2"	WD1-203-12
1/2"	1/2"	1-1/2"	3-1/2"	WD1-203-16
16mm	16mm	55mm	118mm	WD1-203-16mm
5/8"	5/8"	2"	4-5/8"	WD1-203-20
3/4"	3/4"	2-3/16"	5-1/4"	WD1-203-24



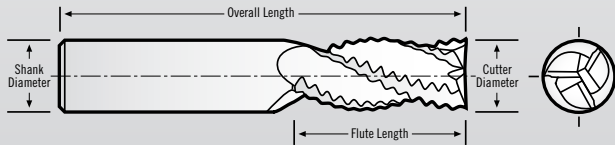
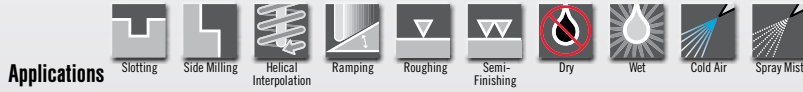
WTL-303 3 Flute Extra Long Solid Carbide Length Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/8"	1"	3"	WTL-303-04
3/16"	3/16"	1-1/8"	3"	WTL-303-06
1/4"	1/4"	1-1/4"	3-1/8"	WTL-303-08
5/16"	5/16"	1-3/8"	3-1/8"	WTL-303-10
3/8"	3/8"	1-1/2"	3-1/2"	WTL-303-12



Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/2"	1/2"	2"	4"	WTL-303-16
5/8"	5/8"	2-1/2"	4-5/8"	WTL-303-20
3/4"	3/4"	3"	5-1/4"	WTL-303-24

Spiral Routers for Rough Cutting **WR**



WRU/WRD Tolerances
 Cutting Dia. = $-.003/-0.007$
 Shank Dia. = $-.0001/-0.0002$
 Flute Length = $+.060/-0.000$
 OAL = $\pm .060$



WRU-301 3 Flute Stub Rougher Solid Carbide Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/2"	1/2"	1-1/2"	3-1/2"	WRU-301-16
5/8"	5/8"	2-3/16"	4-5/8"	WRU-301-20
3/4"	3/4"	2-3/16"	5"	WRU-301-24



WRD-301 3 Flute Stub Rougher Solid Carbide Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/2"	1/2"	1-1/2"	3-1/2"	WRD-301-16
5/8"	5/8"	2-3/16"	4-5/8"	WRD-301-20
3/4"	3/4"	2-3/16"	5"	WRD-301-24



WRU-303 3 Flute Standard Rougher Solid Carbide Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/2"	1/2"	2-3/16"	4"	WRU-303-16
16mm	16mm	55mm	118mm	WRU-303-16mm
5/8"	5/8"	2-1/2"	4-5/8"	WRU-303-20
3/4"	3/4"	2-1/2"	5"	WRU-303-24



WRD-303 3 Flute Standard Rougher Solid Carbide Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/2"	1/2"	2-3/16"	4"	WRD-303-16
16mm	16mm	55mm	118mm	WRD-303-16mm
5/8"	5/8"	2-1/2"	4-5/8"	WRD-303-20
3/4"	3/4"	2-1/2"	5"	WRD-303-24

Another Popular Wood Tool

Page 159



B-333 3 Flute Tuffy Ball End Standard Length

C8 2 Flute Spiral Routers for Signmaking and Engraving

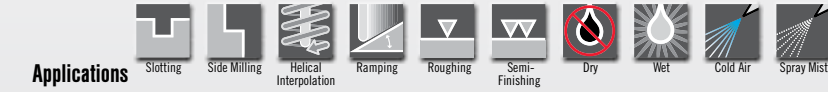
C8 Series



CD8 Series



Characteristics



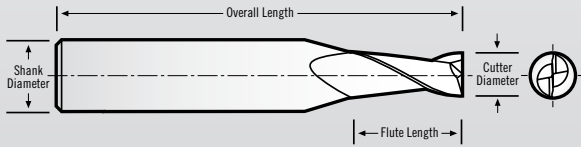
Applications



Materials



Coatings



C8/CD8 Tolerances

Cutting Dia. (1/16" to 1/4") = +.000/-0.002
 (9/32" to 3/4") = +.000/-0.003
 Shank Dia. = -.0001/-0.0002
 Flute Length (1/16" to 5/16") = +.030/-0.000
 (3/8" to 3/4") = +.060/-0.000
 OAL = ±.060

