RobbJack
CORPORATION

SOLID CARBIDE END MILLS, SLITTING SAWS, PCD TOOLS

RobbJack Corporation — Lincoln, California USA

APPLICATIONSGUIDE**2022**

Aluminum

Titanium, Steel & High-Temp Alloys

Composites & Plastics

Die/Mold & Hardened Materials

Miniatures

Multiple Applications

Saws

Wood

WE PROVIDE INCREDIBLY EFFECTIVE SOLUTIONS FOR THE MANUFACTURING INDUSTRY

MADE IN THE USA

CATALOG 10–21

RobbJack CORPORATION

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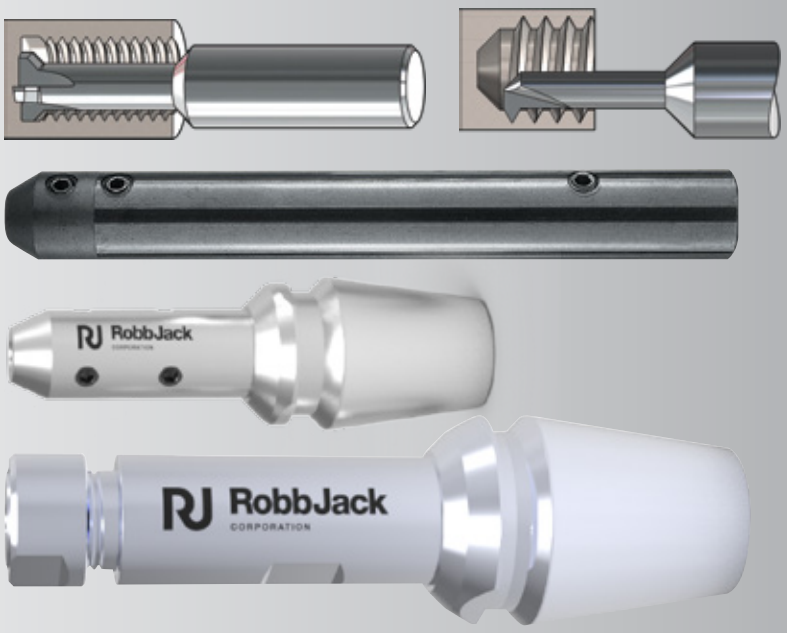

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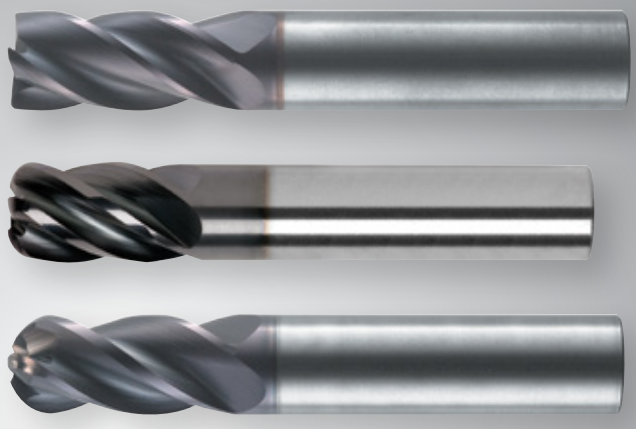

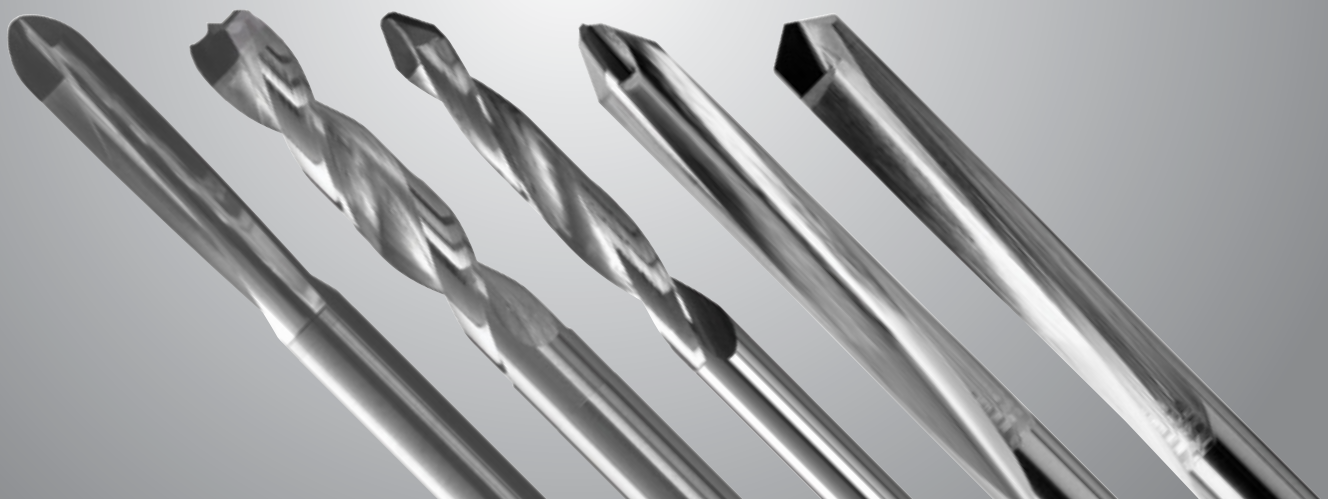

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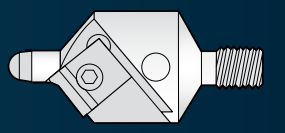
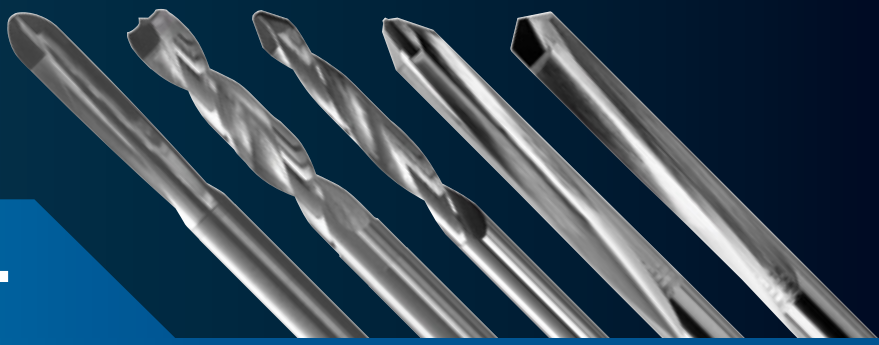
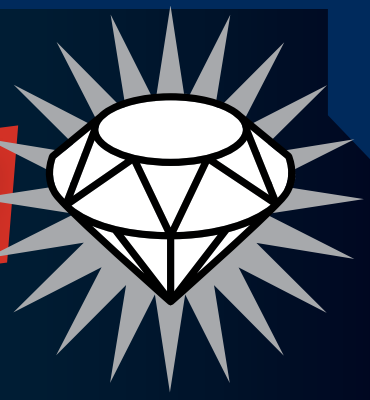
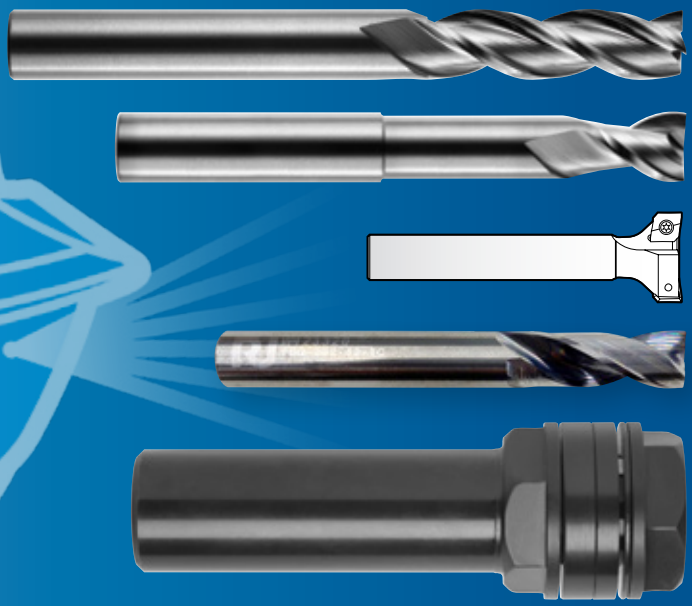




NEW!



THRU-COOLANT



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Alphabetical Tool Listing

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

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END MILL General Speeds & Feeds/Formulas

Material	SFM *Surface Feet/Minute*	SMM *Surface Meters/Minute*	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			
See Die/Mold section			
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	=	$\frac{\text{Surface Feet per Minute x 3.82}}{\text{Tool Diameter}}$
Feedrate (in/min.)	=	RPM × Chip Load per Tooth × Number of Flutes
in³/min	=	Width x Depth × Inches per Minute
Horsepower	=	1.341 × kW
kW	=	.7457 × Horsepower
METRIC SIZES		
Surface Meters per Minute	=	RPM x .00314 × Tool Diameter
RPM	=	$\frac{\text{Surface Meters per Minute x 318.057}}{\text{Tool Diameter}}$
Feedrate (mm/min.)	=	RPM × Chip Load per Tooth × Number of Flutes
cm³/min	=	$\frac{\text{Width (mm) Depth (mm) Feedrate (mm/min)}}{1000}$
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 × 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 recommedned 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

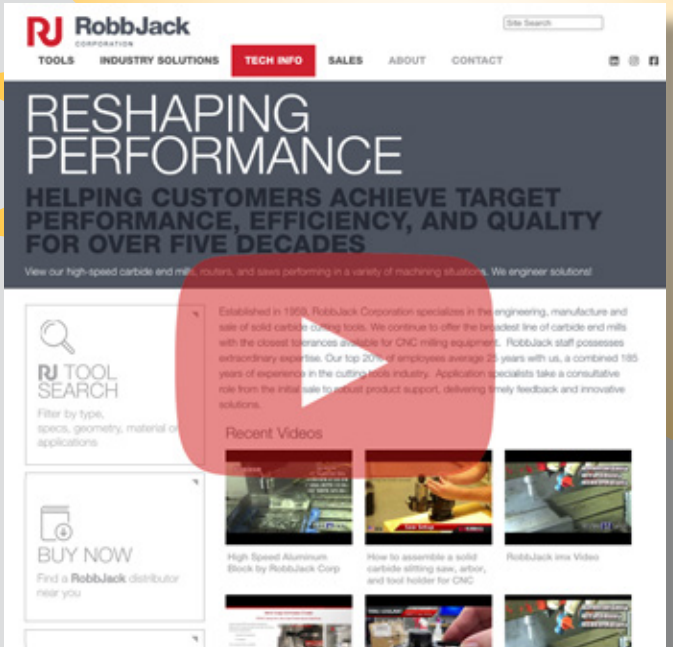
When using FBD-202 (5x) use FBD-201(2x) to start the hole to reduce walking.

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



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 × 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 × 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 × 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 × 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

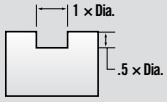
Tool Dia.	Typical Z-Depth	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
		RPM	CLPT	RPM	CLPT	RPM	CLPT	RPM	CLPT
6mm	4mm	Max	0.096mm	Max	0.084mm	Max	0.096mm	Max	0.096mm
8mm	4mm	Max	0.128mm	Max	0.112mm	Max	0.128mm	Max	0.128mm
10mm	5mm	Max	0.16mm	Max	0.14mm	Max	0.16mm	Max	0.16mm
12mm	5mm	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

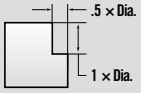
NS SERIES SPEEDS & FEEDS

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

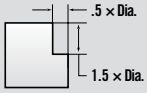
Material	Surface Feet	1/4"		5/16"		3/8"		1/2"		5/8"		3/4"		1"	
		RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min
STAINLESS STEEL															
303	550	8404	31	6723	38	5603	43	4202	48	3362	43	2801	38	2101	34
304	400	6112	17	4890	22	4075	24	3056	27	2445	24	2037	22	1528	19
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

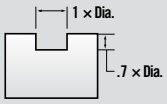
MXG-402 SPEEDS & FEEDS METRIC

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



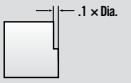
Slotting



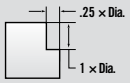
XG-502 AND XF SERIES SPEEDS & FEEDS

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

	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		
Tool Diam.	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	Inch per Revolution*
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 recommedned 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

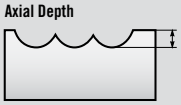
- Special diameters and lengths are available on a make-to-order basis.
- Air or mist coolant on materials greater than 40 HRc.

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

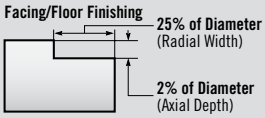
TM SERIES SPEEDS & FEEDS (Semi-Finishing & Finishing)

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"	9,000–10400	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)

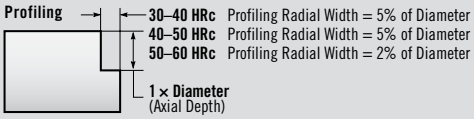
Additional Notes

- 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.



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.



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

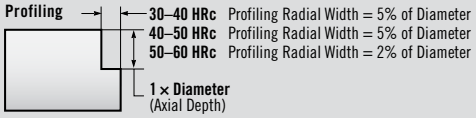
Tool Number	Cutter Diameter	Steels 30–40 HRc		Steels 40–50 HRc		Steels 50–60 HRc	
		RPM	CLPT	RPM	CLPT	RPM	CLPT
HM-402-04	1/8"	17,000–20,000	0.0008–0.001	13,000–17,000	0.0007–0.0009	8,000–13,000	0.0006–0.0008
HM-402-06	3/16"	12,000–14,000	0.0011–0.0015	9,000–12,000	0.0010–0.0014	5,300–9,000	0.0009–0.0012
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

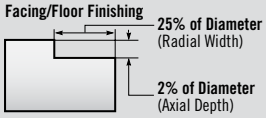
Additional Notes

- 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.

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.

Speeds & Feeds

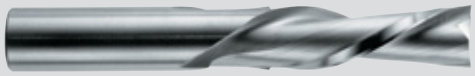
SAWS

Material	Max Axial Depth/Pass (Times Thickness)	Teeth	Inch: SFM Surface Feet/Minute	Inch: Chip Load per Tooth – Standard, Saw Thickness .002"-.031"	Inch: Chip Load per Tooth – Standard, Saw Thickness .031"-.100"	Inch: Chip Load per Tooth – Standard, Saw Thickness >.100"	Metric: SMM Surface Meters/Minute	Metric: Chip Load per Tooth – Metric, Saw Thickness .05mm-1.0mm	Metric: Chip Load per Tooth – Metric, Saw Thickness 1.0mm-3.0mm	Metric: Chip Load per Tooth – Metric, 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

RJ TOOL SEARCH

Filter by type, specs, geometry, material or applications

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

2

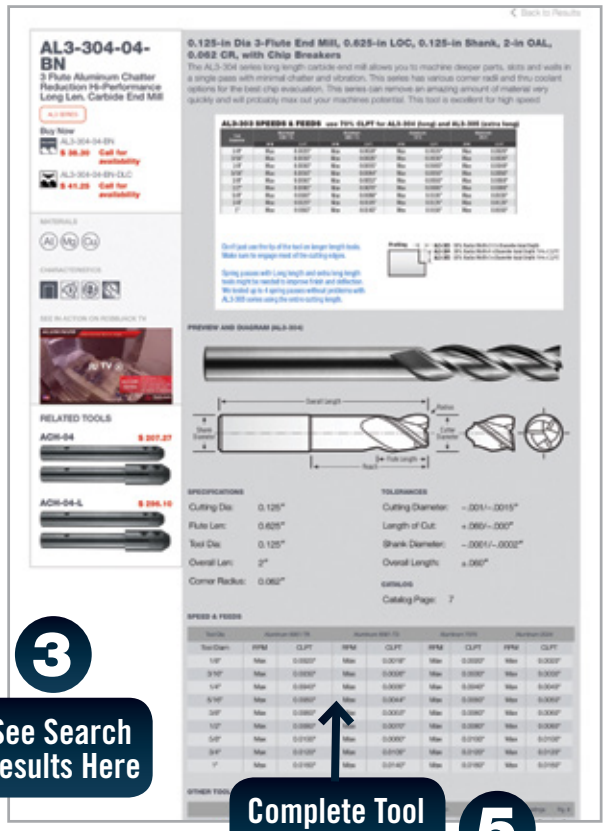
Make your selections here

4

Click on a Tool Number

3

See Search Results Here



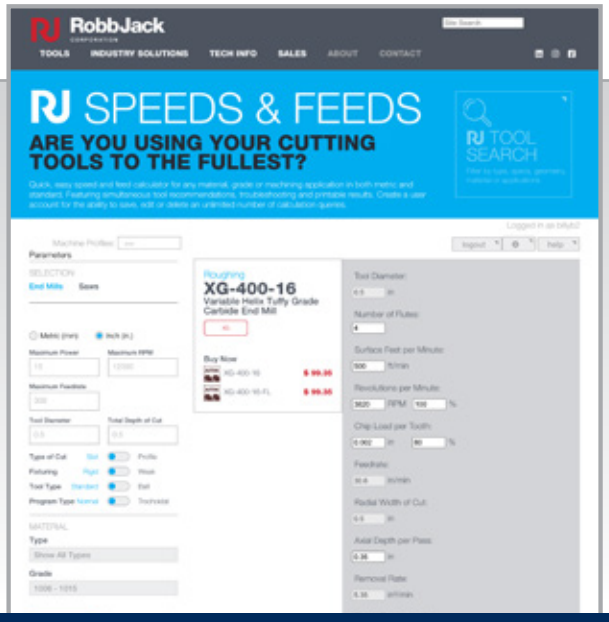
Complete Tool Description

5

Now Online!

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

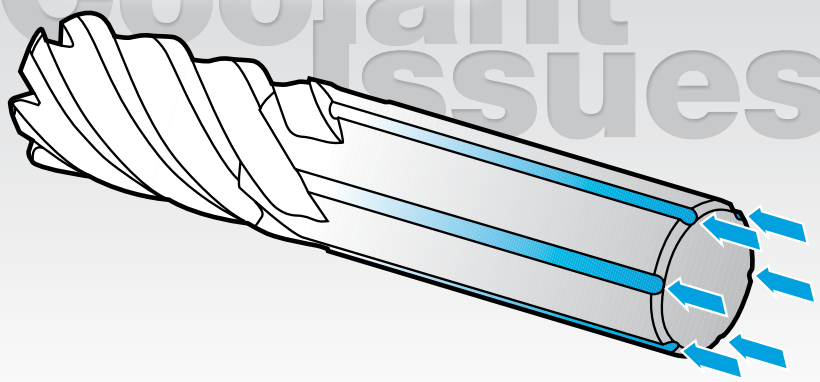
- **Quick, easy calculations, both metric and standard**
- **End mill speeds and feeds**
- **Slitting saw speeds and feeds**
- **Troubleshooting**
- **Printable results**
- **Simultaneous tool recommendations**



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.*

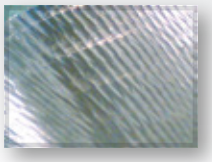
Example:
An A1-201-12 with coolant grooves is Part Number:

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

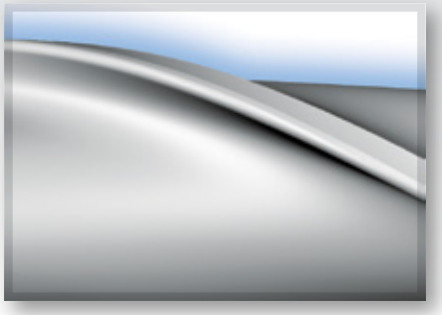
Our patented Mirror Edge geometry helps to eliminate chatter. This geometry can be used in any application where chatter is a problem, usually for thin walls, valves, deep pockets or where the tool sticks out more than 3:1 length to diameter ratio.

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.*

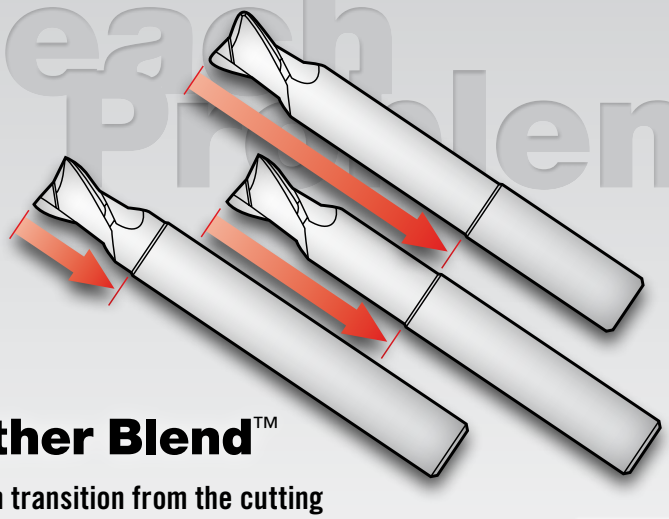
Example:
An XG-402-16 with a T-Process is Part Number:

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

Tools with coatings or other modifications are non returnable.

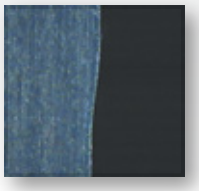
End Mill Modifications

Reach Problems?

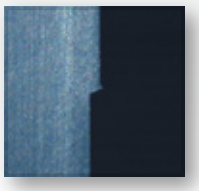


Feather Blend™

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

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.

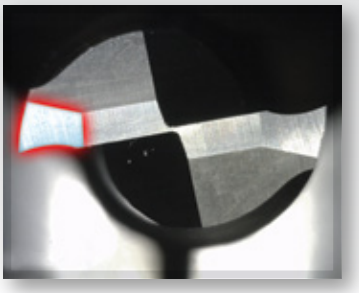
Example:
An A1-201-12 necked with 1.0" Reach is Part Number:

▶ **A1-201-12-N 1.0"**
See price sheet for pricing

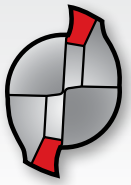
A tool necked with Feather Blend has a reduction in the tool diameter after the cutting length so the tool can cut deeper than its cutting length. It features a smooth transition from the cutting diameter to the neck diameter. Feather Blend reduces staircase marks and stress risers in parts and helps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

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.