**All Sizes on
1/4"
Shanks
to Fit Router
Collets**

Wood & Plastics



C8-201 2 Flute Stub Length C-2 Grade Carbide End Mill

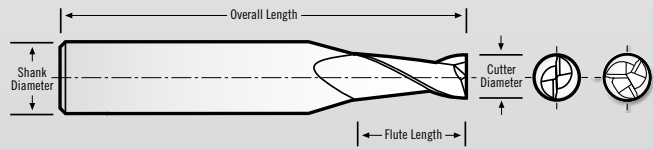
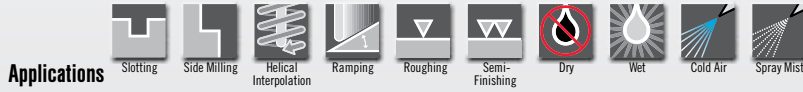
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/4"	1/4"	2"	C8-201-04
3/16"	1/4"	3/8"	2"	C8-201-06
1/4"	1/4"	1/2"	2"	C8-201-08



CD8-201 2 Flute Stub Length Solid Carbide Spiral Router

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/4"	1/4"	2"	CD8-201-04
3/16"	1/4"	3/8"	2"	CD8-201-06
1/4"	1/4"	1/2"	2"	CD8-201-08

2 & 3 Flute Spiral Routers for CNC Production **C8**



C8/CD8 Tolerances

Cutting Dia. (1/16" to 1/4") = +.000/- .002
 (9/32" to 3/4") = +.000/- .003
 Shank Dia. = -.0001/- .0002
 Flute Length (1/16" to 5/16") = +.030/- .000
 (3/8" to 3/4") = +.060/- .000
 OAL = ±.060

Wood & Plastics



C8-203 2 Flute Standard Length C-2 Grade Carbide End Mill

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/4"	1/2"	2-1/2"	C8-203-04
3/16"	1/4"	5/8"	2-1/2"	C8-203-06
1/4"	1/4"	3/4"	2-1/2"	C8-203-08



C8-301 3 Flute Stub Length C-2 Grade Carbide End Mill

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/4"	1/4"	2"	C8-301-04
3/16"	1/4"	3/8"	2"	C8-301-06
1/4"	1/4"	1/2"	2"	C8-301-08



CD8-203 2 Flute Regular Length Solid Carbide Spiral Router

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/4"	1/2"	2-1/2"	CD8-203-04
3/16"	1/4"	5/8"	2-1/2"	CD8-203-06
1/4"	1/4"	3/4"	2-1/2"	CD8-203-08



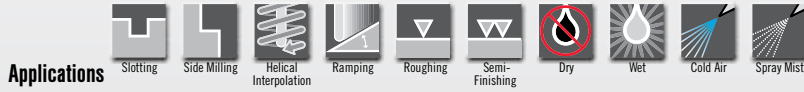
C8-303 3 Flute Standard Length C-2 Grade Carbide End Mill

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/4"	1/2"	2-1/2"	C8-303-04
3/16"	1/4"	5/8"	2-1/2"	C8-303-06
1/4"	1/4"	3/4"	2-1/2"	C8-303-08