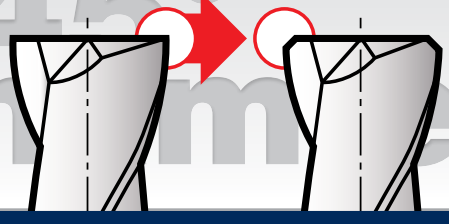
To order a RobbJack tool with a **Wiper Flats**, use the existing standard *Part Number*, and add *-WF.*

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

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

45° Chamfer

45° Chamfer?



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

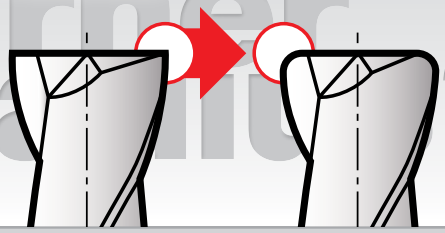
Example:
A1-201-12 with a .040" 45° chamfer is Part Number:

▶ **A1-201-12-CH .040"**
See price sheet for pricing

Tools with coatings or other modifications are non returnable.

End Mill Modifications

Corner Radius



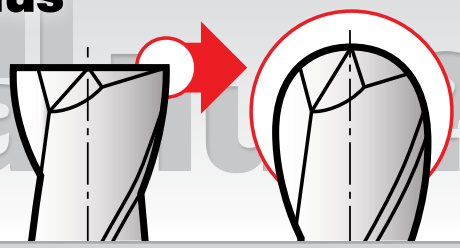
To order a RobbJack tool with a **Corner Radius**, use the existing standard *Part Number*, add *-CR* and desired *Radius Size.*

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.

End Mill 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 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 toolwith 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 with coatings or other modifications are non returnable.

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...

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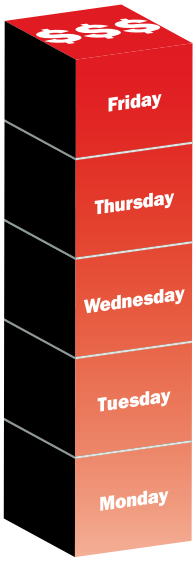
Featured Tools:

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

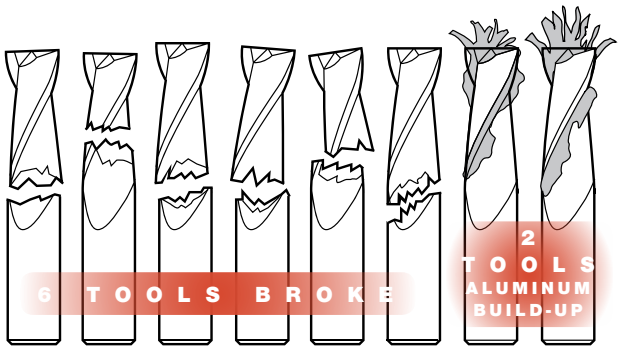
"I just wish we tried this tool sooner! It is truly amazing!"

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

A1-303/AL3

Page 22

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.*

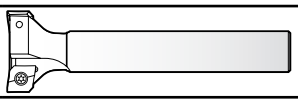
VS.

1 RJ A1-303 Tool

MAX RPM!
MAX Feed Rate!
No Chatter!

A1-303 Series:
Polished & Mirror Edge!

Aluminum Application TOOLS

AL3 303/304/305	NEW!	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	NEW!	2 & 3 Flute High Velocity Chatter Reduction with Reach and Radii for High Horse-Power Short, Medium, Long, and Extra-Long length	 32
MFMHV METRIC 201-205/301-305	NEW!	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 METRIC 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	NEW!	Insertable Face Mill and Polished Inserts	 72
FBD 201/202	NEW!	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

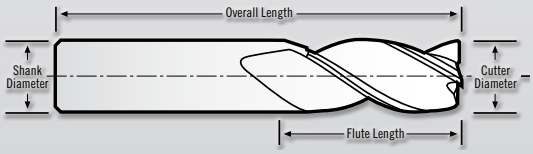
Applications: Slotting, Side Milling, Helical Interpolation, Ramping, High Performance, Roughing, Semi-Finishing, Finishing, Wet

Materials: Aluminum, Copper, Magnesium, Brass

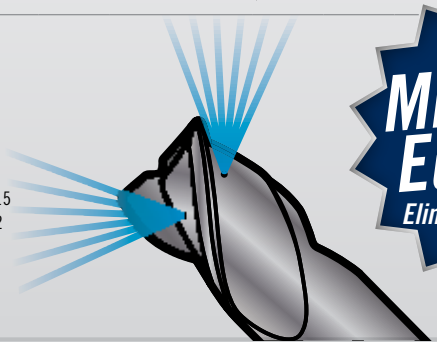
Coatings: Diamond-Like Carbon (DLC)

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/–.0015
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = +/– .060



3 NEW!

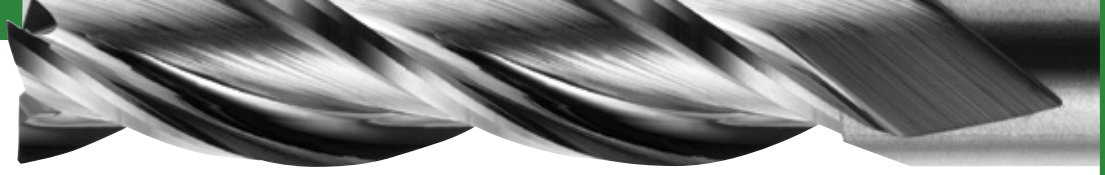
AL3 3 Flute

	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"	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"	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"	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!



AL3 3 Flute – continued

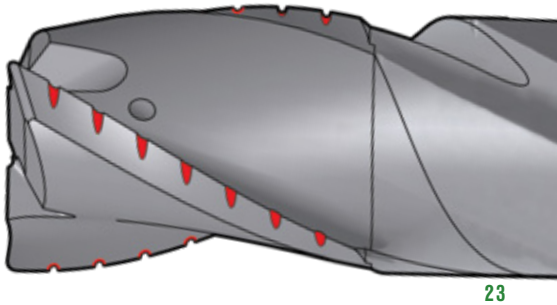
	Cutting Diam.	Shank Diam.	Flute Length	Corner radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
EXTRA LONG	3/16"	3/16"	1"	Sharp Corner	2-1/2"	AL3-305-06	AL3-305-06-DLC	AL3-305-06-TC*	AL3-305-06-TC-DLC*	3/16" DIAMETER
	3/16"	3/16"	1"	0.01"	2-1/2"	AL3-305-06-010	AL3-305-06-010-DLC	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"	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"	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"	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!



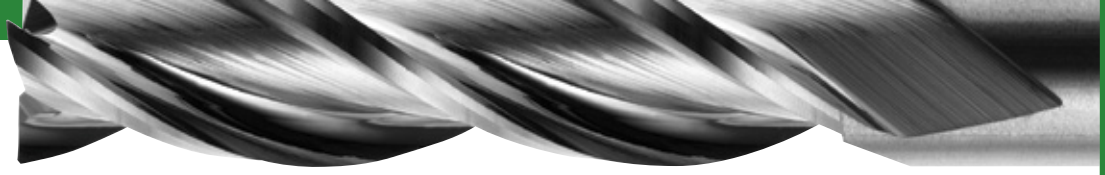
AL3 3 Flute High Performance Aluminum Carbide End Mill

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"	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"	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"	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!



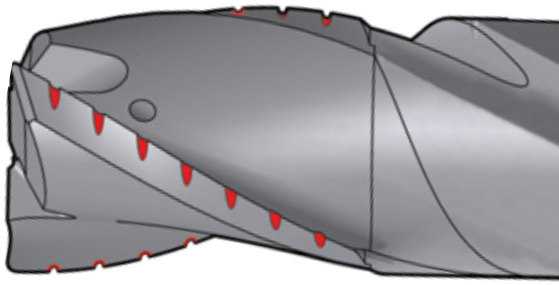
AL3 3 Flute – continued

	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!



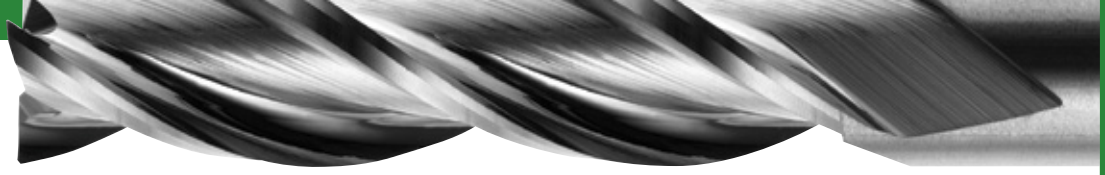
AL3 3 Flute High Performance Aluminum Carbide End Mill

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"	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"	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"	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!



AL3 3 Flute – continued

EXTRA LONG

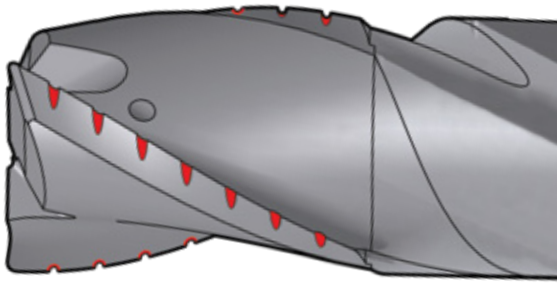
Cutting Diam.	Shank Diam.	Flute Length	Corner radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated
1"	1"	5"	Sharp Corner	8"	AL3-305-32	AL3-305-32-DLC	AL3-305-32-TC	AL3-305-32-TC-DLC
1"	1"	5"	0.01"	8"	AL3-305-32-010	AL3-305-32-010-DLC	AL3-305-32-010-TC	AL3-305-32-010-TC-DLC
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

1" DIAMETER

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

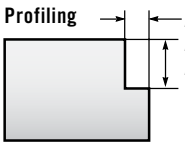
Chip Breakers

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

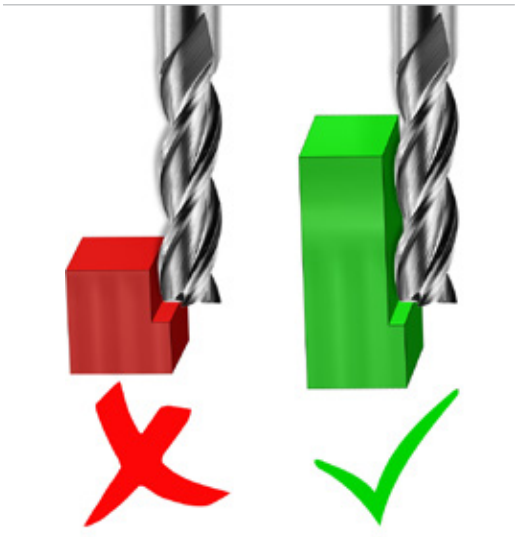


AL3-303 SPEEDS & FEEDS

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



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.

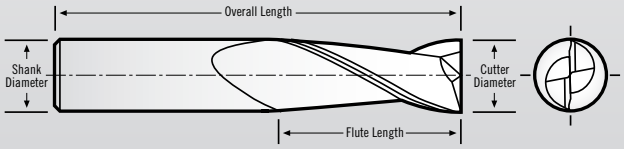
A1/MA1 2 Flute High Performance Tools for Aluminum

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/–.0015
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = +/– .060

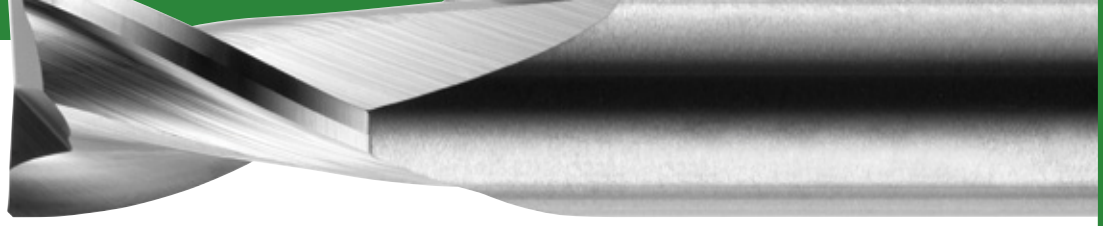
MA1 Series Tolerances:
Cutting Dia. = –0.018/–0.038mm
Shank Dia. = –0.002/–0.005mm
Flute Length (<10D) = +0.75/–0.000mm
(>10D) = +1.5/–0.000mm
OAL = +/–10mm

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 × 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

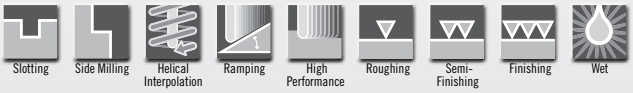
Axial depth of cut up to 1 × diameter of the tool up to a full slot

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

A1/MA1 3 Flute High Performance Tools for Aluminum

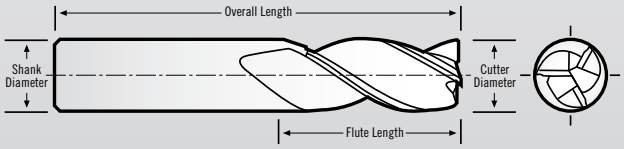
Characteristics

Applications



Materials

Coatings



A1 Series Tolerances:
Cutting Dia. = –.0007/–.0015
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = +/– .060

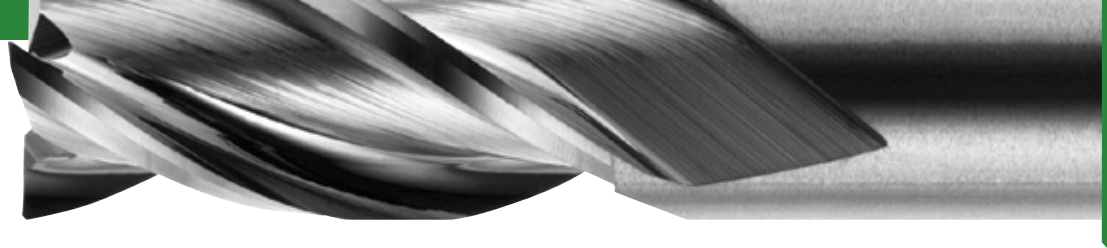
MA1 Series Tolerances:
Cutting Dia. = –0.018/–0.038mm
Shank Dia. = –0.002/–0.005mm
Flute Length (<10D) = +0.750/–0.000mm
(>10D) = +1.500/–0.000mm
OAL = +/–10mm

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 × 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 × diameter of the tool with 50% radial step over.

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

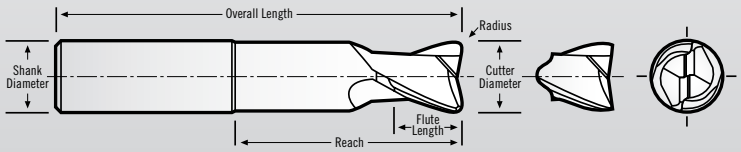
FMHV 2 Flute Ultra-High Velocity Tools for Aluminum

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! h4 Shank Tolerance up to 150% more gripping force **Tightest in the Industry!**

NEXT GENERATION Mirror Edge! Eliminates Chatter & Vibration

FMHV Series Tolerances:
Cutting Dia. = –.001/–.0015
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = +/– .060

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"	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"	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"	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"	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	

Other Reach Lengths available upon request.

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

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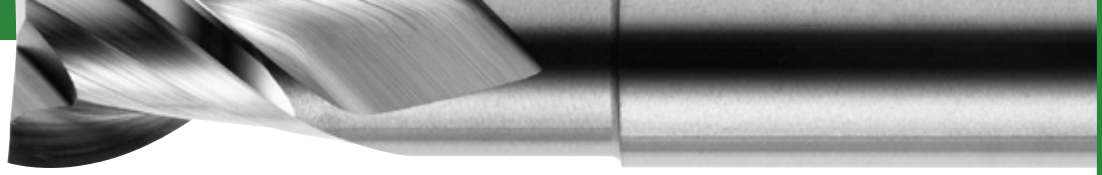

FMHV 2 Flute (Short to Long Reach)

	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.

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FMHV 2 Flute Ultra-High Velocity Tools for Aluminum

FMHV 2 Flute (Short to Long Reach)

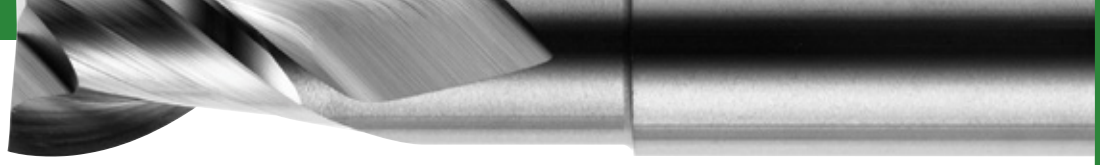
	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
MEDIUM	5/8"	5/8"	7/8"	Sq. End	2-1/16"	4"	FMHV-202-20	FMHV-202-20-DLC	FMHV-202-20-TC	FMHV-202-20-DLC-TC	5/8" DIAMETER
	5/8"	5/8"	7/8"	0.03"	2-1/16"	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"	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"	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	
	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	
MEDIUM	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	
	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"	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	
LONG	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	
	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"	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	
EXTRA LONG	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	
	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"	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	

*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—

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"	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:

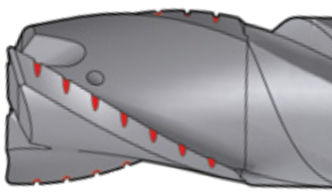
Diameter	Chip load per tooth	Typical Depth	Recommended RPM	Type of cut
1" Diameter	.008-.015	.300 up to .750	Max Tap Tested RPM Or Max RPM	Slot or profile (stay away from 50% radial step-over)
3/4" Diameter	.006-.012	.200 up to .900		
5/8" Diameter	.005-.011	.100 up to .750		
1/2" Diameter	.004-.010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

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



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!

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

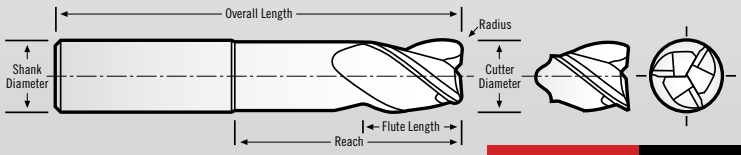
Applications: Slotting, Side Milling, Helical Interpolation, Ramping, High Performance, Roughing, Semi-Finishing, Finishing, Wet

Materials: Aluminum, Copper, Magnesium, Brass

Coatings: Diamond-Like Carbon (DLC)

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/–.0015
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.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"	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"	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"	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	

**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—

3 Flute FMHV

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	
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	
MEDIUM	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	
	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	
LONG	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	
	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	
EXTRA LONG	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	
	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.

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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"	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"	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"	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"	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"	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
MEDIUM	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
	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"	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"	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

5/8" DIAMETER

3/4" DIAMETER

*Other Reach Lengths available upon request.

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

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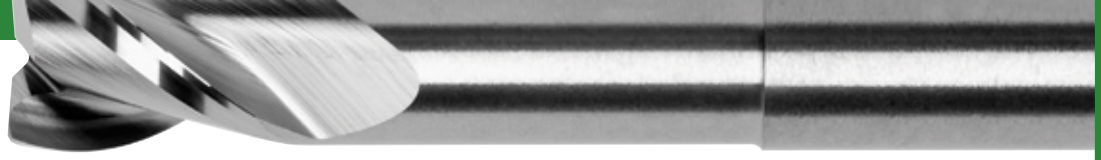
NEW!

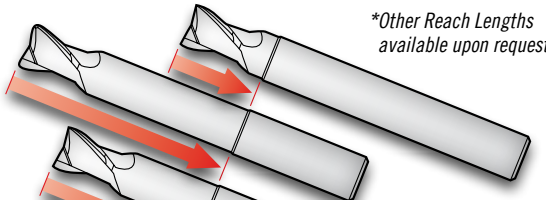


FMHV 3 Flute (Short to Long Reach)

	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
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

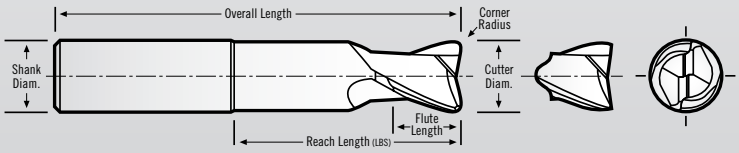
Applications: Slotting, Side Milling, Helical Interpolation, Ramping, High Performance, 3-D, Roughing, Semi-Finishing, Finishing, Wet

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/–.000 mm
Overall Length = +/– 1.500 mm

2

NEW!

MFMHV 2 Flute (Short to Long Reach)

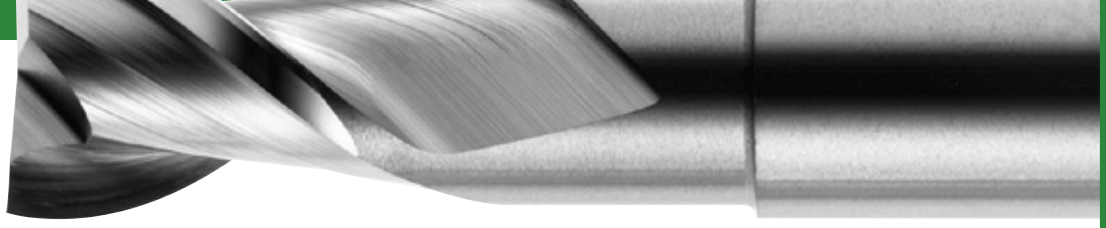
	Cutting Diameter	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated	
SHORT	6mm	6mm	2	10mm	Sq. End	18mm	51mm	MFMHV-201-06	MFMHV-201-06-DLC	MFMHV-201-06-TC	MFMHV-201-06-DLC-TC	6 mm DIAMETER
	6mm	6mm	2	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	
	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	
	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.

*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—

NEW!



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	
	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	
	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	
	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	
	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	
	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	
	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	
	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	
	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.

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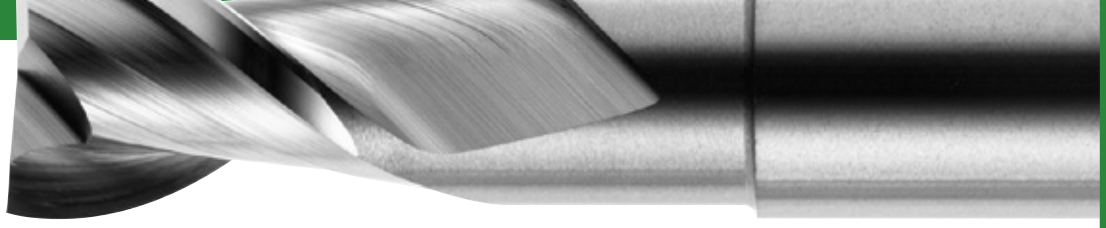
NEW!



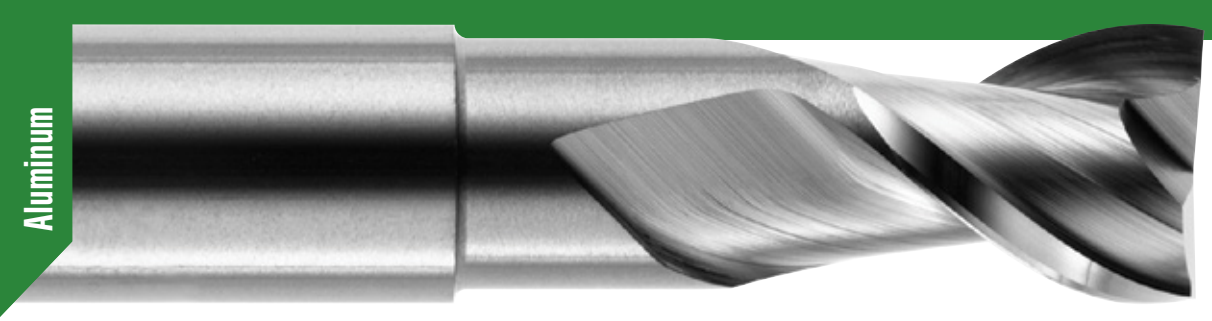
MFMHV 2 Flute (Short to Long Reach) — continued

	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
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

25 mm DIAMETER

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		

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

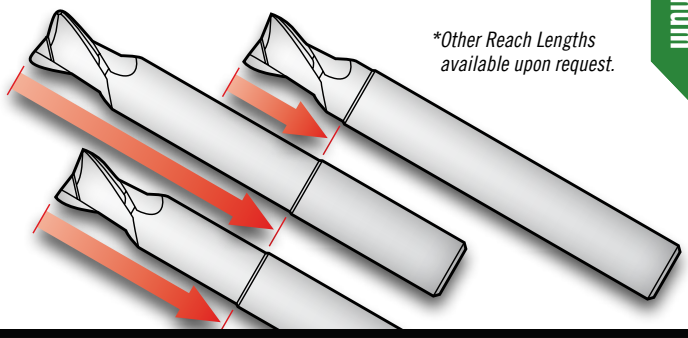
Recommended feed per tooth

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!



*Other Reach Lengths 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

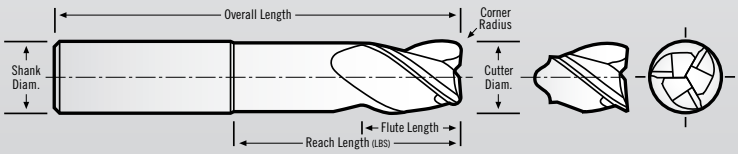
Applications: Slotting, Side Milling, Helical Interpolation, Ramping, High Performance, Roughing, Semi-Finishing, Finishing, Wet

Materials: Aluminum, Copper, Magnesium, Brass

Coatings: Diamond-Like Carbon (DLC)

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/–.000 mm
Overall Length = +/– 1.500 mm

3

ALL-NEW BALANCED END DESIGN
CANNOT PLUNGE

MFMHV 3 Flute (Short to Long Reach)

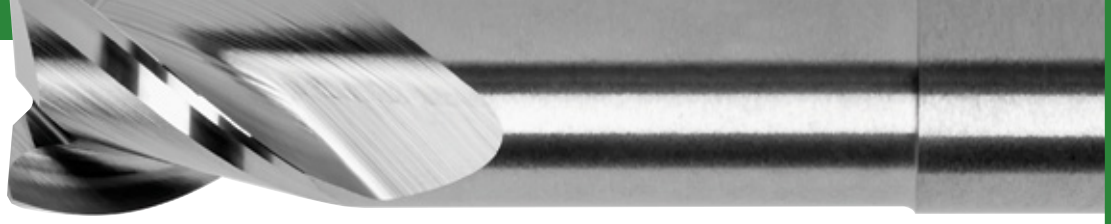
	Cutting Diam.	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Uncoated w/ Thru Coolant Holes	Thru Coolant DLC Coated	
SHORT	6mm	6mm	3	10mm	Sq. End	18mm	51mm	MFMHV-301-06	MFMHV-301-06-DLC	MFMHV-301-06-TC	MFMHV-301-06-DLC-TC	6 mm DIAMETER
	6mm	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	
	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	
	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.

*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—

NEW!



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	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	8mm	8mm	3	13mm	Sq. End	38mm	76mm	MFMHV-303-08	MFMHV-303-08-DLC	MFMHV-303-08-TC	MFMHV-303-08-DLC-TC	
	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	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	10mm	10mm	3	13mm	Sq. End	45mm	88mm	MFMHV-302-10	MFMHV-302-10-DLC	MFMHV-302-10-TC	MFMHV-302-10-DLC-TC	
	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	10mm	10mm	3	13mm	Sq. End	57mm	100mm	MFMHV-303-10	MFMHV-303-10-DLC	MFMHV-303-10-TC	MFMHV-303-10-DLC-TC	
	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	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.

CONTINUED ON NEXT PAGE—

MFMHV

3 Flute Ultra-High Velocity Tools for Aluminum

MFMHV 3 Flute (Short to Long Reach) — continued

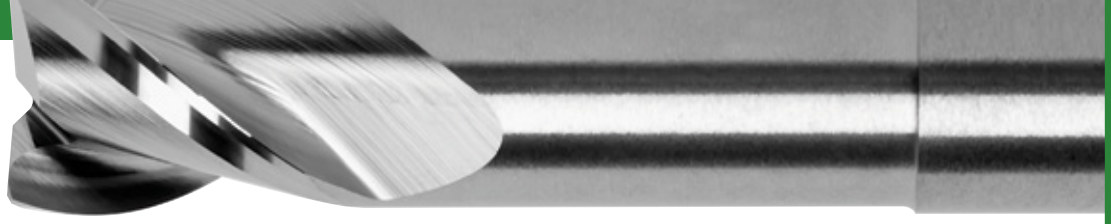
	Cutting Diam.	Shank Diam.	Cutting Edges	Flute Length	Corner Radius	Reach Length (LBS)	Overall Length	Uncoated	DLC Coated	Uncoated w/ Thru Coolant Holes	Thru Coolant DLC Coated	
MEDIUM	12mm	12mm	3	19mm	Sq. End	41mm	89mm	MFMHV-302-12	MFMHV-302-12-DLC	MFMHV-302-12-TC	MFMHV-302-12-DLC-TC	12 mm DIAMETER
	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	
	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	
	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	
	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	
	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!



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.

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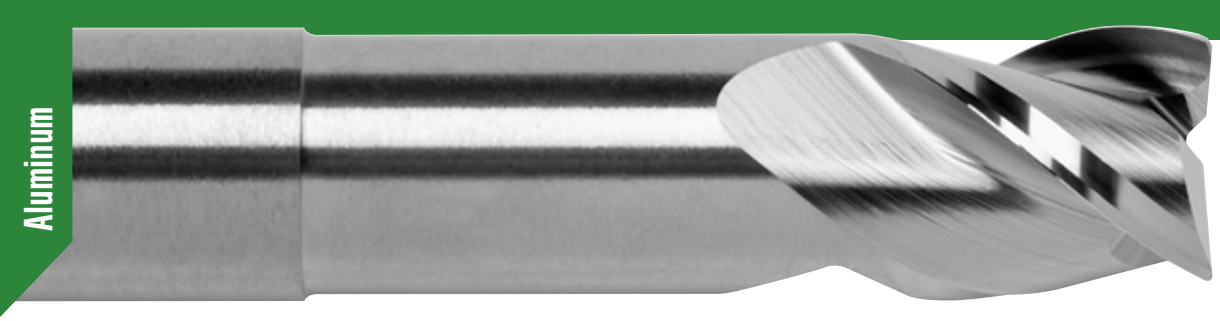


NEW!

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
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

25 mm DIAMETER

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		

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

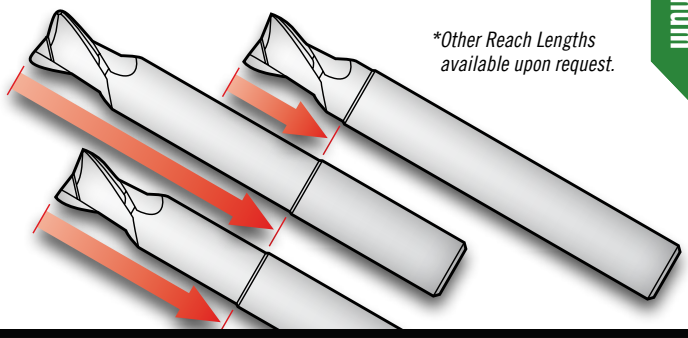
Recommended feed per tooth

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!



*Other Reach Lengths 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

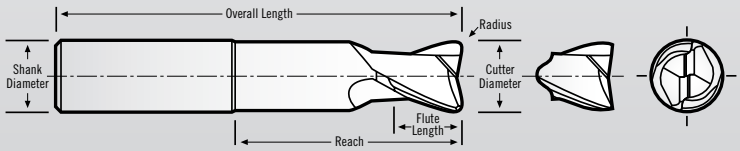
Characteristics: Square End, Corner Radius, Ball End, 2 Flute, 40° Helix, Feather Blend, Necked, Mirror Edge

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/–.0015
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.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"	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"	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"	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"	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.

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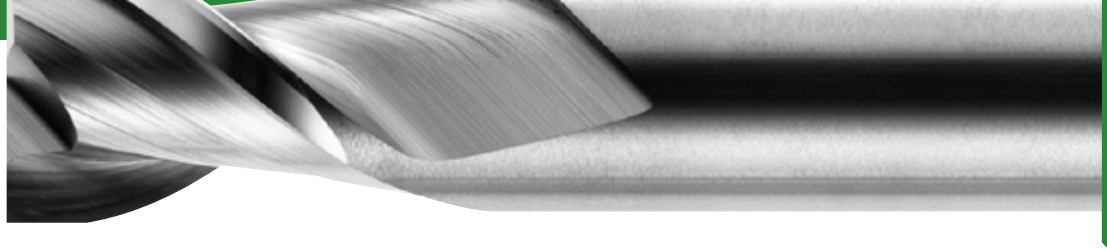

FM 2 Flute (Short to Long Reach) — continued

	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"	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"	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"	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"	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"	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"	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.*

CONTINUED ON NEXT PAGE—

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.

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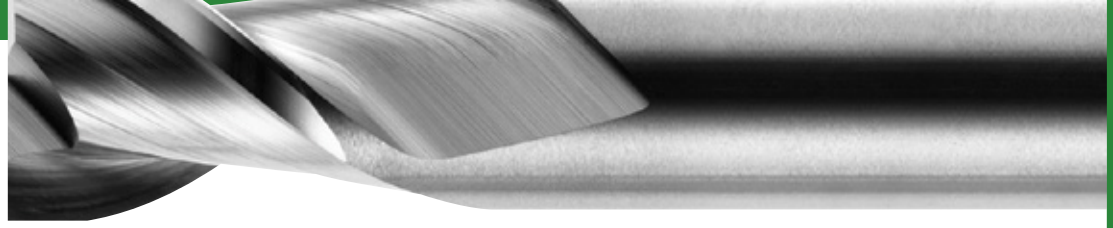


FM 2 Flute (Short to Long Reach) — continued

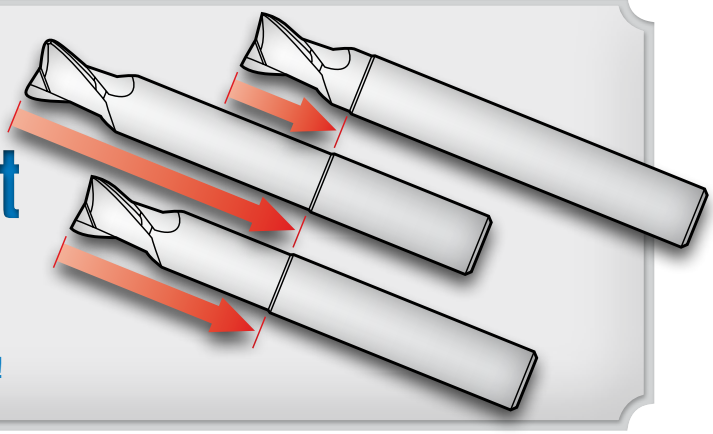
	Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length*	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
SHORT	1"	1"	1"	Sq. End	2"	6"	FM-201-32	FM-201-32-**DLC**
	1"	1"	1"	0.03"	2"	6"	FM-201-32-030	FM-201-32-030-**DLC**
	1"	1"	1"	0.06"	2"	6"	FM-201-32-060	FM-201-32-060-**DLC**
	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**

1" DIAMETER

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

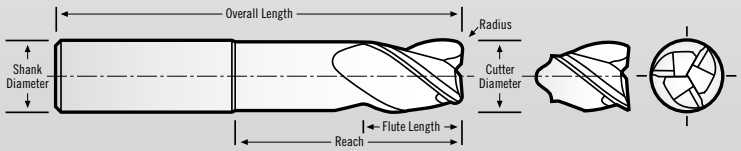
Characteristics: Square End, Corner Radius, Ball End, 3 Flute, 40° Helix, Feather Blend, Necked, Mirror Edge

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/–.0015
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = ±.060

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

NEW!

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"	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"	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"	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**	
MEDIUM	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**	
	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"	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.

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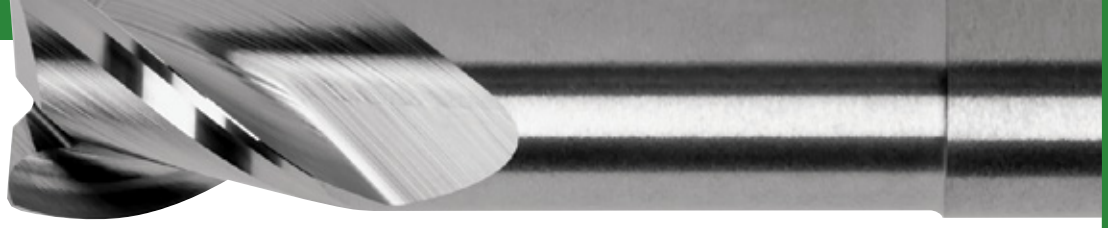
NEW!



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"	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"	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"	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"	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"	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"	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.

CONTINUED ON NEXT PAGE—

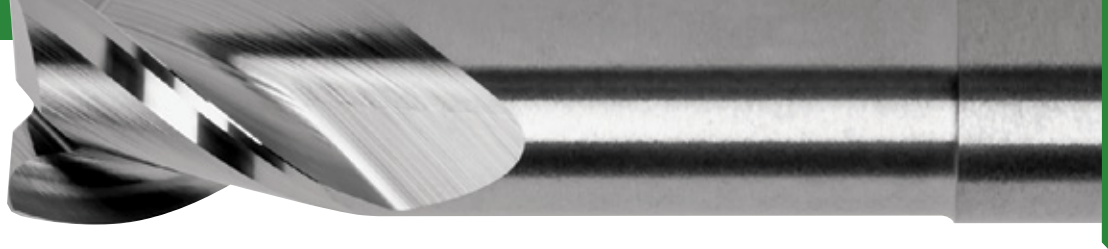
FM 3 Flute High Performance Tools for Aluminum

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.

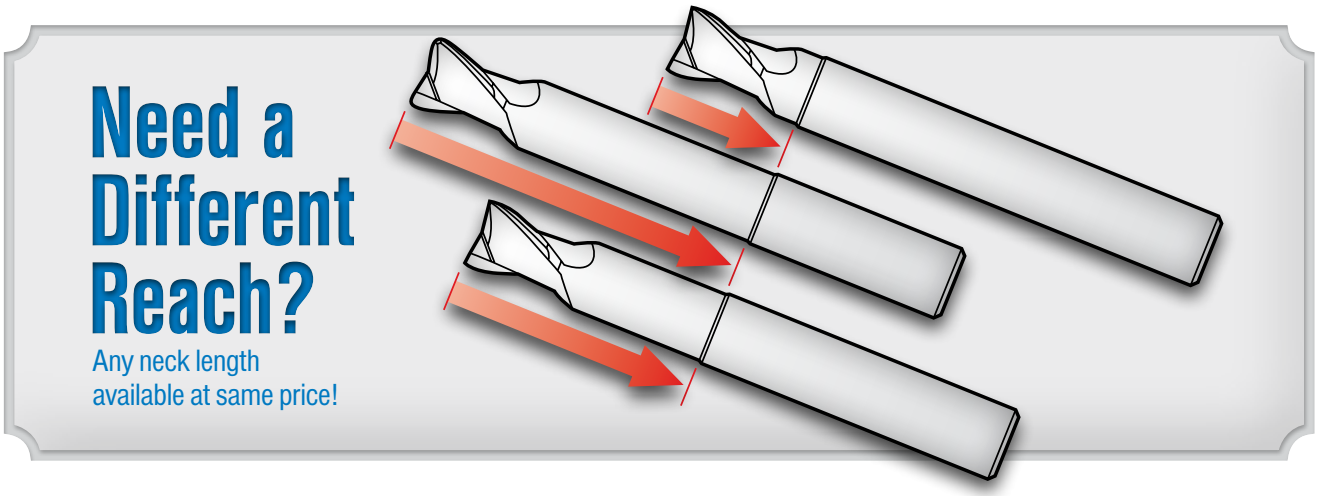


FM 3 Flute (Short to Long Reach) — continued

	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"	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**

1" DIAMETER

Other Reach Lengths available upon request.



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

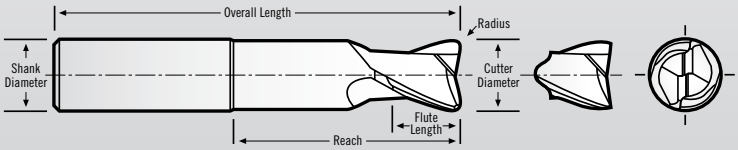
Applications: Slotting · Side Milling · Helical Interpolation · Ramping · High Performance · 3-D · Roughing · Semi-Finishing · Finishing · Wet

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/–.000 mm
(>10D) = +1.500/–.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**	
	6mm	6mm	7mm	Ball End	18mm	75mm	MFM-202-06-BN	MFM-202-06-BN-**DLC**	
L	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**	
	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**	
XL	6mm	6mm	7mm	Sq. End	30mm	75mm	MFM-204-06	MFM-204-06-**DLC**	
	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**	
SHORT	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**	
MED	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**	
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.

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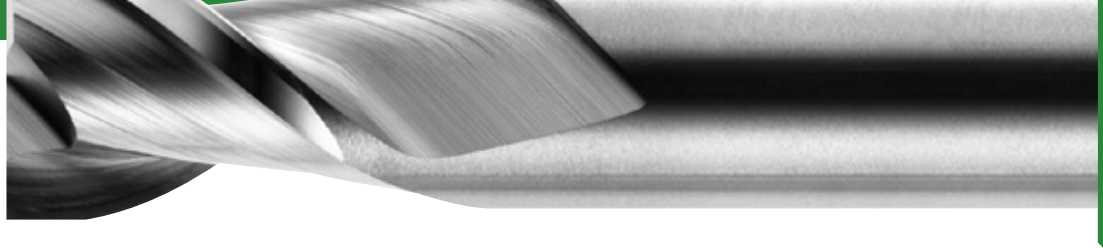


MFM 2 Flute Metric (Short to Long Reach) METRIC — continued

	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**	10mm 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**	12mm 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**	16mm 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.

CONTINUED ON NEXT PAGE—

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**	
	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**	
	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**	
	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**	
	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**	
	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**

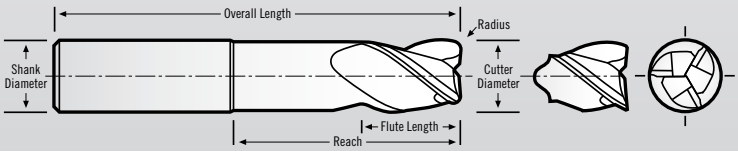
Characteristics

Applications

Materials

Coatings

MFM Series comes with **Mirror Edge** for **Chatter Reduction**



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

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

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**	
	6mm	6mm	7mm	Ball End	18mm	75mm	MFM-302-06-BN	MFM-302-06-BN-**DLC**	
L	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**	
	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**	
XL	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**	
	6mm	6mm	7mm	1.0mm	30mm	75mm	MFM-304-06-100	MFM-304-06-100-**DLC**	
	6mm	6mm	7mm	Ball End	30mm	75mm	MFM-304-06-BN	MFM-304-06-BN-**DLC**	
SHORT	8mm	8mm	9mm	Sq. End	16mm	80mm	MFM-301-08	MFM-301-08-**DLC**	8 mm DIAMETER
	8mm	8mm	9mm	1.0mm	16mm	80mm	MFM-301-08-100	MFM-301-08-100-**DLC**	
	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**	
MED	8mm	8mm	9mm	Sq. End	24mm	80mm	MFM-302-08	MFM-302-08-**DLC**	
	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.*

CONTINUED ON NEXT PAGE—

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		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**	
	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**	
	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**	
	10mm	10mm	11mm	1.5mm	50mm	100mm	MFM-304-10-150	MFM-304-10-150-**DLC**	
	10mm	10mm	11mm	2.5mm	50mm	100mm	MFM-204-10-250	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**	
	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**	
	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**	
	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**	
	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**	
	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.