HB 2+2 Herringbone Routers



Characteristics



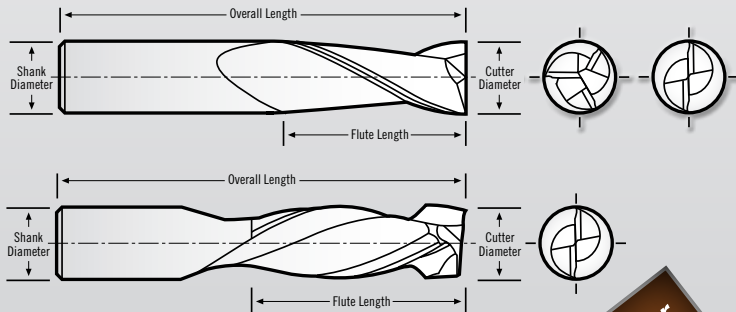
Applications



Materials



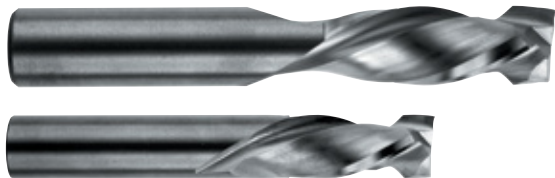
Coatings



HB Tolerances

Cutting Dia. (1/16" to 1/4") = $+0.000/-0.002$
 (9/32" to 3/4") = $+0.000/-0.003$
 Shank Dia. = $-0.0001/-0.0002$
 Flute Length (1/16" to 5/16") = $+0.030/-0.000$
 (3/8" to 3/4") = $+0.060/-0.000$
 OAL = ± 0.060

Short Upshear Length for Thin Materials



HB-401 2+2 Flute Short Tip Herringbone Router

Cutting Diameter	Shank Diameter	Flute Length	Upshear Length	Overall Length	Uncoated
1/4"	1/4"	3/4"	3/16"	2-1/2"	HB-401-08
3/8"	3/8"	1"	1/4"	2-1/2"	HB-401-12
1/2"	1/2"	1-1/8"	1/4"	3"	HB-401-16
5/8"	5/8"	1-5/16"	5/16"	4"	HB-401-20
3/4"	3/4"	1-5/16"	3/8"	4"	HB-401-24



HB-402 2+2 Flute Compression Herringbone Router

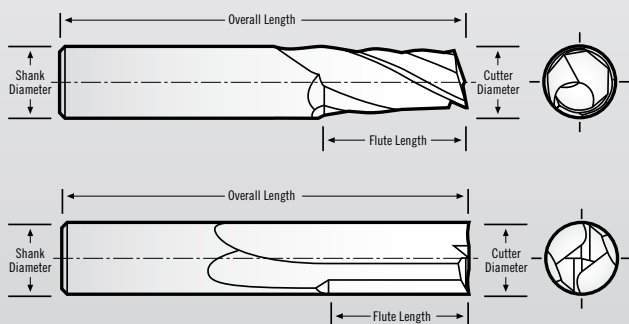
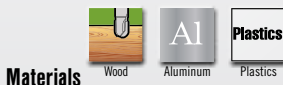
Cutting Diameter	Shank Diameter	Flute Length	Upshear Length	Overall Length	Uncoated
1/4"	1/4"	3/4"	1/2"	2-1/2"	HB-402-08
3/8"	3/8"	1"	5/8"	2-1/2"	HB-402-12
1/2"	1/2"	1-1/8"	9/16"	3"	HB-402-16
5/8"	5/8"	1-5/16"	3/4"	4"	HB-402-20
3/4"	3/4"	1-5/16"	3/4"	4"	HB-402-24



HB-404 2+2 Flute Long Length Compression Herringbone Router

Cutting Diameter	Shank Diameter	Flute Length	Upshear Length	Overall Length	Uncoated
1/2"	1/2"	1-5/16"	3/4"	3-1/2"	HB-404-16

Tuffy Grade Carbide Router Bits PM/MPM/GTS



PM/PMD Series Tolerances
 Cutting Dia. = +0.000/-0.002
 Shank Dia. = -0.0001/-0.0002
 Flute Length = +0.060/-0.000
 OAL = ±0.060

MPM Tolerances
 Cutting Dia. = +.000/-0.075mm
 Shank Dia. = -.002/-0.005mm
 Flute Length = +1/2"/+1.500mm
 OAL = ±10mm

GTS Series Tolerances
 Cutting Dia. = +.000/-0.002
 Shank Dia. = -.0001/-0.0002
 Flute Length = +.060/-0.000
 OAL = ±0.060



Wood & Plastics



PM 1 Flute Upshear Polished Flute Carbide Router

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/8"	1/2"	2"	PM-104-04
1/8"	1/4"	1/2"	2"	PM-108-04
3/16"	3/16"	5/8"	2"	PM-106-06
3/16"	1/4"	5/8"	2"	PM-108-06
3/16"	1/4"	1-1/4"	3"	PM-108-06L
1/4"	1/4"	3/4"	2"	PM-108-08
1/4"	1/4"	1-1/2"	3"	PM-108-08L
3/8"	3/8"	1-1/4"	3"	PM-112-12
1/2"	1/2"	1-1/2"	4"	PM-116-16



PMD 1 Flute Downshear Polished Flute Carbide Router

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/4"	1/2"	2"	PMD-108-04
3/16"	1/4"	5/8"	2"	PMD-108-06
1/4"	1/4"	3/4"	2"	PMD-108-08



Best Used in Plastics



GTS 2 Flute Tuffy Grade Straight Flute Router

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
1/8"	1/4"	1/2"	2"	GTS-201-04
1/4"	1/4"	3/4"	2-1/2"	GTS-201-08
3/8"	3/8"	7/8"	2-1/2"	GTS-201-12
1/2"	1/2"	1"	3"	GTS-201-16



MPM 1 Flute Upshear Tuffy Grade Carbide Router Polished Flute

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Uncoated
4mm	4mm	12mm	50mm	MPM-104-04
4mm	6mm	12mm	50mm	MPM-106-04
5mm	6mm	14mm	50mm	MPM-106-05
6mm	6mm	14mm	57mm	MPM-106-06
8mm	8mm	22mm	63mm	MPM-108-08
10mm	10mm	25mm	72mm	MPM-110-10
12mm	12mm	25mm	83mm	MPM-112-12



Characteristics

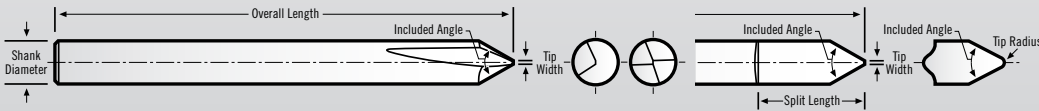
1 Flute 2 Flute

Applications

Slotting Side Milling Semi-Finishing Finishing Dry Wet Cold Air Spray Mist

Materials

Wood Aluminum (Al) Copper (Cu) Titanium (Ti) Magnesium (Mg) Cast Iron Steel Stainless Steel SUPER Alloys Plastics Composites 40 HRC Hardness BRASS



ET2 Plunge Tip for Drill and Engrave Engraving Tool

Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Uncoated
.010"	1/4"	60°	—	2	ET2-01060
.020"	1/4"	60°	—	2	ET2-02060
.010"	1/4"	90°	—	2	ET2-01090
.020"	1/4"	90°	—	2	ET2-02090

NOTE: Two flute tool serves as a multipurpose tool, which can be used for engraving, chamfering, spot-drilling and countersinking.



ET3 Ball Tip Engraving Tool

Tip Radius	Shank Diameter	Included Angle	Split Length	Overall Length	Uncoated
.005"	1/4"	30°	.650"	2"	ET3-00530
.010"	1/4"	30°	.650"	2"	ET3-01030
.020"	1/4"	30°	.650"	2"	ET3-02030
.030"	1/4"	30°	.650"	2"	ET3-03030
.005"	1/4"	60°	.650"	2"	ET3-00560
.010"	1/4"	60°	.650"	2"	ET3-01060
.020"	1/4"	60°	.650"	2"	ET3-02060
.030"	1/4"	60°	.650"	2"	ET3-03060

NOTE: Ball shaped radius on the tip, excellent results for high speed engraving and 3D engraving applications



ET4 Standard Engraving Tool for Most Applications

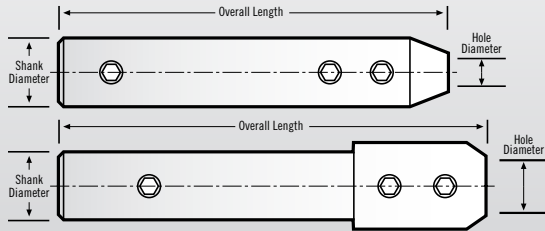
Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Uncoated
.010"	1/4"	60°	.650"	2"	ET4-01060
.020"	1/4"	60°	.650"	2"	ET4-02060
.030"	1/4"	60°	.650"	2"	ET4-03060
.050"	1/4"	60°	.650"	2"	ET4-05060
.060"	1/4"	60°	.650"	2"	ET4-06060
.010"	1/4"	90°	.650"	2"	ET4-01090
.020"	1/4"	90°	.650"	2"	ET4-02090
.030"	1/4"	90°	.650"	2"	ET4-03090
.050"	1/4"	90°	.650"	2"	ET4-05090
.060"	1/4"	90°	.650"	2"	ET4-06090

NOTE: Utilized in a wide variety of machines, including top loading engraving machines, CNC milling machines and industrial engraving marking systems.