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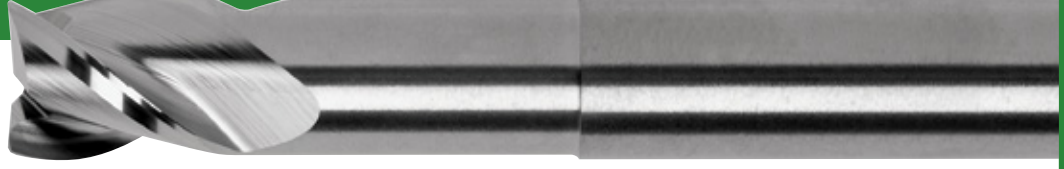


MFM 3 Flute (Short to Long Reach) — continued

	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**	
	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**	
	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**	
	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**	
	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**	
	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**	
	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

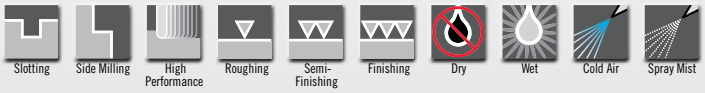
Tool Diameter	Typical Z-Depth	Aluminum 6061-T6		Aluminum 6061-T3		Aluminum 7075		Aluminum 2024	
		RPM	Chip Load per Tooth	RPM	Chip Load per Tooth	RPM	Chip Load per Tooth	RPM	Chip Load per Tooth
6mm	4mm	Max	0,096mm	Max	0,084mm	Max	0,096mm	Max	0,096mm
8mm	4mm	Max	0,128mm	Max	0,112mm	Max	0,128mm	Max	0,128mm
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

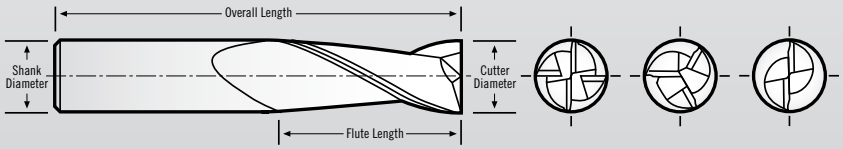
Characteristics

Applications



Materials

Coatings



S1 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

MS1 Tolerances

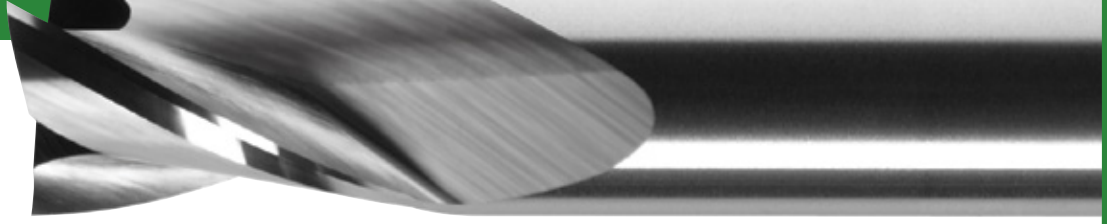
Cutting Dia. = +.000/–.075mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.500/+1.500mm
OAL = ±10mm

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**

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**



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**

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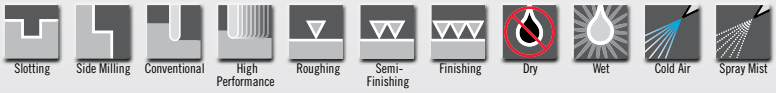
C1/MC1 C-2 Grade Carbide End Mills

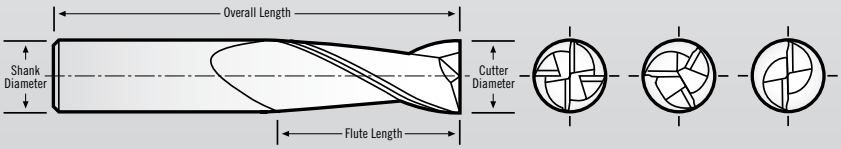
Characteristics

Applications



Materials

Coatings



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

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

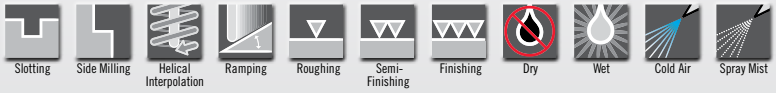
C1-401 4 Flute C-2 Grade Standard Length

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**

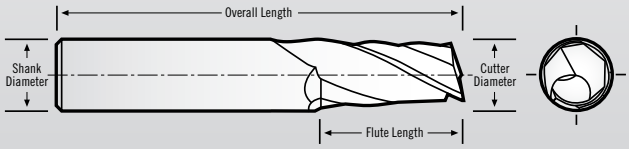
PM/MPM/PMD Tuffy Grade Carbide Router Bits

Characteristics

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

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

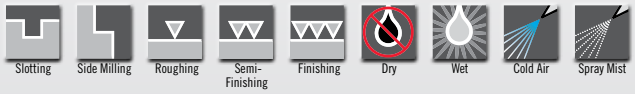
MPM Upshear 1 Flute Tuffy Grade METRIC

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

Router for Aluminum Aircraft Skins WU1/WD1

Characteristics

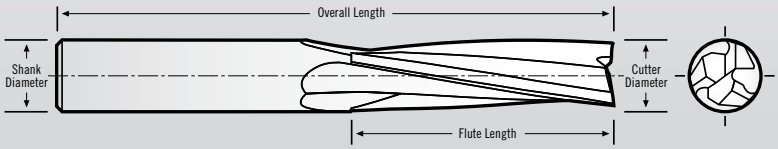
Applications



Materials

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

UP Shear

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

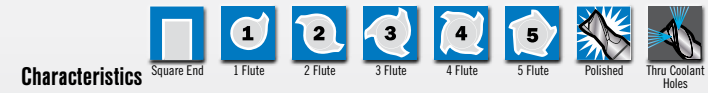
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/2"	1/2"	1-3/4"	4"	WU1-310-16
5/8"	5/8"	2"	4-5/8"	WU1-310-20
3/4"	3/4"	2-1/2"	5"	WU1-310-24

Shear DN

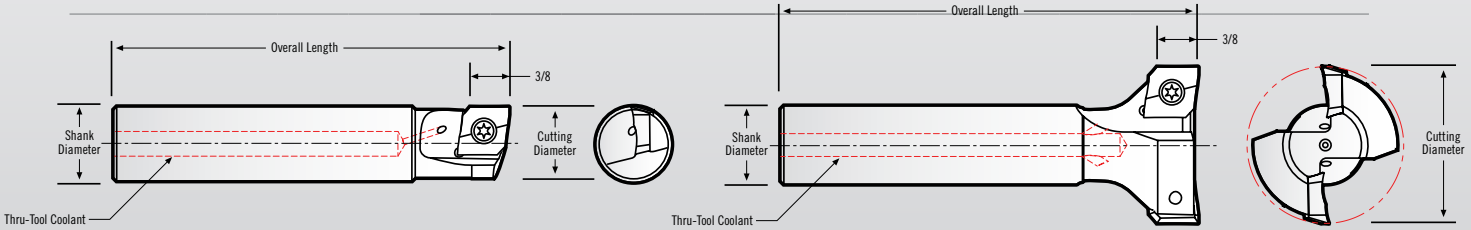
WD1-310 Downshear 3 Flute Standard Length (10° Helix)

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



NEW!



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:

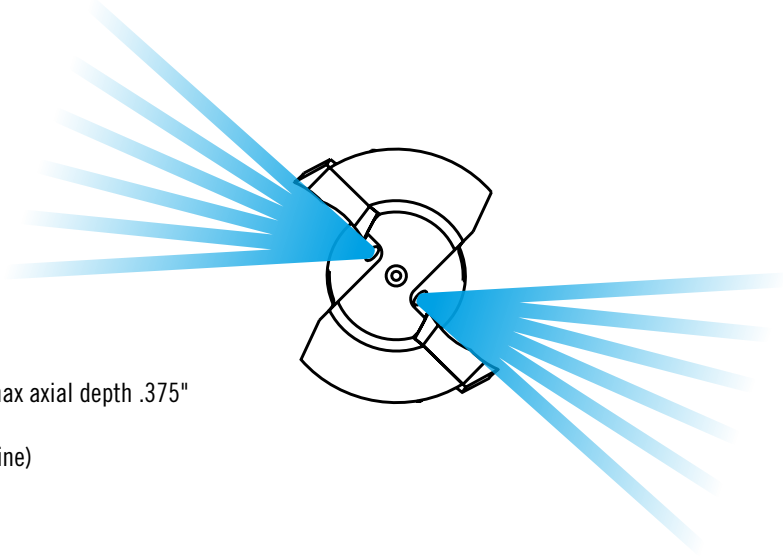
10,000 Max RPM

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)



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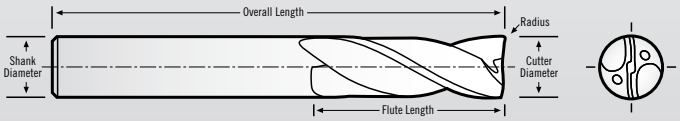
FBD 2 Flute Flat Bottom Drills for Aluminum

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"

2 NEW! **180° Tip**

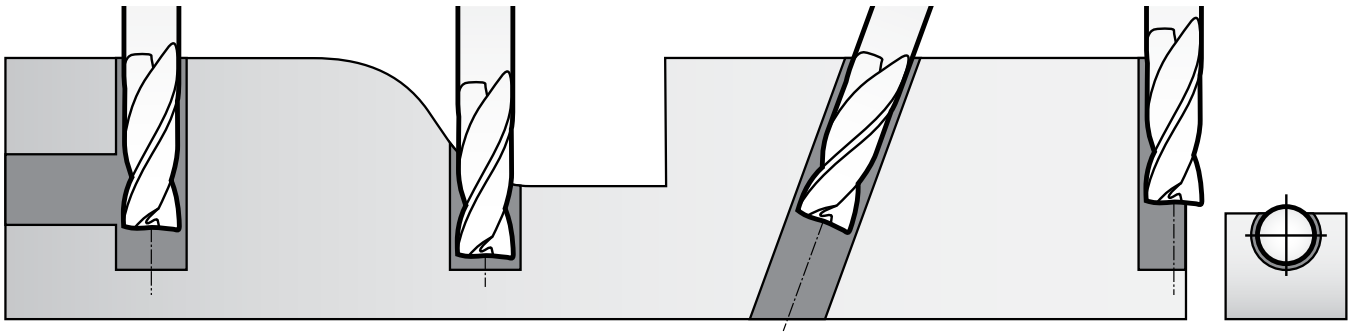
FBD-201 2 Flute 2x Diameter Flat Bottom Drills

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

2 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

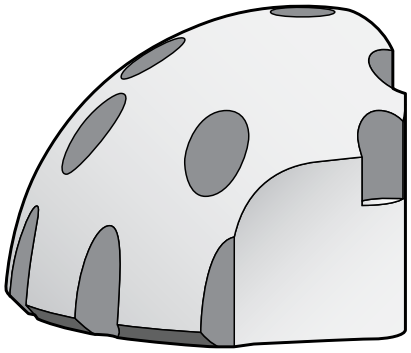
** Adjust RPM to 70% of recommedned RPM when on an angled or curved surface is greater than 30 degrees or when the cutter is not fully encapsulated and only drilling a partial hole

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

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Featured Tools:

NS Series – Machine Steel with Ease!

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- **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 CuttingTools
- Available in **Inch and Metric Sizes**

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

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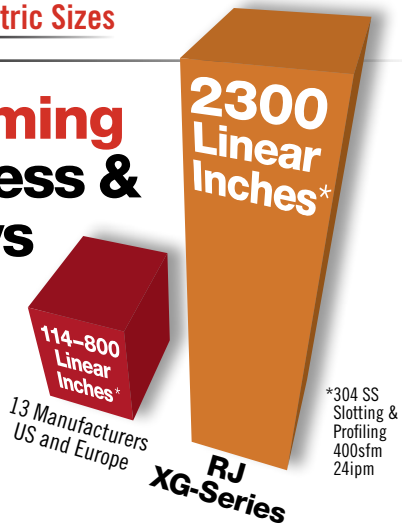

XF Series – Best Tool for High-Speed Machining

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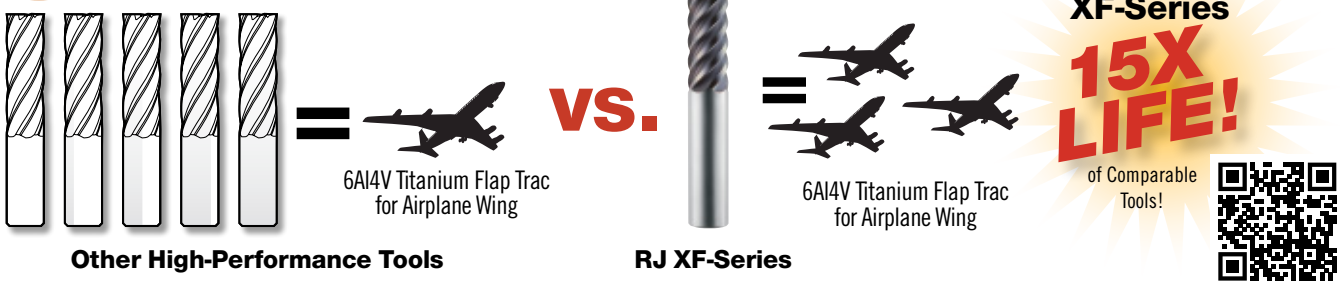


Other High-Performance Tools **RJ XF-Series**

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	NEW! Flat Bottom Drills for Aluminum 3x and 5x Lengths			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

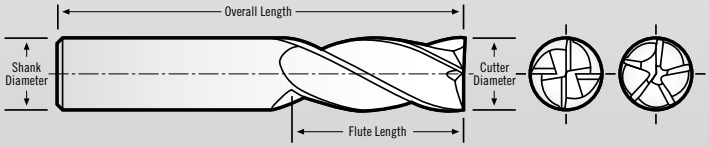
NS/MNS Tuffy Grade Carbide End Mills

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

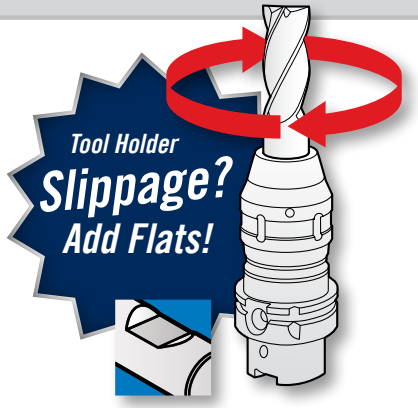
Coatings: Aluminum Titan. Nitride



NS Tolerances
Cutting Dia. = –.001/–.002
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = +/–.060

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

Add Flats for High Torque Cuts!



NS-401 4 Flute Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Chamfer	Overall Length	Tool number Flats, AlTiN Coated	Tool number No Flats, AlTiN 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	Tool number Flats, AlTiN Coated	Tool number No Flats, AlTiN 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	Tool number Flats, AlTiN Coated	Tool number No Flats, AlTiN 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

Add Flats for High Torque Cuts!

MNS-402 4 Flute Standard Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Chamfer	Overall Length	Tool Number w/Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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

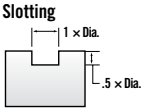
MNS SERIES SPEEDS & FEEDS METRIC

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

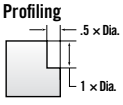
Speeds and feeds are based on applications with very rigid machine tools, toolholders, and fixturing. Speeds and feeds will vary dramatically depending on the application. Extreme forces can be generated and can cause damage, if not appropriate for the cutting conditions.

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



XG/MXG Tuffy Grade Carbide End Mills

Characteristics: Square End, Corner Radius, 4 Flute, 5 Flute, Variable Helix, Flats

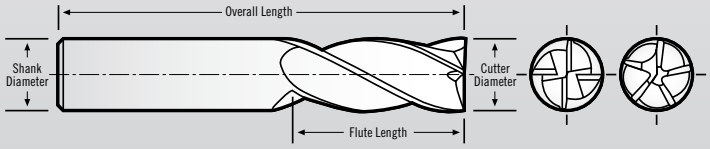
Applications: Slotting, Side Milling, Helical Interpolation, Ramping, High Performance, Roughing, Semi-Finishing, Finishing, Dry, Wet, Cold Air, Spray Mist

Materials: Titanium, Cast Iron, Steel, Stainless Steel, Super Alloys, 40 HRc Hardness

Coatings: AlTiN Aluminum Titan. Nitride

Variable Helix a≠b

NEW! SMALLER SIZES



XG Tolerances
Cutting Dia. = –.001/–.002
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = +/–.060

MXG Tolerances
Cutting Dia. = –.025/–.050mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.50/+1.50mm
OAL = +/– 1mm

4 Flute

Add Flats for High Torque Cuts!

XG-400 4 Flute Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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

XG-402 4 Flute Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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

MXG-402 Metric 4 Flute Standard Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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

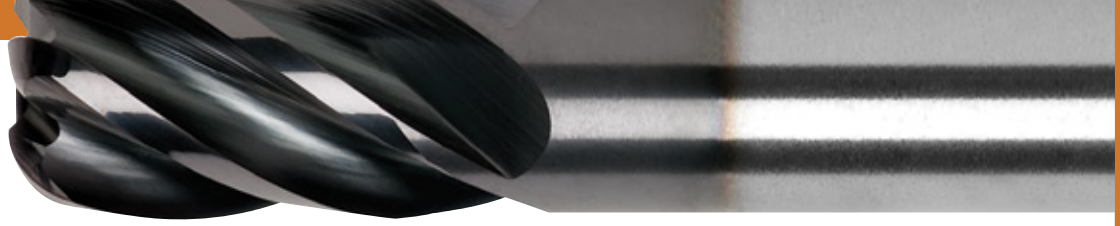
NOTE: Metric tools do not have flats.

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

Different Corner Radii Available

Add -CR and desired corner radius size

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



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, AlTiN Coated	Tool Number No Flats, AlTiN 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

Variable Helix a≠b

XG-502 5 Flute Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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

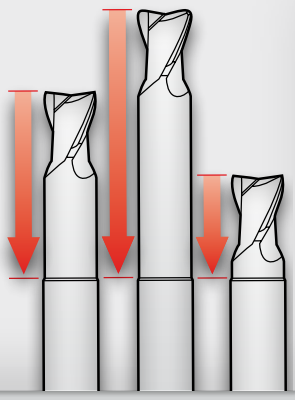
MXG-502 Metric 5 Flute Standard Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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.

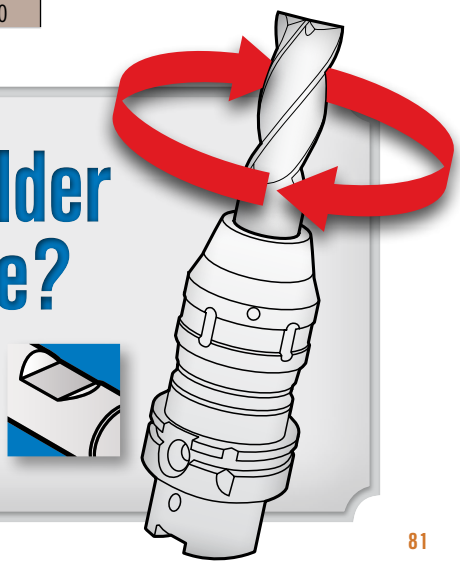
Need Reach?

See End Mill Modifications (page 17)



Tool Holder Slippage?

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



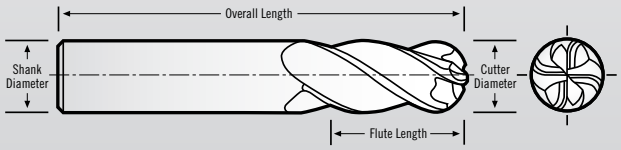
XG/MXG Tuffy Grade Carbide End Mills

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: Titanium · Cast Iron · Steel · Stainless Steel · Super Alloys · 40 HRc Hardness

Coatings: AlTiN Aluminum Titan. Nitride

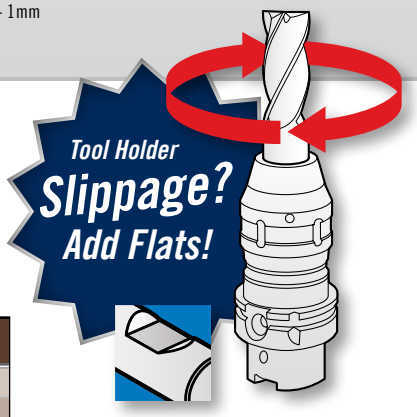


XG-BN Tolerances
Cutting Dia. = –.001/–.002
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = +/–.060

MXG-BN Tolerances
Cutting Dia. = –.025/–.050mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.50/+1.50mm
OAL = +/– 1mm

NEW SIZES!

Add Flats for High Torque Cuts!



XG-402BN 4 Flute Ball End Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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**

NOTE: Metric tools do not have flats.

Tuffy Grade Carbide End Mills XF/MXF

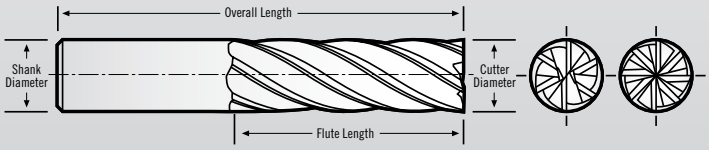
Characteristics: Square End · Corner Radius · 6 Flute · 8 Flute · 45° Helix · Flats

Applications: Side Milling · High Performance · Semi-Finishing · Finishing · Dry · Wet · Cold Air · Spray Mist

Materials: Titanium · Cast Iron · Steel · Stainless Steel · Super Alloys · 40 HRc Hardness

Coatings: AlTiN Aluminum Titan. Nitride

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



XF Tolerances
Cutting Dia. = –.001/–.002
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = +/–.060

MXF Tolerances
Cutting Dia. = –.025/–.050mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.500/+1.500mm
OAL = ±10mm

XF-602/802 6/8 Flute Standard Length

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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

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

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN 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

NOTE: Metric tools do not have flats.

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

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

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

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

CONTINUED ON NEXT PAGE—

Speeds & Feeds MXG/XF

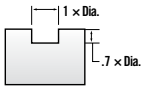
MXG-402 SPEEDS & FEEDS METRIC —CONTINUED FROM PREVIOUS

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

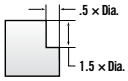
General Guidelines for XG-402 and MXG-402

- 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

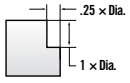


XG-502 AND XF SERIES SPEEDS & FEEDS

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

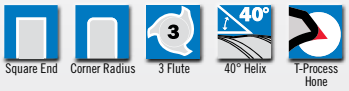
XF Finish Profiling

XG-502 Profiling

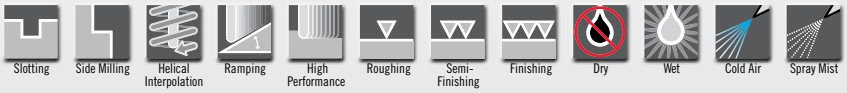


ST/MST Super Tuffy Grade Carbide End Mills

Characteristics

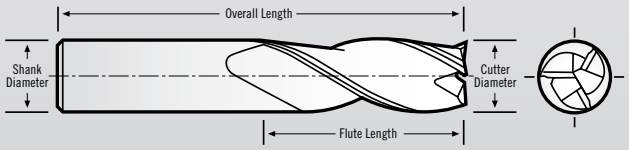


Applications



Materials

Coatings



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

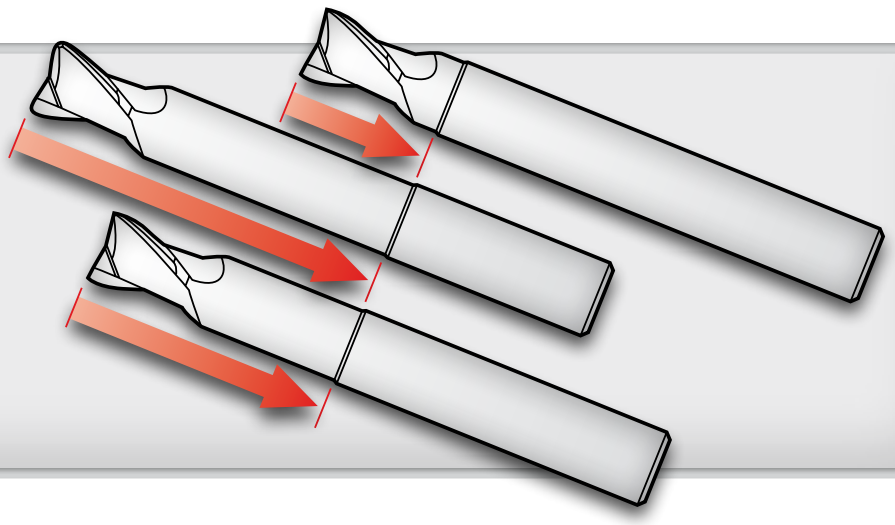
HONED EDGE!

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**

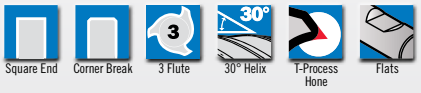
Need Reach?

See End Mill Modifications (page 14)

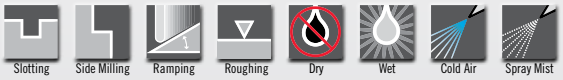


STR/MSTR 3 Flute Super Tuffy Grade Carbide Ruffers

Characteristics



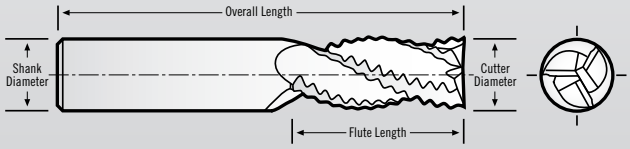
Applications



Materials

Coatings

STR Series comes with T-Process Honed Edges



STR Series Tolerances
Cutting Dia. = –.003/–.007
Shank Dia. = –.0001/–.0002
Flute Length (1/4" to 5/16") = +.030/–.000
(3/8" to 3/4") = +.060/–.000
OAL = ±.060

MSTR Tolerances
Cutting Dia. = –.075/–.180mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.500/+1.500mm
OAL = ±10mm

HONED EDGE!

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

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.

HONED EDGE!

STR-303 3 Flute Super Tuffy 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 Tuffy 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.

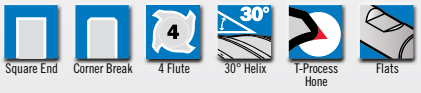
Need Without Flats?

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

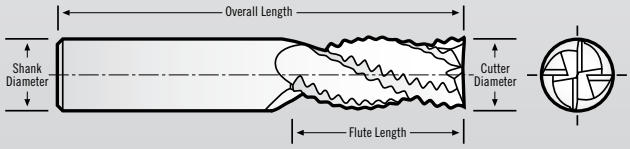
Characteristics



Applications

Materials

Coatings



STR Series Tolerances

Cutting Dia. = –.003/–.007
Shank Dia. = –.0001/–.0002
Flute length (1/4" to 5/16") = +.030/–.000
(3/8" to 3/4") = +.060/–.000
OAL = ±.060

MSTR Tolerances

Cutting Dia. = –.075/–.180mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.500/+1.500mm
OAL = ±10mm

HONED EDGE!

STR-401 4 Flute Super Tuffy Carbide Ruffer Stub Length

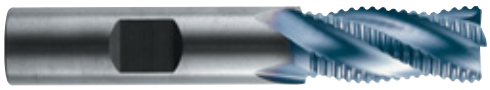
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/4"	1/4"	1/2"	2-1/2"	STR-401-08*	STR-401-08-**T***	STR-401-08-**C***	STR-401-08-**A***
5/16"	5/16"	1/2"	2-1/2"	STR-401-10*	STR-401-10-**T***	STR-401-10-**C***	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

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.



HONED EDGE!

STR-404 4 Flute Super Tuffy 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 Tuffy 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-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.

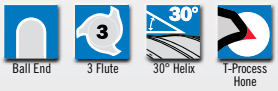
Need Without Flats?

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

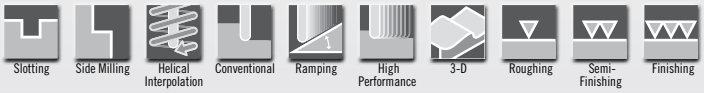
NOTE: Metric sizes do not come with flats.

B 3 Flute Tuffy Grade Carbide Ball End Mills

Characteristics

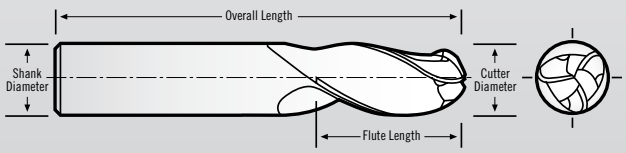


Applications



Materials

Coatings



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

HONED EDGE!

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**

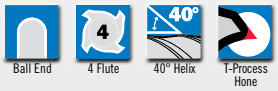
HONED EDGE!

B-330 3 Flute Tuffy Ball End Standard Length

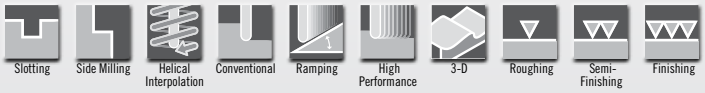
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/2"	1-1/2"	B-330-04	B-330-04-**T**	B-330-04-**C**	B-330-04-**A**
3/16"	3/16"	5/8"	2"	B-330-06	B-330-06-**T**	B-330-06-**C**	B-330-06-**A**
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

Characteristics

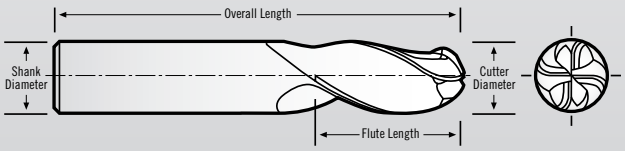


Applications



Materials

Coatings



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

HONED EDGE!

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

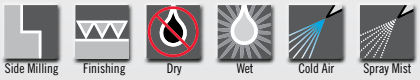
4 Flute Tuffy Ball End Standard Length 40° Helix METRIC

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

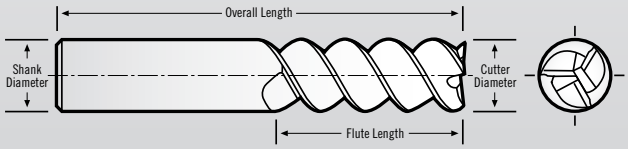
Characteristics

Applications



Materials

Coatings



ST-360 Tolerances

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

MST-360 Tolerances

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

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

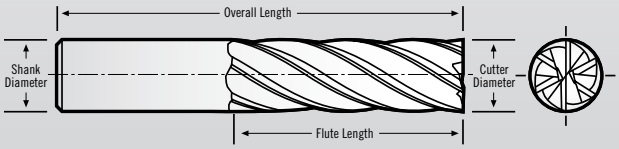
Characteristics: Square End · Corner Radius · 6 Flute · 30° Helix · 40° Helix

Applications: Side Milling · Semi-Finishing · Finishing · Dry · Wet · Cold Air · Spray Mist

Materials: Cast Iron · Steel · Stainless Steel · Super Alloys

Coatings: TiN Titanium Nitride · TiCN Titanium Carbo-Nitride · AlTiN Aluminum Titan. Nitride

Available with Coolant Grooves See Page 13



ST-630/ST-646 Tolerances
Cutting Dia. = +.001/–.000
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = ±.060

MST-646 Tolerances
Cutting Dia. = +.025/–.000mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.500/+1.500mm
OAL = ±10mm

Corner Radius · 40° Helix

+ Tolerances · Honed Radius

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**

Square End · 30° Helix

+ Tolerances

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**

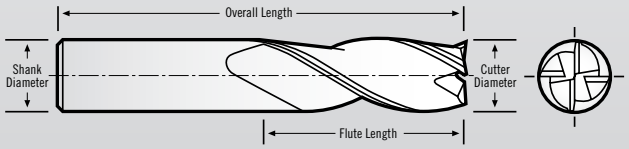
ST/MST 4 Flute Super Tuffy Grade Carbide End Mills

Characteristics

Applications

Materials

Coatings



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 = ±10mm

Sharp Edges + Tolerances

TiN TiCN AlTiN

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**

TiN TiCN AlTiN

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**

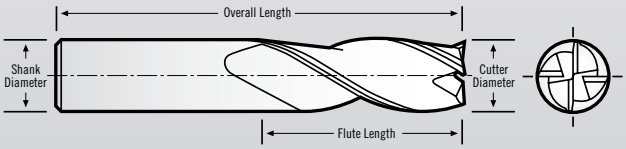
4 Flute Super Tuffy Grade Carbide End Mills ST/MST

Characteristics: Corner Break; 4 Flute; 30° Helix; T-Process Hone

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 = ±10mm

+ Tolerances

HONED EDGE!

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**

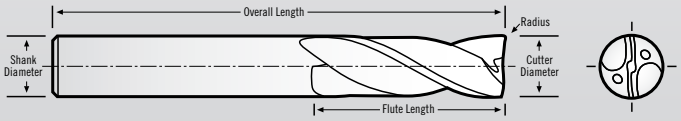
FBD 2 Flute Flat Bottom Drills for Steel and difficult alloys

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"

2 NEW! **180° Tip**

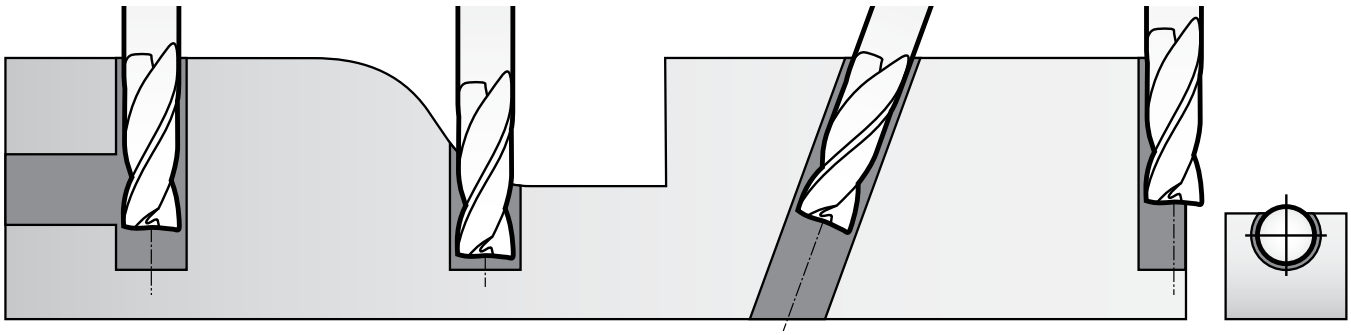
FBD-201 2 Flute 2x Diameter Flat Bottom Drills

Cutting Diameter	Shank Diameter	Flute Length	Max Hole depth	Corner Radius	Overall Length	Tool Number AlTiN Coated	Tool Number Thru Coolant AlTiN 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

2 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 AlTiN Coated	Tool Number Thru Coolant AlTiN 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

	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		
Tool Diameter	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	Inch per Revolution*
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 Diameter	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 recommedned 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

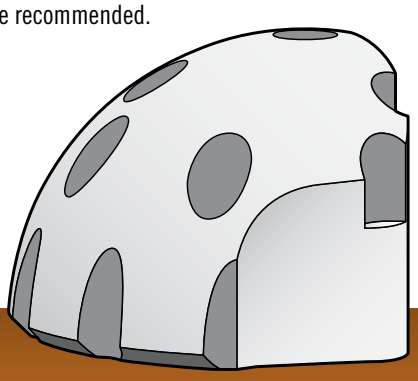
When using FBD-202 (5x) use FBD-201(2x) to start the hole to reduce walking.

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.



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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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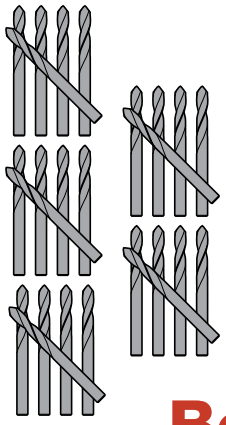


= Wing Spars Complete Ship Set

VS.

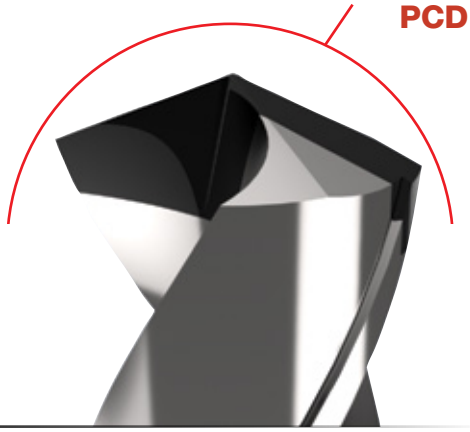
= Wing Spars Complete Ship Set

Before **After**

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

NEW!

Single Shot PCD



CPCD-203 – Best Trimming Tool for Composites

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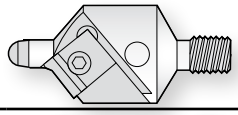
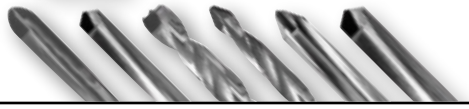
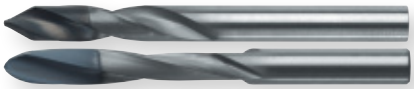
View the CPD-203 in action on our web site!

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	NEW!	Countersink Bodies and Inserts		102
PCD-TIPPED Drills	NEW!	PCD-Tipped Diamond Drills NEW SIZES!		104
P810 / F104 Drills		Diamond Coated Drills		106
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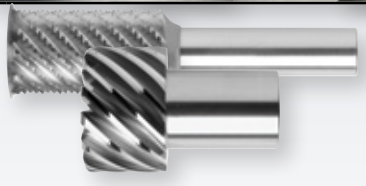
SPECIALS				

CSK Aircraft Countersinks

NEW!

Characteristics


2 Flute, 100° Countersink

Applications

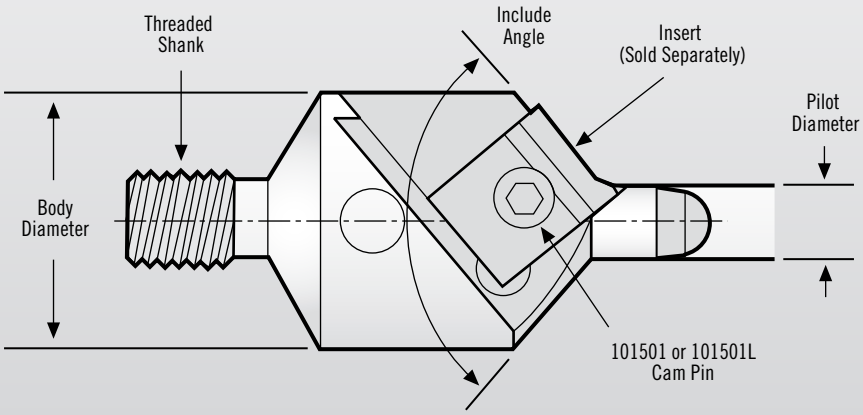
Counter Sinking, Dry, Wet, Cold Air, Spray Mist

Materials

Composites

Coatings

Diamond Coated (DCC)



10-20X Tool Life Over Carbide!

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

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

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

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

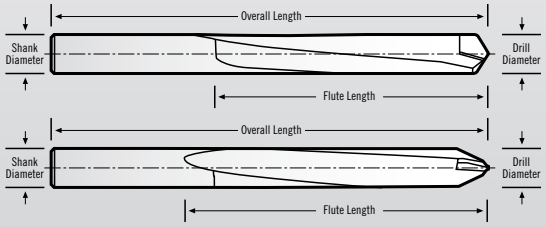
QUOTES@ROBBJACK.COM

PCD PCD-Tipped Diamond Drills

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



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

NEW!

Single Shot PCD

Any diameter available from .0620" to .5000"

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

Best Performing Drill in most Composites

135/20°

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

W

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!

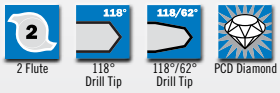
Get the advantage of geometries that used to be only available in carbide. Get the wear resistance of Diamond and the ability to re-sharpen PCD drills.

See RobbJack Videos at
robbjack.com/robbjack-tv

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

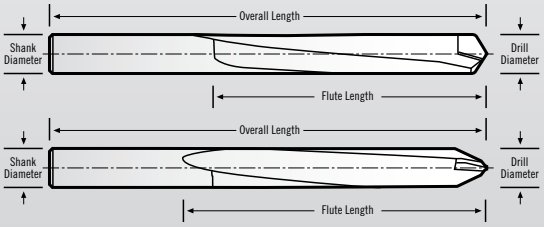
PCD-Tipped Diamond Drills **PCD**

Characteristics



Applications

Materials



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

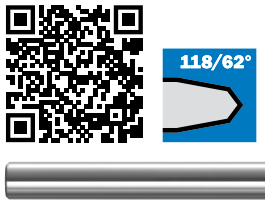
10-20X *Tool Life Over Carbide!*

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

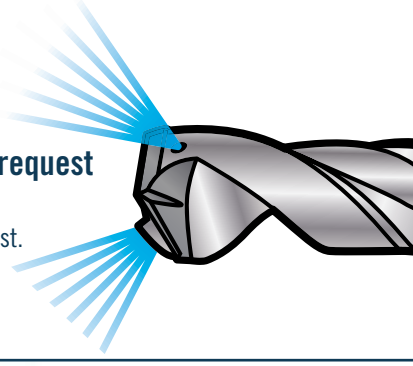
Tool Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
.0625	1/8"	0.5	1.5	PCD-11862-0625
.0980	1/8"	0.5	1.5	PCD-11862-0980
.1285	1/8"	0.5	1.5	PCD-11862-1285
.1655	3/16"	1.4	2.7	PCD-11862-1655
.1915	1/4"	1.4	2.7	PCD-11862-1915
.2210	1/4"	1.4	2.7	PCD-11862-2210
.2510	1/4"	1.4	2.7	PCD-11862-2510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

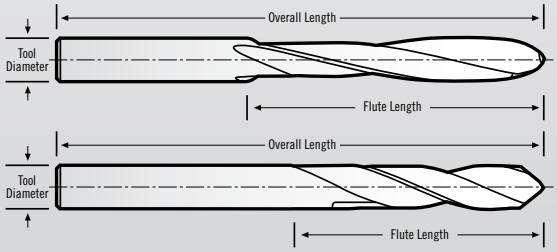
Hole Drilling | Dry | Wet | Cold Air | Spray Mist

Materials

Aluminum | Copper | Magnesium | Plastics | Composites | Brass

Coatings

Diamond Coated (DCC)



P810/F104 Drills Tolerances

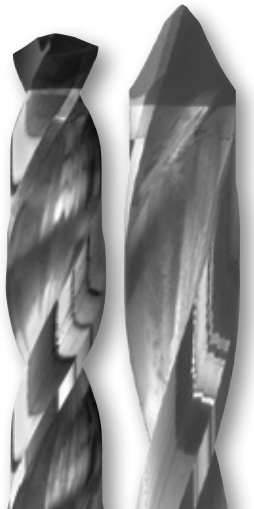
Drill Dia. = +0.0000/–0.0005
+0.000mm/–0.0127mm
Shank Dia. = –0.0001/–0.0030
+0.000mm/–0.076mm
Flute Length = +0.030
+0.762mm
OAL = +/–0.060
+/–1.5mm

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

Characteristics

118°/17° Drill Tip

4 Flute

Applications


Hole Drilling


Roughing


Semi-Finishing


Finishing


Dry


Wet


Cold Air


Spray Mist

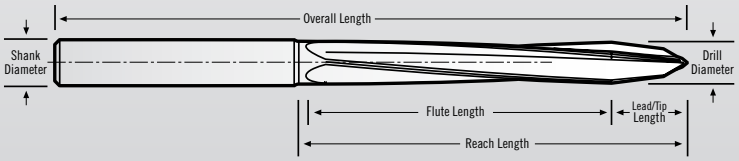
Materials

Graphite


Composites

Coatings


Diamond Coated (DCC)



Drill/Reamer Tolerances

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

P810 4 Flute Diamond Coated Drill/Reamer

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

Drill Diameter	Tolerance from Nominal		Flute Length	Overall Length	Shank Diameter	Lead/Tip Length	Reach	Tool Number Diamond Coated
	Minimum	Maximum						
0.1280"	+.0002"	-.0000"	1"	3"	1/4"	0.325	1-3/4"	P810-100512-1
0.1620"	+.0002"	-.0000"	1"	3"	1/4"	0.3668	1-3/4"	P810-100513-1
0.1910"	+.0002"	-.0000"	1-1/2"	3-1/2"	1/4"	0.475	2"	P810-100486-1
0.2240"	+.0002"	-.0000"	1-1/2"	3-1/2"	1/4"	0.418	2"	P810-100495-1
0.2340"	+.0002"	-.0000"	1-1/2"	3-1/2"	1/4"	0.5232	2-1/8"	P810-100551-1
0.2510"	+.0002"	-.0000"	1-1/2"	3-1/2"	1/4"	0.4684		P810-100494-1
0.2640"	+.0002"	-.0000"	1-1/2"	3-1/2"	1/4"	0.59		P810-100510-1
0.2730"	+.0002"	-.0000"	1-1/2"	3-1/2"	1/4"	0.617		P810-100537-1
0.3140"	+.0002"	-.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

2 Flute

118° Drill Tip

Applications


Slotting


Side Milling


Helical Interpolation


Ramping


Roughing


Semi-Finishing


Finishing


Dry


Wet


Cold Air


Spray Mist

Materials

Graphite


Composites

Coatings


Diamond Coated (DCC)


Diamond-Like Carbon (DLC)

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 jobbers 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 Cernter 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+

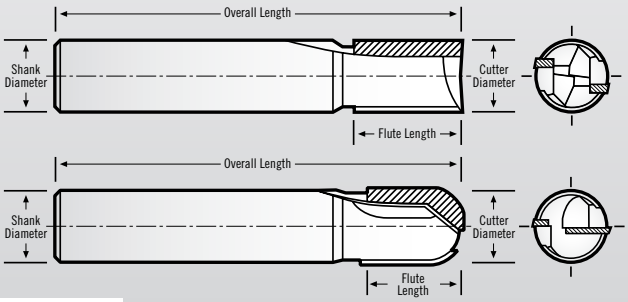
PCD-Tipped Router Bits **CPCD/MCPCD**

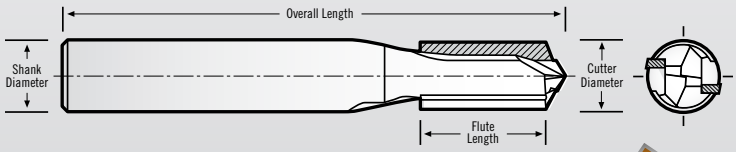
Characteristics: Square End, Ball End, 118° Drill Tip, 2 Flute, PCD Diamond

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

Materials: Aluminum, Copper, Magnesium, Plastics, Composites, Brass

10-20X Tool Life Over Carbide!