ET SPEEDS & FEEDS

Material	5000 RPM	7500 RPM	10,000 RPM
	in/min	in/min	in/min
NON-FERROUS METALS			
Aluminum/Aluminum Alloys	10 ipm	15 ipm	20 ipm
Brass/Bronze	10 ipm	15 ipm	20 ipm
Copper/Copper Alloys	10 ipm	15 ipm	20 ipm
Magnesium	10 ipm	15 ipm	20 ipm
COMPOSITES			
G10 Fiberglass	15 ipm	22.5 ipm	30 ipm
Graphite	15 ipm	22.5 ipm	30 ipm
Carbon Fiber	15 ipm	22.5 ipm	30 ipm
Plastics	15 ipm	22.5 ipm	30 ipm
FERROUS METALS			
Cast Iron	5 ipm	7.5 ipm	10 ipm
Steel, Low Carbon	5 ipm	7.5 ipm	10 ipm
Steel, Medium Carbon	7.5 ipm	11.25 ipm	15 ipm
Steel, Hardened	2.5 ipm	3.75 ipm	5 ipm
Stainless Steel, Soft	5 ipm	7.5 ipm	10 ipm
Stainless Steel, Hard	2.5 ipm	3.75 ipm	5 ipm
Inconel	4 ipm	6 ipm	8 ipm
Titanium, Soft	5 ipm	7.5 ipm	10 ipm
Titanium, Hard	2.5 ipm	3.75 ipm	5 ipm

Accuhold End Mill Extension Holder **ACH/MAH**



ACH Tolerances

Hole Dia. = $+0.0015/-0.0000$
 Shank Dia. = $-0.0001/-0.0003$
 OAL = ± 0.060

MAH Tolerances

Hole Dia. = $+0.004/-0.000$ mm
 Shank Dia. = $+0.000/-0.007$ mm
 OAL = ± 1.5 mm

NEW!



ACH Accuhold End Mill Ultra Precision Extension Holder

Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3/32"	3/8"	2-1/8"	5-40	ACH-03
1/8"	3/8"	3-1/4"	8-32	ACH-04
1/8"	3/8"	6"	8-32	ACH-04-L
5/32"	1/2"	3-1/2"	8-32	ACH-05
3/16"	1/2"	3-1/2"	8-32	ACH-06
3/16"	1/2"	5"	8-32	ACH-06-L
1/4"	5/8"	4-1/4"	10-32	ACH-08
1/4"	5/8"	6"	10-32	ACH-08-L
5/16"	3/4"	4-1/2"	1/4-28	ACH-10
3/8"	3/4"	4-1/2"	5/16-24	ACH-12
3/8"	3/4"	6"	5/16-24	ACH-12-L
7/16"	3/4"	4-1/2"	5/16-24	ACH-14
1/2"	3/4"	4-3/4"	3/8-24	ACH-16*
1/2"	1"	4-3/4"	3/8-24	ACH-16L
1/2"	1"	6"	3/8-24	ACH-16-32-L
9/16"	1"	5-1/4"	3/8-24	ACH-18
5/8"	1"	5-1/2"	3/8-24	ACH-20
3/4"	1"	5-1/4"	7/16-20	ACH-24**
3/4"	1-1/4"	6"	7/16-20	ACH-24-1.25
1"	1"	5-1/2"	7/16-20	ACH-32**

* 1" Diameter x 1.5" Long Head

**ACH-24 & ACH-32 have a 1-1/4" diameter x 2-1/4" long head and hole depth of only 2" deep

Metric End Mill Extension Holder with Inch Shank.

Use this precision end mill extension holder to convert your inch tool holder to be able to hold onto metric shanks. This is the tightest tolerance end mill extension used to reach into parts that need longer length. Precision end mills need precision holders to eliminate runout (TIR) and reduce tool breakage. Convert your inch tool holder to metric sizes.