CPCD Tolerances
Cutting Dia. = ±.003
Shank Dia. = –.0001/–.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

New PCD Grade & Geometries specifically designed for CFRP Materials

118° Drill Tip, PCD Diamond

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

Square End, PCD Diamond

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-**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.

118° Drill Tip, PCD Diamond

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.

Square End, PCD Diamond

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

Ball End, PCD Diamond

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

Square End, PCD Diamond

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

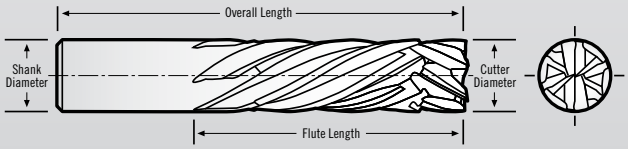
CR/MCR Compression Router

Characteristics

Applications

Materials

Coatings



CR Tolerances

Cutting Dia. = –.001/–.003
Shank Dia. = –.0001/–.0002
Flute Length (<0.3125) = +.020/+.030
(>0.3125) = +.030/+.060
OAL = ±.060

MCR Tolerances

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

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**

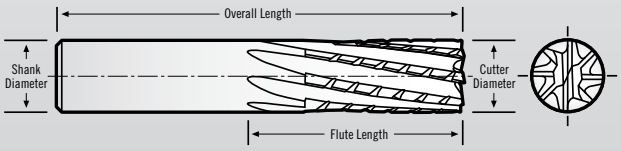
Carbide Composite Router CE/MCE

Characteristics

Applications

Materials

Coatings



CE Tolerances

Cutting Dia. = –.001/–.003
Shank Dia. = –.0001/–.0002
Flute Length (<0.3125) = +.020/+.030
(>0.3125) = +.030/+.060
OAL = ±.060

MCE Tolerances

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

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

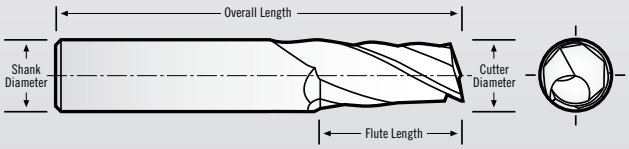
Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number Diamond Coated
6mm	6mm	6	20mm	63mm	MCE-602-06-**D**
10mm	10mm	8	25mm	63mm	MCE-802-10-**D**
12mm	12mm	8	28mm	76mm	MCE-802-12-**D**

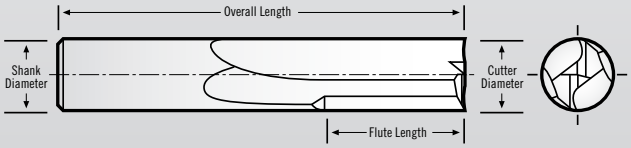
PM/MPM/MPD/GTS Tuffy Grade Carbide Router Bits

Characteristics Square End · 1 Flute · 2 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
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/–.075mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.500/+1.500mm
OAL = ±10mm

GTS Series Tolerances
Cutting Dia. = +.000/–.002
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = ±.060

Polished
Best Tool for Plastics
Eliminates Material Sticking to Tool and Melting in the Cut

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 · 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

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

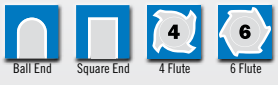
2 Flute

GTS 2 Flute Tuffy Grade Straight Flute

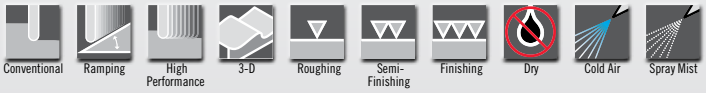
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/4"	1/2"	2"	GTS-201-04
1/4"	1/4"	3/4"	2-1/2"	GTS-201-08
3/8"	3/8"	7/8"	2-1/2"	GTS-201-12
1/2"	1/2"	1"	3"	GTS-201-16

Replaceable Tip End Mills P820

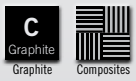
Characteristics



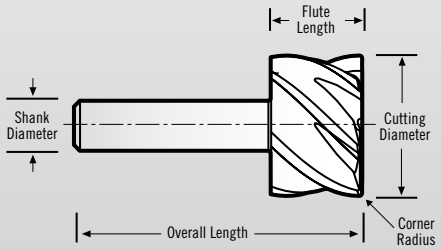
Applications



Materials



Coatings



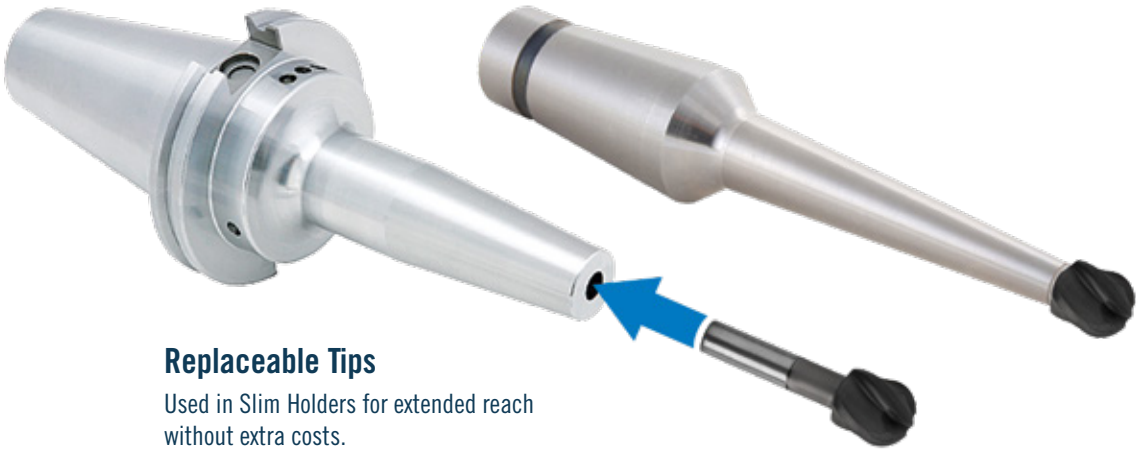
Standard Tolerances
Cutting Dia. = +0.001/–.001"
Shank Tolerance h6
Flute Length = ±.060"
OAL = ±.060"

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

Characteristics: Ball End · Square End · Corner Radius · 2 Flute · 4 Flute

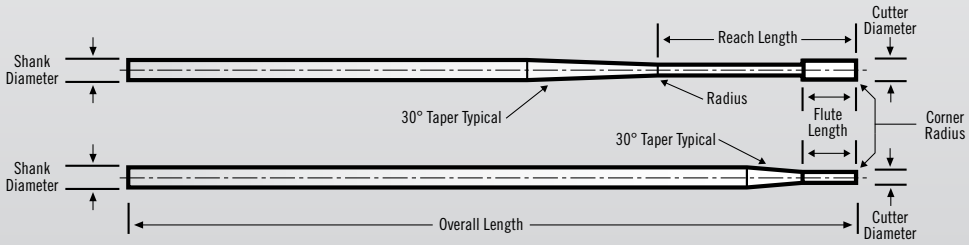
Applications: Conventional · Ramping · High Performance · 3-D · Roughing · Semi-Finishing · Finishing · Dry · Cold Air · Spray Mist

Materials: Aluminum · Composites · Plastics

Coatings: Diamond Coated (DCC)

Standard Tolerances

Cutting Dia. = +0.001/–.001"
Shank Tolerance h6
Flute Length = ±.060"
OAL = ±.060"



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

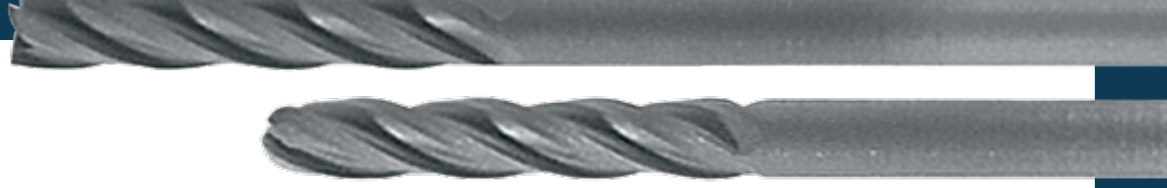
NEW!

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

Diamond Coated (DCC)



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

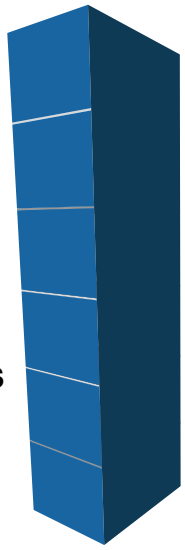
Designed for Airplane Engine Nacelles

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

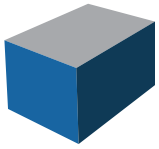
Produces the Cleanest Holes

Dove Tail Cutters – Cut 40 Hours Off Operation!

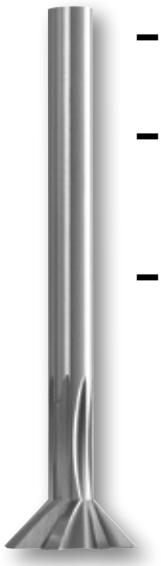


6 Days VS. 1 Day

Other Tools



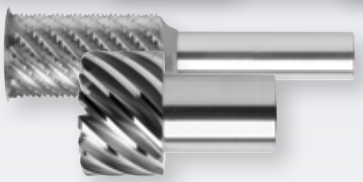
RJ Dove Tail Cutter



- 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)		**132**
A1 / MA1 201	(See Aluminum Applications)		**28**
SAWS	(See Saws Applications)		**170**
SPECIALS			

Call for Quote!
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Made to Order

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

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

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- **Watch Videos**
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- **Get Tips and Tricks**
- **And More...**

Tools for DIE/MOLD & HARDENED MATERIALS

Die/Mold
Scan this code to:

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

Featured Tools:

TM/MTM Series – High Feed Mill

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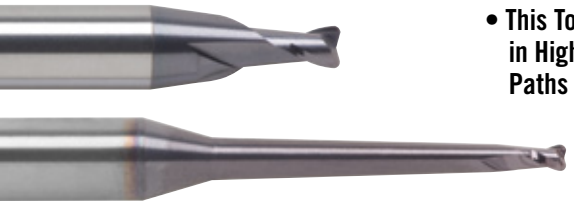
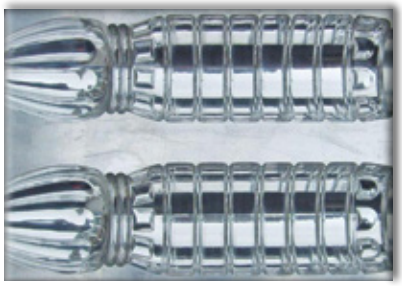


- High Speed Geometry
- This Tool Works Great in High Speed Tool Paths and in Tight Areas

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

Page 125



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

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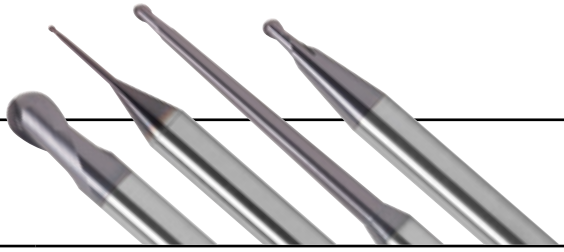
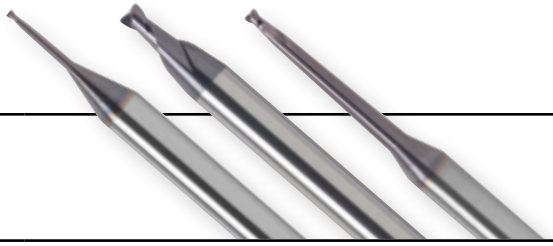
P38	NEW!	4 Flute Lightning Series End Mills Diamond Coated for Graphite Electrodes	**122**
P820	NEW!	4 and 6 Flute Replaceable Tip End Mills Diamond Coated for Graphite Electrodes	**124**
DM		2 Flute Extended Length Ball Nose	**125**
MDM		2 Flute Extended Length Ball Nose	**126**
TM		2 Flute Extended Length Toroidal Corner Radius	**128**
MTM		2 Flute Extended Length Toroidal Corner Radius	**129**
HM		4, 6, 8 and 10 Flute Corner Radius	**130**
MHM		4, 6, 8 and 10 Flute Corner Radius	**130**
ET		Engraving Tools (See Multiple Applications)	**166**





P38 Lightning Diamond Coated Series End Mills

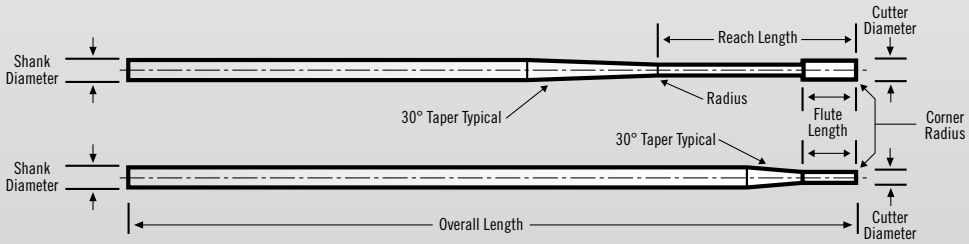
Characteristics: Ball End, Corner Radius, Square End, 2 Flute, 4 Flute

Applications: Conventional, Ramping, High Performance, 3-D, Roughing, Semi-Finishing, Finishing, Dry, Cold Air, Spray Mist

Materials: C Graphite, Composites

Coatings: Diamond Coated (DCC)

Standard Tolerances
Cutting Dia. = +0.001/–.0001"
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

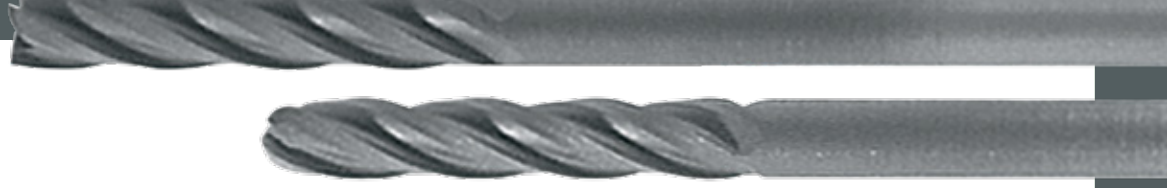
NEW!

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

10-20X Tool Life! DIAMOND COATED

Diamond Coated (DCC)

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



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!

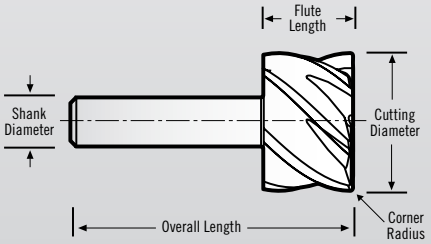
P820 Replaceable Tip End Mills

Characteristics: Ball End, Square End, 4 Flute

Applications: Conventional, Ramping, High Performance, 3-D, Roughing, Semi-Finishing, Finishing, Dry, Cold Air, Spray Mist

Materials: C Graphite, Composites

Coatings: Diamond Coated (DCC)



Standard Tolerances
Cutting Dia. = +0.001/–.0001"
Shank Tolerance h6
Flute Length = ±.060"
OAL = ±.060"

NEW!

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.

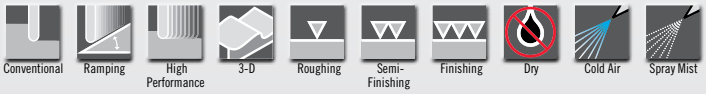
CUTTING SPEEDS

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

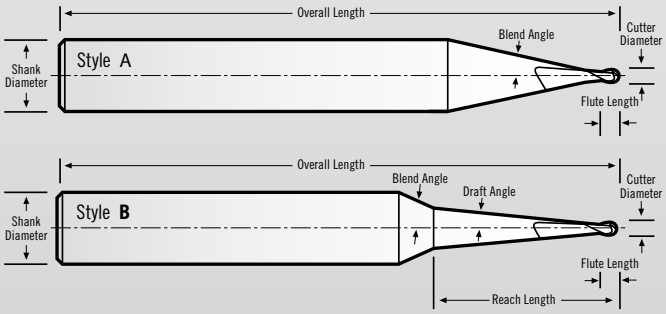
Applications

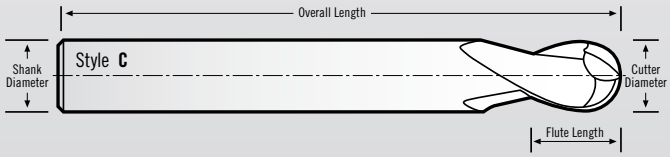


Materials

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 AlTiN 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 AlTiN 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 AlTiN 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 30–40 HRc	STEELS 40–50 HRc	STEELS 50–60 HRc
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

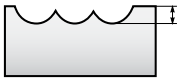
Roughing or Semi-Finishing
25%–40% of tool diameter

Radial Step Over for finishing depends on finish requirements.

DM SERIES SPEEDS & FEEDS (Finishing)

Tool Number	Cutter Diameter	Rotations Per Minute (RPM)		
		STEELS 30–40 HRc	STEELS 40–50 HRc	STEELS 50–60 HRc
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: Corner Radius; 2 Flute; 30° Helix

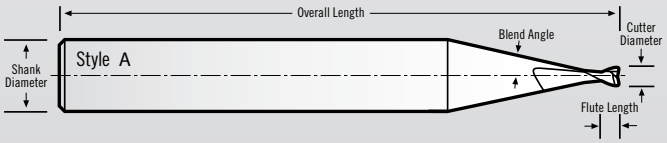
Applications: Side Milling; Helical Interpolation; Conventional; Ramping; High Performance; Roughing; Semi-Finishing; Finishing; Dry; Cold Air; Spray Mist

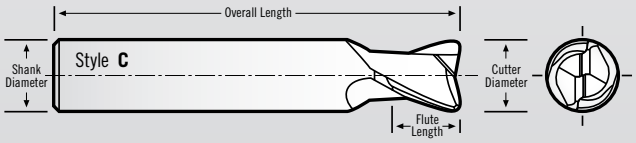
Materials: 40 HRc Hardness; 50 HRc Hardness; 64 HRc Hardness

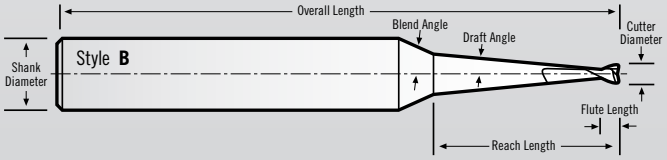
Used for Hardened Materials

Best Tool for Helical Bores or Tight Corners

Coatings: AlTiN Aluminum Titan. Nitride







TM Tolerances:
Cutting Dia. = –.001/ –.002
Shank Dia. = –.0001/ –.0002
Flute Length (1/32 to 0.50) = +.000/+.020
OAL = ±.060

MTM Tolerances
Cutting Dia. = –.025/–.050mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.50/+1.50mm
OAL = ±10mm

TM 2 Flute Tuffy Grade Toroid End Mill

Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Corner Radius	Tool Style	Overall Length	Tool Number AlTiN 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 Tuffy Grade Toroid End Mill METRIC

AlTiN

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

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	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"	9,000–10400	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

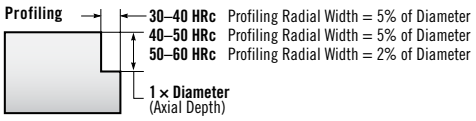
(Use maximum RPM if suggested RPM is higher than the machine's capabilities)

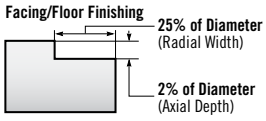
Additional Notes

- 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.

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.

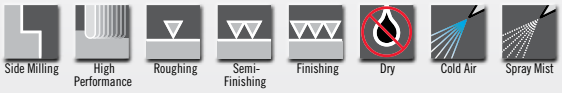




HM/MHM Die/Mold End Mills

Characteristics

Applications

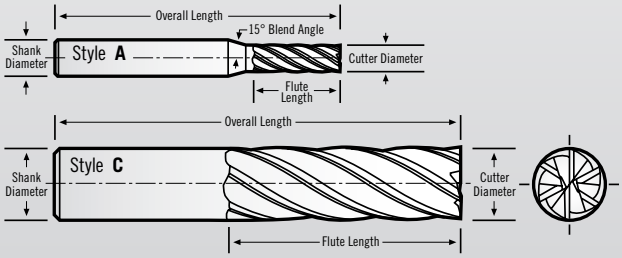


Materials

Used for Hardened Materials

Coatings

Best Tool for Open Areas of Floors & Walls



HM Tolerances
Cutting Dia. = –.001/–.002
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = ±.060

MHM Tolerances
Cutting Dia. = –.025/–.050mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.50/+1.50mm
OAL = ±10mm

HM Multi-Flute Tuffy Grade

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Corner Radius	Tool Style	Overall Length	Tool Number AlTiN 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 AlTiN 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)

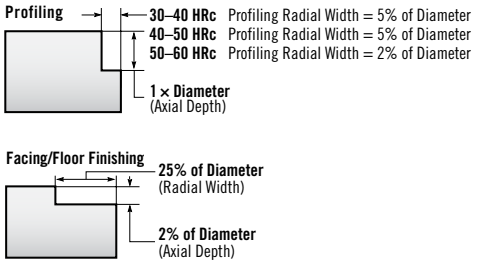
Tool Number	Cutter Diameter	Steels 30–40 HRc		Steels 40–50 HRc		Steels 50–60 HRc	
		RPM	CLPT	RPM	CLPT	RPM	CLPT
HM-402-04	1/8"	17,000–20,000	0.0008–0.001	13,000–17,000	0.0007–0.0009	8,000–13,000	0.0006–0.0008
HM-402-06	3/16"	12,000–14,000	0.0011–0.0015	9,000–12,000	0.0010–0.0014	5,300–9,000	0.0009–0.0012
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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The BEST Miniature Tools in Any Size as Standard

- .005–.062 in every .001 increment as standard. All shipped from stock.
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"We only use RobbJack's SS and SR tools on our machines. When you need a tool to work, the first time, every time, we can count on RobbJack."

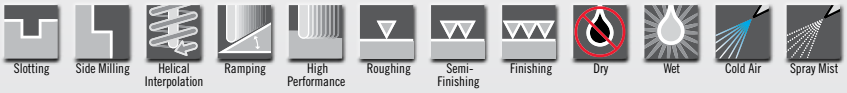
"…these tools are amazing! They run faster and longer than any other tool we have ever tried."

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

SS-2 2 Flute Miniature End Mills

Characteristics

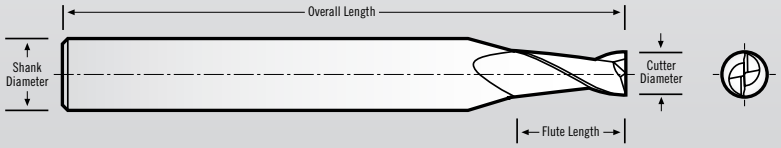
Applications



Materials

Coatings

Hand-Select +/-.0002 Available



SS/SR Tolerances
Cutting Dia. = ±.0005"
Shank Dia. = –.0001/–.0002"
Flute Length = +.003/–.000"
OAL = +.040/–.000"

MSS/MSR Tolerances
Cutting Dia. = ±.010mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.10/–0.00mm
OAL = +1/–0.00mm

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 NumberCoated	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 Tuffy 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

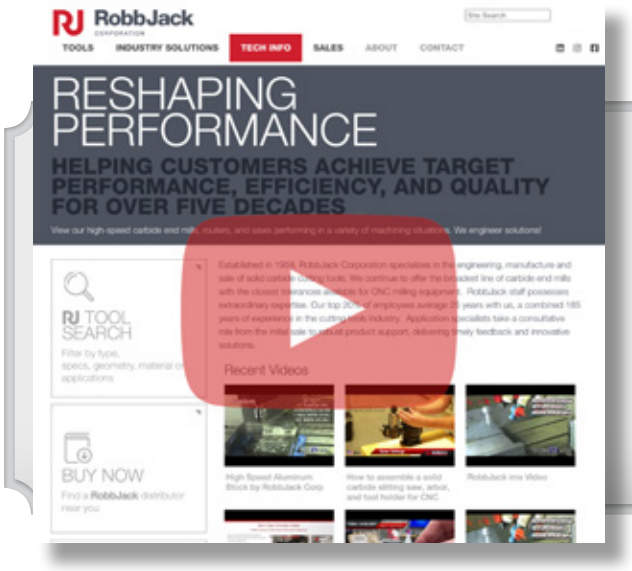
SR-2 2 Flute Tuffy Grade Standard Length

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**

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

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 NumberCoated
.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**



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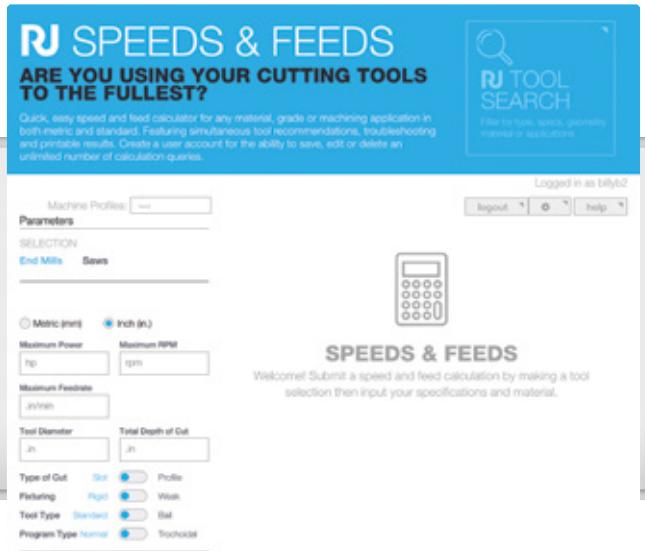


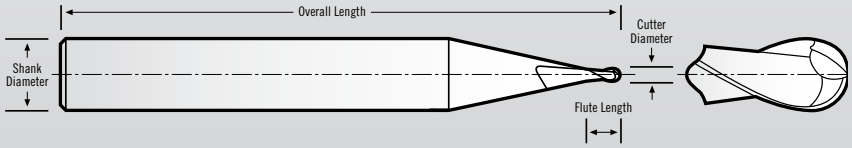
SS/SR-2BN 2 Flute Miniature Ball End Mills

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. = ±.0005"
Shank Dia. = – .0001/–.0002"
Flute Length = +.003/–.000"
OAL = +.040/–.000"

MSS/MSR Tolerances
Cutting Dia. = ±.010 mm
Shank Dia. = –.002/–.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

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 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	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**

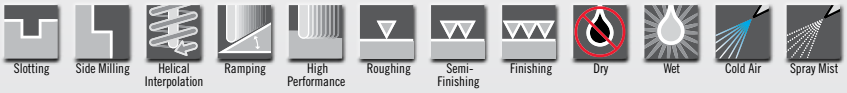
Videos Online

See RobbJack's miniatures in action online:
www.youtube.com/RobbJackCorp
or
robbjack.com/robbjack-tv

SS/MSS-4 4 Flute Miniature End Mills

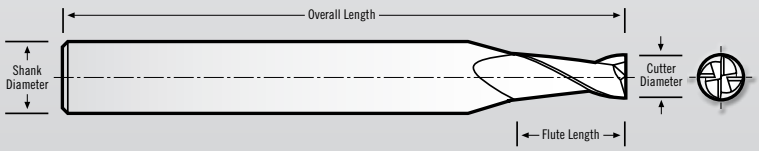
Characteristics

Applications



Materials

Coatings



SS/SR Tolerances
Cutting Dia. = ±.0005"
Shank Dia. = –.0001/–.0002"
Flute Length = +.003/–.000"
OAL = +.040/–.000"

MSS/MSR Tolerances
Cutting Dia. = ±.010mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.10/–0.00mm
OAL = +1/–0.00mm

Tight Tolerances

SS-4 4 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 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	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**

Tight Tolerances

SR-4 4 Flute Tuffy Grade Standard Length

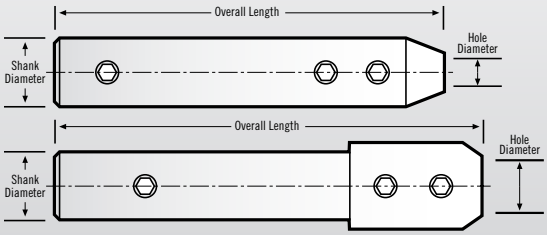
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.031"	1/8"	.0930"	1-1/2"	SR-4-031	SR-4-031-**T**	SR-4-031-**C**	SR-4-031-**A**	SR-4-031-**DLC**
.040"	1/8"	.1200"	1-1/2"	SR-4-040	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	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. = +.00015/–.00000
Shank Dia. = –.0001/–.0003
OAL = ±.060

MAH Tolerances
Hole Dia. = +.004/–.000 mm
Shank Dia. = +.000/–.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

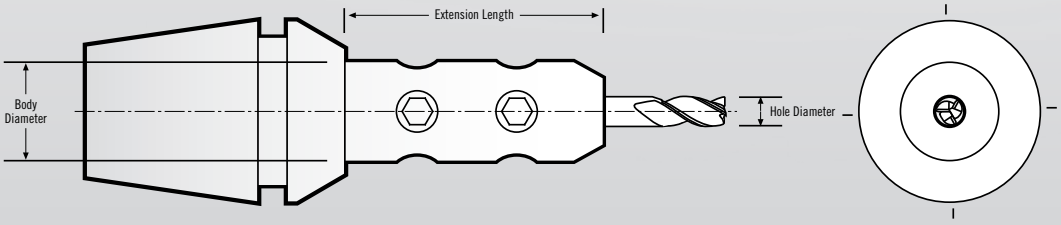
Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3mm	3/8"	3-1/4"	6-32	ACH-M3
4mm	1/2"	3-1/2"	8-32	ACH-M4
5mm	1/2"	3-1/2"	10-32	ACH-M5
6mm	5/8"	4-1/4"	10-32	ACH-M6
7mm	5/8"	4-1/4"	10-32	ACH-M7
8mm	3/4"	4-1/2"	1/4-28	ACH-M8
9mm	3/4"	4-1/2"	5/16-24	ACH-M9
10mm	3/4"	4-1/2"	5/16-24	ACH-M10
11mm	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!

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.

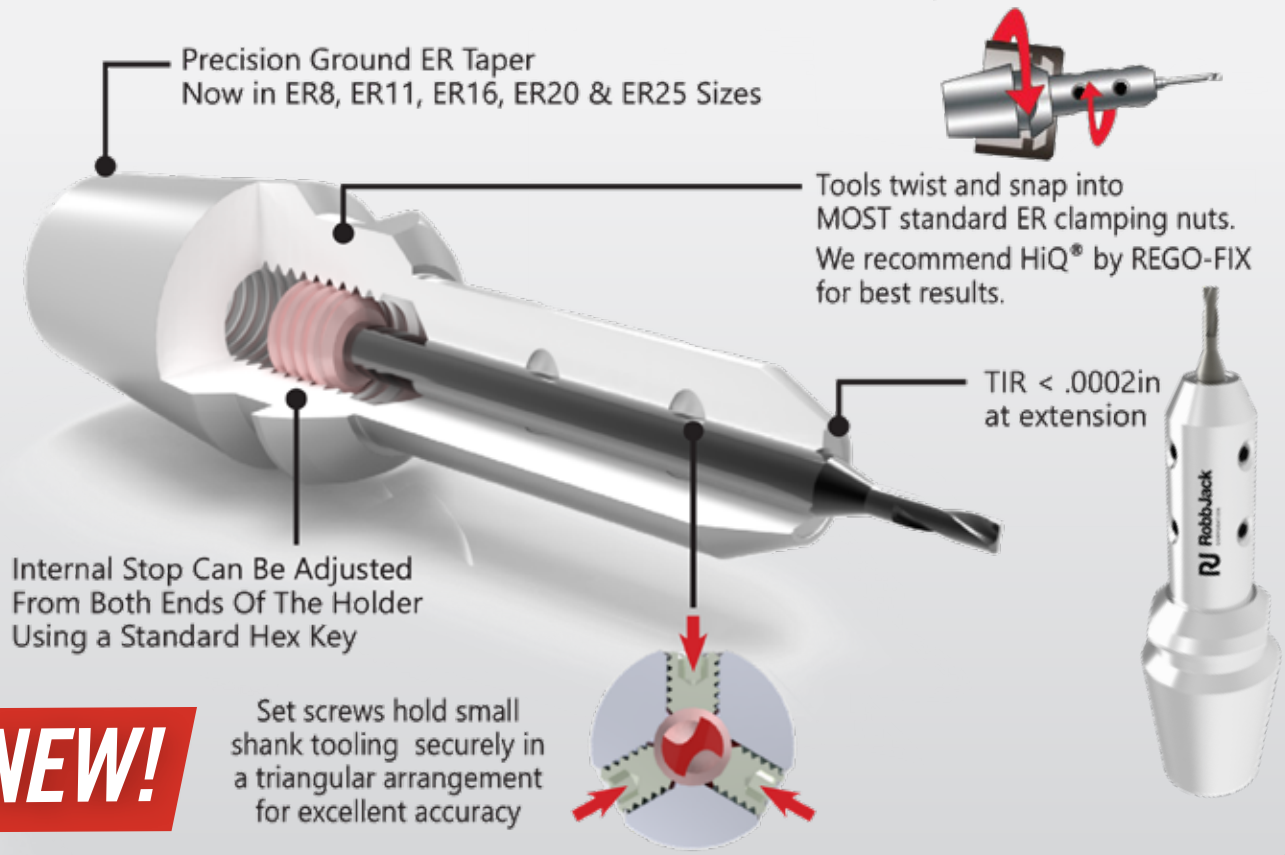
ER11 Solid Mill Extension

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

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*



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!

Scan this code to:

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

TL / MTL 303	3 Flute Extra Length Tuffy Grade Carbide End Mill		146
T6 200/202/400/402	2 and 4 Flute Double Ended Tuffy Grade Carbide End Mill		147
T12 201/203	2 Flute Tuffy Grade Carbide End Mill		149
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SB / MSB 201 **B / MB** 203	2 Flute Ball End Tuffy Grade Carbide End Mill		156
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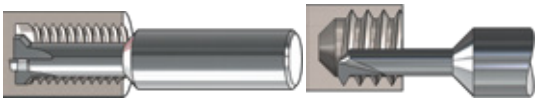
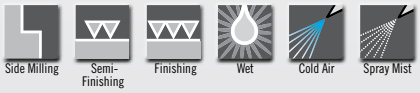
THR/RTHR NEW! Thread / Thread Relief	1, 2, 3, 4, and 6 Flute Thread Mill made from Solid Carbide Internal Thread Relief End Mill		164
ET2 / ET3 / ET4	1 Flute Plunge Tip, Ball Tip and Standard Engraving Tools		166
ACH / MAH **ACH-M** NEW!	Accuhold End Mill Ultra Precision Extension Holders		167
ER 8/11/16/20/25 NEW!	Solid ER-Mill Extensions		168

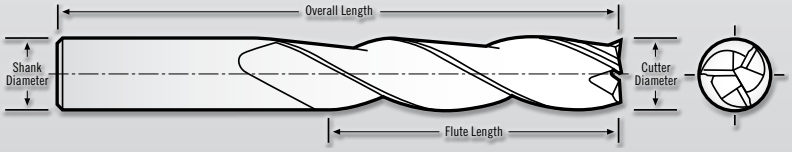
TL/MTL Tuffy Grade Carbide End Mills

Characteristics

Applications



Materials



TL Series Tolerances

Cutting Dia.(1/8") = –.001/–.002
(3/16" to 3/4") = +.001/–.000
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = ±.060

MTL Tolerances

Cutting Dia.3mm = –.025/–.051mm
4 to 20mm = +.025/–.000mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.500/+1.500mm
OAL = ±10mm

S1 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

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

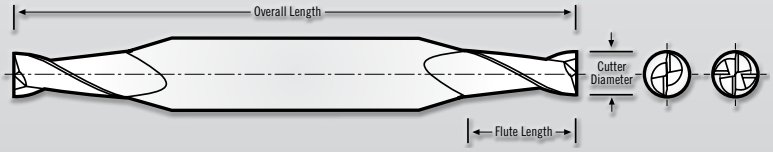
Characteristics
Square End · 2 Flute · 30° Helix

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

Materials
Aluminum · Copper · Titanium · Magnesium · Cast Iron · Steel · Stainless Steel · Brass · Wood

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

+/- TIGHT Tolerances



T6 Series Tolerances
Cutting Dia. = ±.0005
Shank Dia. = –.0001/–.0002
Flute Length = +.030/–.000
OAL = ±.060

All Sizes on 3/16" Shanks for Strength

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*

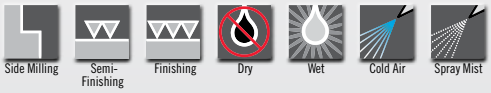
T6-202 2 Flute Standard Length Tuffy Grade

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

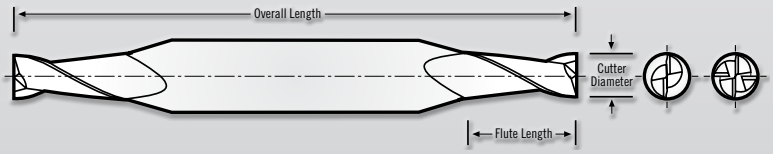
Characteristics


Applications


Materials


Coatings


All Sizes on 3/16" Shanks for Strength



T6 Series Tolerances
Cutting Dia. = ±.0005
Shank Dia. = –.0001/–.0002
Flute Length = +.030/–.000
OAL = ±.060

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**

Characteristics: Square End · 2 Flute · 30° Helix · Flats

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

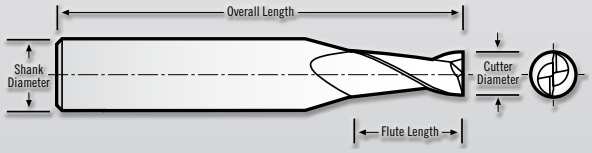
Materials: Aluminum · Copper · Titanium · Magnesium · Cast Iron · Steel · Stainless Steel · Brass · Wood

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

T12 Series Comes in 64th Sizes

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

Multiple Applications



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

T12-201 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

Characteristics: Square End · 4 Flute · 30° Helix · Flats

Applications: Side Milling · Semi-Finishing · Finishing · Dry · Wet · Cold Air · Spray Mist

Materials: Aluminum · Copper · Titanium · Magnesium · Cast Iron · Steel · Stainless Steel · Brass

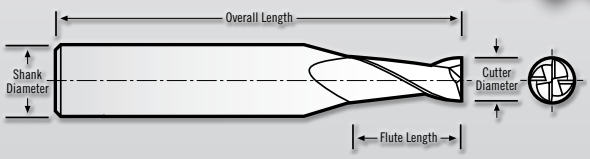
Coatings: Titanium Nitride · Titanium Carbo-Nitride · Aluminum Titan. Nitride · Diamond-Like Carbon (DLC)

T12 Series Comes in 64th Sizes

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

Need WITHOUT Flats?