METRIC



MAH Precision Extension Holder for Metric Size End Mill

Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3mm	10mm	82.5mm		MAH-03
4mm	12mm	110mm		MAH-04
5mm	12mm	110mm		MAH-05
6mm	16mm	125mm		MAH-06
8mm	20mm	135mm		MAH-08
10mm	20mm	135mm		MAH-10
12mm	25mm	150mm		MAH-12*

* 1" Diameter x 1.5" Long Head



ACH-M Metric to Inch End Mill Ultra Precision Extension Holder

Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3mm	3/8"	3.25	6-32	ACH-M3
4mm	1/2"	3-1/2"	8-32	ACH-M4
5mm	1/2"	3-1/2"	10-32	ACH-M5
6mm	5/8"	4-1/4"	10-32	ACH-M6
7mm	5/8"	4-1/4"	10-32	ACH-M7
8mm	3/4"	4-1/2"	1/4-28	ACH-M8
9mm	3/4"	4-1/2"	5/16-24	ACH-M9
10mm	3/4"	4-1/2"	5/16-24	ACH-M10
11mm	3/4"	4-1/2"	5/16-24	ACH-M11
12mm	3/4"	4-3/4"	3/8-24	ACH-M12*
12mm	1"	4-3/4"	3/8-24	ACH-M12-1
13mm	1"	4-3/4"	3/8-24	ACH-M13
14mm	1"	5-1/2"	3/8-24	ACH-M14
15mm	1"	5-1/2"	3/8-24	ACH-M15
16mm	1"	5-1/2"	3/8-24	ACH-M16
18mm	1"	5-1/4"	7/16-20	ACH-M18**
20mm	1"	6"	7/16-20	ACH-M20-1
20mm	1-1/4"	6"	7/16-20	ACH-M20
25mm	1"	6-1/2"	7/16-20	ACH-M25**

*ACH-M12 has a 1" diameter x 1.5" long head

**ACH-M18 & ACH-M25 have a 1-1/4" diameter x 2-1/4" long head and hole depth of only 2" deep

SPEEDS & FEEDS

WOOD SERIES SPEEDS & FEEDS

Material	RPM (1/4")	Feed Inches/Minute
Wood		
Hardwoods	18,000	180–250
Softwoods	18,000	180–250
MDF	18,000	150–250
Laminated Materials	18,000	150–250

General Guidelines

- Select the shortest flute length possible for the application. Shorter flute length router tools offer better stability and increased feed rates.
- Select the largest diameter tool for the job. Increasing diameter by 10% provides 25% more strength.

- Adjust RPM and feed rate to reduce vibration. Vibration will cause poor finish and chip tools. Too slow a feed rate can also cause vibration and poor tool life.
- Regular cleaning of tool holders and collets help ensure the tool's performance and life.
- Securing the part as rigidly as possible will improve finishes and tool life.

Material	RPM (1/4")	Feed Inches/Minute
Plastics, Others		
Solid Surface	15,300	70–130
Fiberglass	15,300	80–150
Phenolic	15,300	80–150
Aluminum (Soft)	18,000	90–120
Aluminum (Aircraft Grade)	18,000	180–230
Copper	9,200	45–60
Foam	18,000	150–300
Plastics (Soft)	18,000	180–250
Plastics (Hard)	18,000	150–200

Wood Tools in Other Sections

MINIATURES

(See Miniatures Applications)



132

SAWS

(See Saws Applications)



170

S1 / MS1 301

2, 3 and 4 Flute



66

A1 / MA1 201

(See Aluminum Applications)



28

C1 201/301

2 & 3 Flute on 1/4" Shank
(See Multiple Applications)



68

SB / B 201/203 MSB / MB 201/203

2 Flute Ball End
(See Multiple Applications)



156

PCD 203 Routers

2 Flute PCD Diamond
(See Composites)



109

PM / MPM / PMD Routers

Single Flute

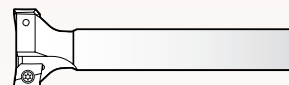


112

AIC / INS FaceMills

NEW!

Insertable Face Mill
and Polished Inserts



72

DON'T SEE WHAT YOU NEED?

RobbJack manufactures a wide variety of end mills in addition to those listed in our catalog. We can make tools for your specific needs by modifying standard tools or through custom manufacture. We can work directly from your prints to design and build the exact tool for your requirements. Contact us if you need:

- **Special Cutting and/or Shank Diameters**
- **Special Cutting Length and/or Overall Lengths**
- **Corner Radii, Full Ball or Corner Chamfer Configurations**
- **Chip Breakers or Roughing Cutters**
- **Special Tolerances**
- **Tapered End Mills, Constant Helix or Constant Lead.**
- **Special Coatings Available.**

To get a quote or more information about a custom tool, fax or call us with your specifications and any other pertinent information (photocopy the form below). If you are not sure of the best configuration for your application, we will be glad to help you.

Remember, to obtain the best performance in all end mill applications:

- Use the largest diameter possible.
- Use the shortest flute length possible.
- Use the correct number of flutes for your application.
- Use recommended speed and feed rates.

Copy this form and fax it to us at
(916) 645-0146 or (916) 645-1668
or email: quotes@robbjack.com

OR.. scan this code!



RobbJack Custom End Mill Request for Quote/Information

Description of Application:

Order Quantity:

Cutting Diameter:

Tolerance:

Cutting Length:

Shank Diameter:

Overall Length:

Number of Flutes:

Special Configurations (Radii, Chamfers, Set Screw Flats, Chip Breakers, Coatings, etc.):

For Tapered Tools:

Major Diameter:

Tip Diameter:

Per Side/Included Angle:

Tolerance:

End Configuration (Full Ball, Corner Radii, Square End):

(Note: RobbJack recommends 3 flutes for all tapered applications)



Questions?

Call us:

at (916) 645-6045
or (800) 527-8883

Fax us:

at (916) 645-0146
or (916) 645-1668

Visit us:

at www.robbjack.com

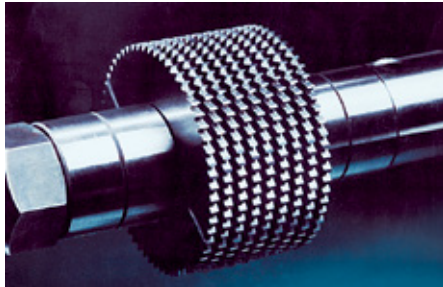
Email us:

quotes@robbjack.com



SPECIAL SAWS TO MEET YOUR SPECIFIC NEEDS

In addition to the broad line of standard saws listed in this catalog, RobbJack is capable of manufacturing a wide variety of special saws. If our standard offerings do not meet your needs, call or fax your specifications to us for quotation. Contact us if you need:



- **Special Cutting Diameters**
- **Special Thicknesses**
- **Special Arbor Hole Sizes and Keyways**
- **Special Chamfers, Angles or Radii**
- **Special Tooth Configurations and Pitches**
- **Special Coatings Available.**
- **Gang Saws** – If your requirements call for the use of more than one saw at a time, contact us for a complete, ready-to-use package, including saws, arbors and spacers. We are experts in ganging saws, which generally require flat and parallel hubs, made to your exacting specifications.

**Copy this form and fax it to us at
(916) 645-0146 or (916) 645-1668
or email: quotes@robbjack.com**

We are frequently able to combine saws and spacers into an integral saw with offset hub, which reduces tolerances buildup by one-half.

Many of these features can be achieved by modifying standard saws. Others require that we start from scratch. We will work directly from your prints or help you design

the saws you need from the following information. Simply photocopy the bottom of this page, fill it out and fax it to us along with any other pertinent data. And remember, to obtain the best performance in all saw applications:

- Use the smallest diameter and the greatest thickness possible.
- Choose the number of teeth (tooth count) to meet your specific application (if you are not sure of the best configuration for your application, call us and we'll advise you).
- Ask for feed and speed recommendations to get started right.

RobbJack Custom Saw Request for Quote/Information

Outside Diameter: _____

Saw Thickness: _____

Inside Diameter: _____

Number of Teeth: _____

Keyway on I.D.: _____

For Gang Use: _____

Special Configurations (such as Chamfers, Angles, Radii or Forms): _____

Order Quantity: _____

RJ RobbJack
CORPORATION

Questions?

Call us:
at (916) 645-6045
or (800) 527-8883

Fax us:
at (916) 645-0146
or (916) 645-1668

Visit us:
at www.robbjack.com

Email us:
quotes@robbjack.com