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



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

T12-403 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

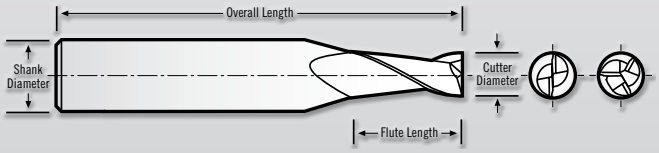
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/8"	3/8"	1/2"	2-1/2"	T12-405-04	T12-405-04-**T**	T12-405-04-**C**	T12-405-04-**A**	T12-405-04-**DLC**
9/64"	3/8"	1/2"	2-1/2"	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**

Characteristics: Square End, 2 Flute, 3 Flute, 30° Helix

Applications: Side Milling, Helical Interpolation, High Performance, Roughing, Semi-Finishing, Finishing, Dry, Wet, Cold Air, Spray Mist

Materials: Aluminum, Copper, Magnesium, Plastics, Composites, Brass, Wood

Coatings: Diamond-Like Carbon (DLC)



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

Slotting, Side Milling, Helical Interpolation

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**

Slotting, Side Milling, Helical Interpolation

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**

Side Milling

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**

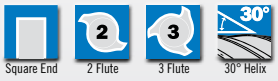
Side Milling

C8-303 3 Flute Standard Length C-2 Grade

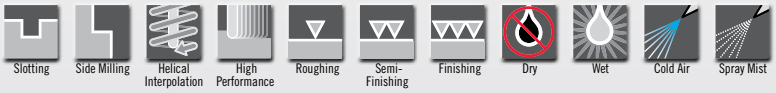
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/8"	1/4"	1/2"	2-1/2"	C8-303-04	C8-303-04-**DLC**
3/16"	1/4"	5/8"	2-1/2"	C8-303-06	C8-303-06-**DLC**
1/4"	1/4"	3/4"	2-1/2"	C8-303-08	C8-303-08-**DLC**

TS 2 & 3 Flute Tuffy Grade Carbide End Mills

Characteristics

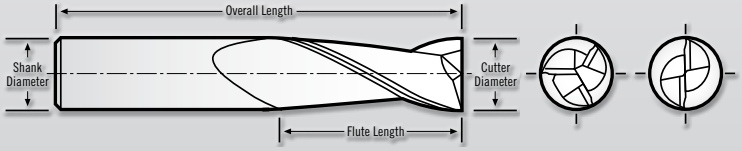


Applications



Materials

Coatings

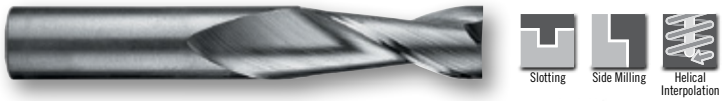


TS Tolerances

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-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**

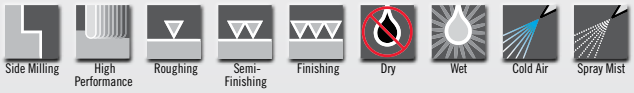
TS-301 3 Flute Stub Length Tuffy Grade

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

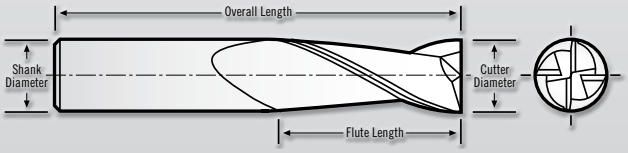
Characteristics

Applications



Materials

Coatings



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

Side Milling

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**

MTS-401 4 Flute Stub Length Tuffy Grade 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
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**

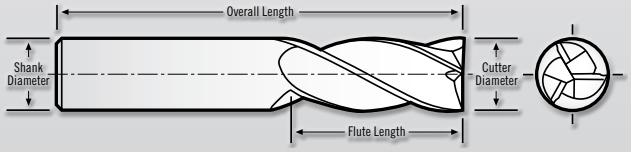
TR 3 Flute Tuffy Grade Carbide End Mills

Characteristics
Square End · 3 Flute · 30° Helix · Flats

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

Materials
Aluminum · Copper · Titanium · Magnesium · Cast Iron · Steel · Brass · Wood

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



TR-303 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 Series Comes in + Tolerances

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.*

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

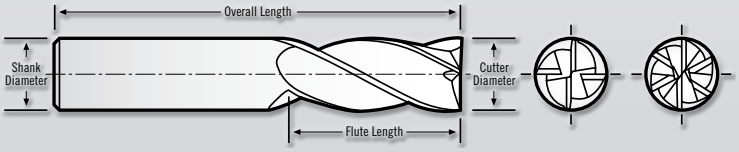
4/6 Flute Tuffy Grade Carbide End Mills TR

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

Side Milling

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.*

Side Milling

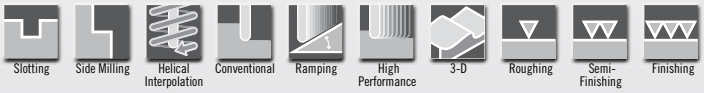
TR-606 6 Flute Standard Length Tuffy Grade

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

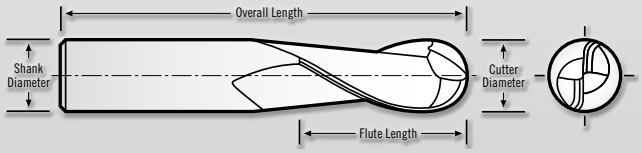
Characteristics

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

NEW Coatings Available!

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**

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**

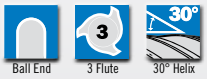
METRIC

MB-203 2 Flute Ball End Standard Length Tuffy Grade

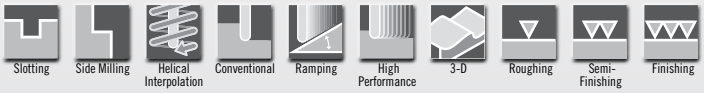
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
2mm	3mm	8mm	38mm	MB-203-02	MB-203-02-**T**	MB-203-02-**C**	MB-203-02-**A**	MB-203-02-**DLC**
3mm	3mm	12mm	38mm	MB-203-03	MB-203-03-**T**	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**

SB/MSB 3 Flute Tuffy Grade Carbide Ball End Mills

Characteristics

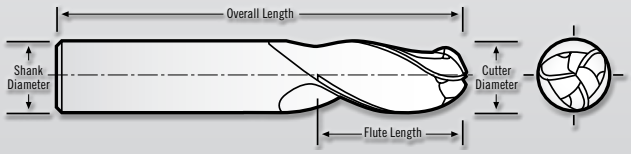


Applications



Materials

Coatings



SB/B 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 1) = +.060/–.000
OAL = ±.060

MB Tolerances

Cutting Dia. = +.000/–.075mm
Shank Dia. = –.002/–.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**

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**

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

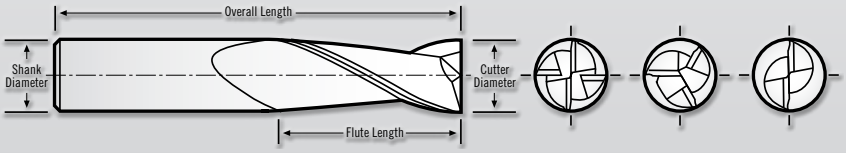
Characteristics: Square End, 2 Flute, 3 Flute, 4 Flute, 30° Helix, Flats

Applications: Side Milling, High Performance, Roughing, Semi-Finishing, Finishing, Dry, Wet, Cold Air, Spray Mist

Materials: Aluminum, Copper, Magnesium, Plastics, Composites, Brass, Wood

Coatings: Diamond-Like Carbon (DLC)

+ Tolerances 64th Sizes



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

Slotting, Side Milling, Helical Interpolation

Flats!

+ Tolerances

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"	Flats!	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**

Slotting | Side Milling | Helical Interpolation

+ Tolerances

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.

+ Tolerances

Flats!

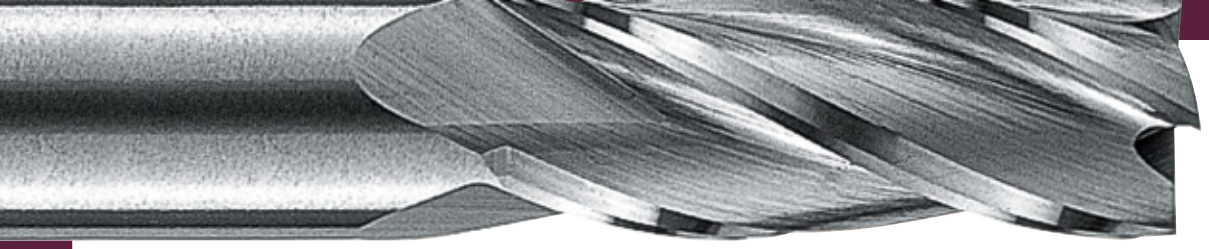
NR-303 3 Flute Standard Length C-2 Grade

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.



NR C-2 Grade Carbide End Mills

NR-404 4 Flute Standard Length C-2 Grade

Flats!

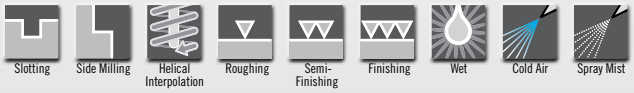
Flats!

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**

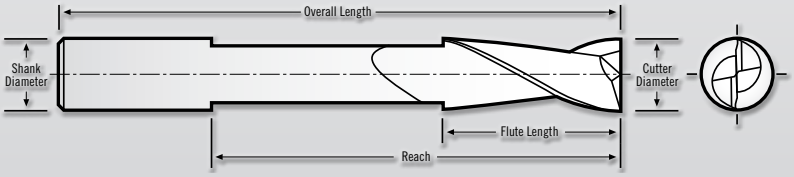
Tuffy Grade Carbide End Mills EX

Characteristics

Applications



Materials



EX Series Tolerances

Cutting Dia. (1/8") = –.001/–.002
(3/16" to 1) = +.001/–.000
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = ±.060

+ Tolerances

Flats!

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**

+ Tolerances

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

Have Chatter?

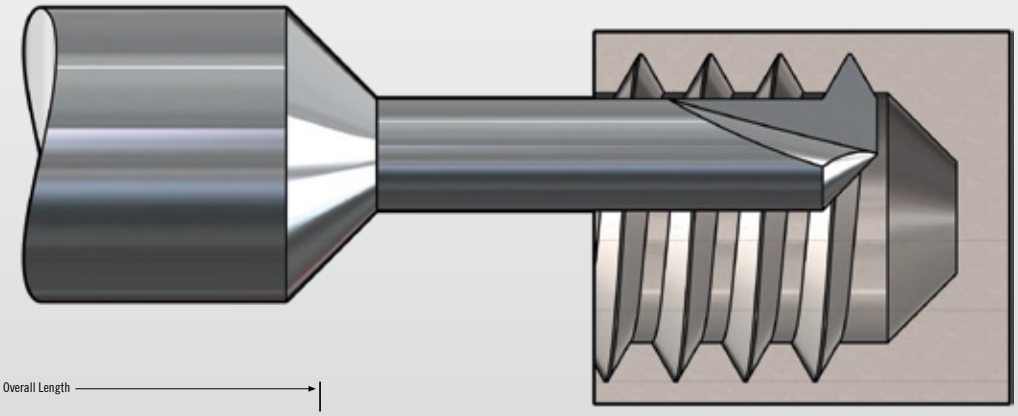
See Robblack's FM Series (p.16)!

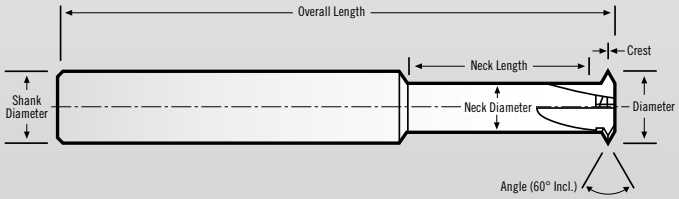
THR Solid Carbide Thread Mills

NEW!

Will make COARSE, FINE or Custom Threads

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.





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.

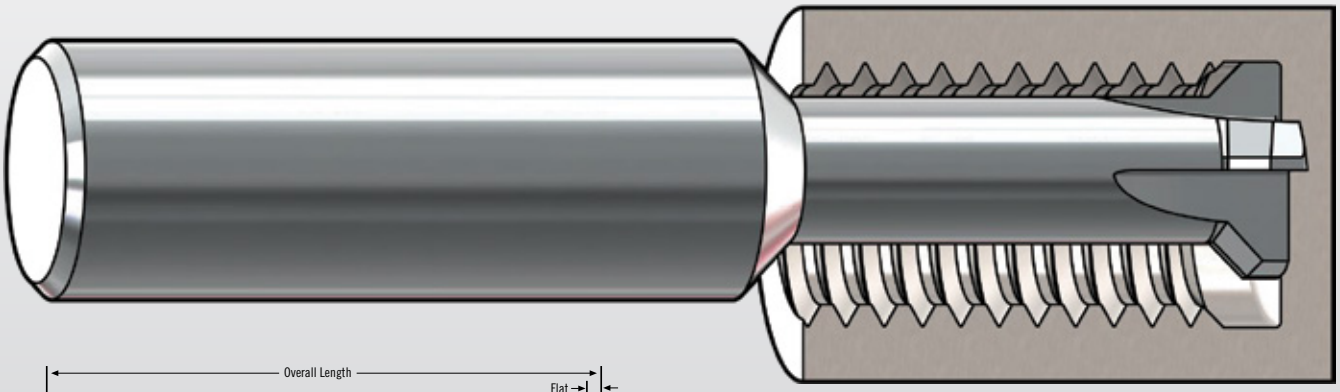
THR 1/2/3/4/6 Flute Thread Mill for Inch and Metric Threads

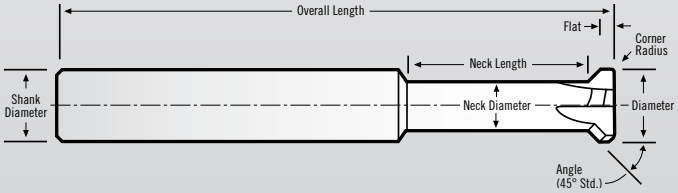
Thread Size		Cut Diameter	Crest	Neck Diam.	Neck Length	Shank Diam.	Overall Length	Number of Flutes	Uncoated	AlTiN Coated	DLC Coated
Inch	Metric										
#3	2mm	0.072	0.001	0.040	0.160	3/16"	2"	1	THR-3	THR-3-**A**	THR-3-**DLC**
#4/#5	3mm/3.5mm	0.083	0.001	0.045	0.190	3/16"	2"	1	THR-4	THR-4-**A**	THR-4-**DLC**
#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.





Undercut diameter:
Pitches finer than 20 TPI = thread basic major dia + .0075"
Pitches of 20 TPI and courser = thread basic major dia + .0150"

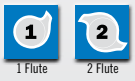
RTHR 2/3/4/6 Flute Internal Thread Relief End Mill

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**

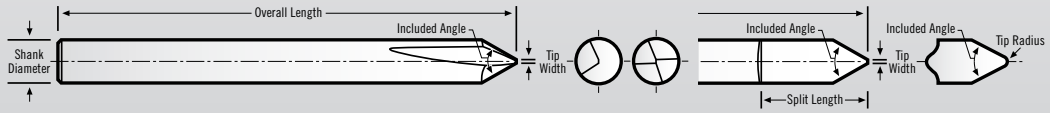
ET Engraving Tools

Characteristics



Applications

Materials



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

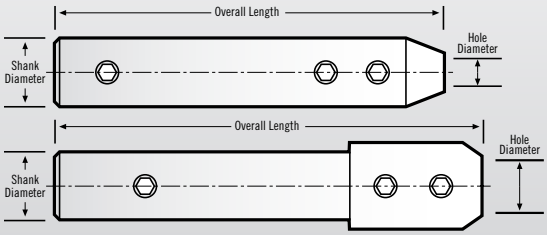
Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Uncoated
.010"	1/4"	60°	.650"	2"	ET4-01060
.020"	1/4"	60°	.650"	2"	ET4-02060
.030"	1/4"	60°	.650"	2"	ET4-03060
.050"	1/4"	60°	.650"	2"	ET4-05060
.060"	1/4"	60°	.650"	2"	ET4-06060
.010"	1/4"	90°	.650"	2"	ET4-01090
.020"	1/4"	90°	.650"	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/–.00000
Shank Dia. = –.0001/–.0003
OAL = ±.060

MAH Tolerances
Hole Dia. = +.004/–.000 mm
Shank Dia. = +.000/–.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!

Metric to Inch

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

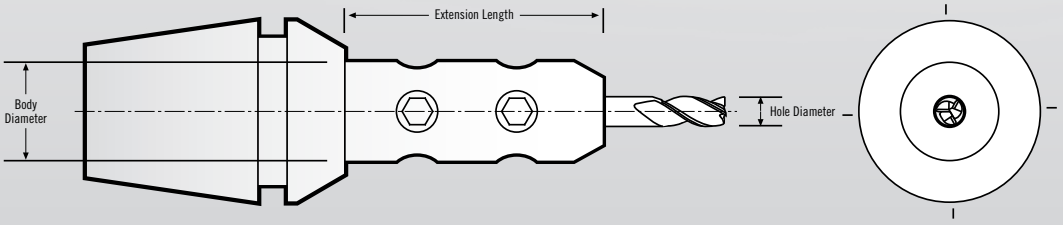
Hole Diameter	Shank Diameter	Overall Length	Screw	Uncoated
3mm	3/8"	3.25	6-32	ACH-M3
4mm	1/2"	3-1/2"	8-32	ACH-M4
5mm	1/2"	3-1/2"	10-32	ACH-M5
6mm	5/8"	4-1/4"	10-32	ACH-M6
7mm	5/8"	4-1/4"	10-32	ACH-M7
8mm	3/4"	4-1/2"	1/4-28	ACH-M8
9mm	3/4"	4-1/2"	5/16-24	ACH-M9
10mm	3/4"	4-1/2"	5/16-24	ACH-M10
11mm	3/4"	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!



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.

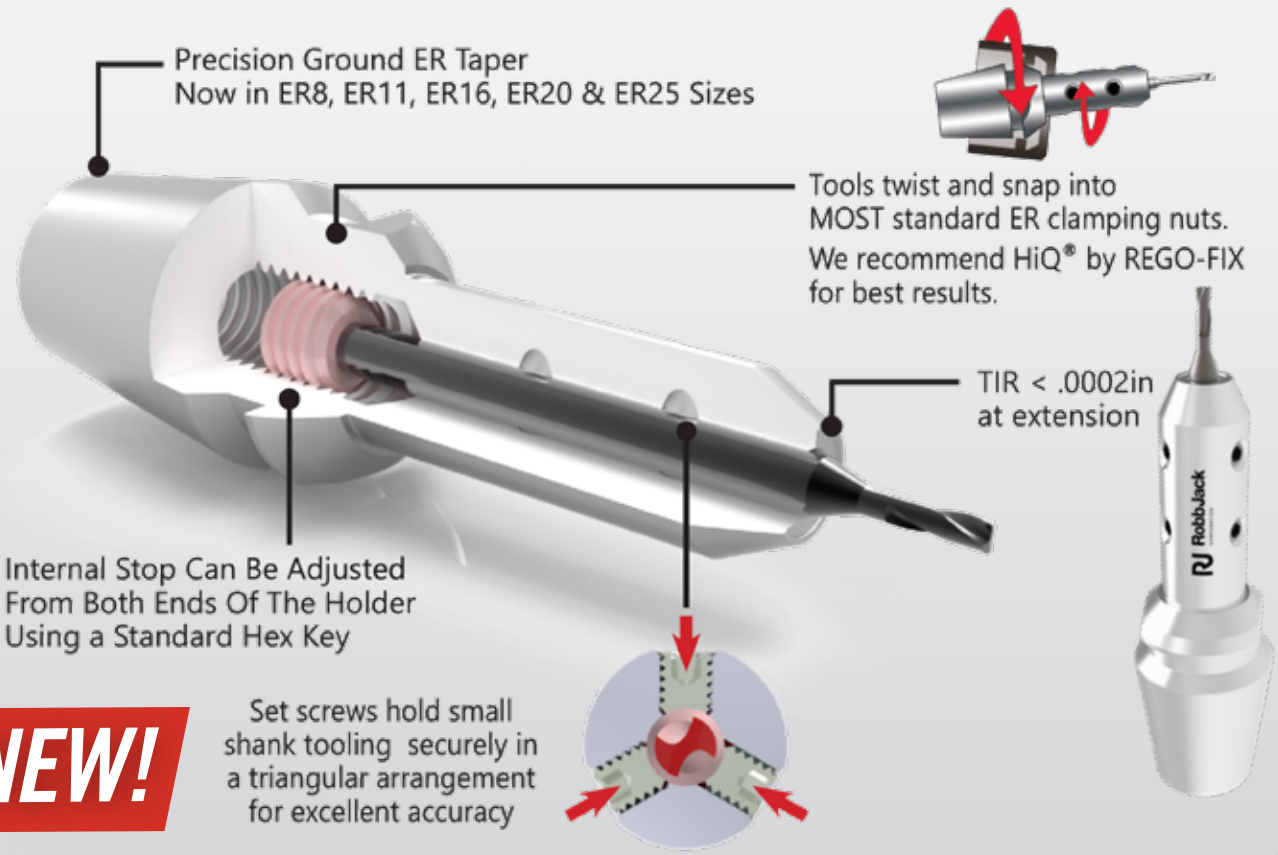
ER11 Solid Mill Extension

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

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*



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:

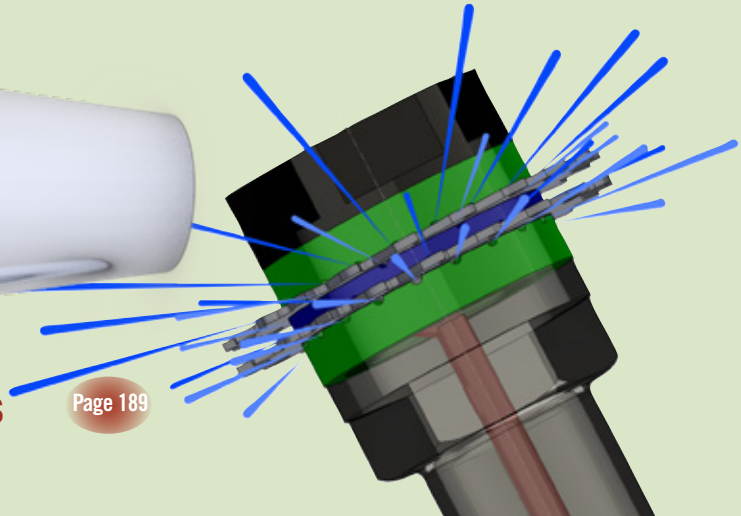
- Watch Videos
- How to Assemble a Saw and Arbor
- Tips and Tricks
- And More...

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

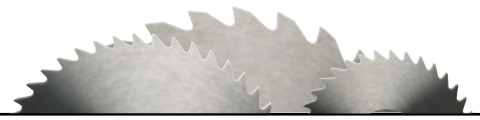
ALL NEW



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	NEW!	Ultra Precision Saw Arbor for Carbide Slitting Saws	188
CF-FLANGES	NEW!	Solid Carbide Thru-Coolant Saw Flanges	189
CSP Spacers	NEW!	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	NEW!	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.

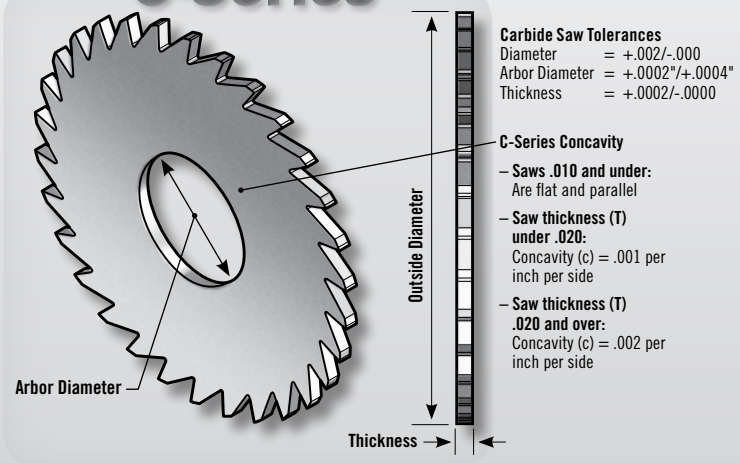
Note: Saws thinner than .0100" or 0.254MM thick are considered specials and may not be returned

Pricing Special Decimal Thicknesses

To price a saw thickness not listed in the catalog, use the price of the closest thicker standard saw.

SAWS

C-Series



Carbide Saw Tolerances
Diameter = +.002/-.000
Arbor Diameter = +.0002"/+.0004"
Thickness = +.0002/-.0000

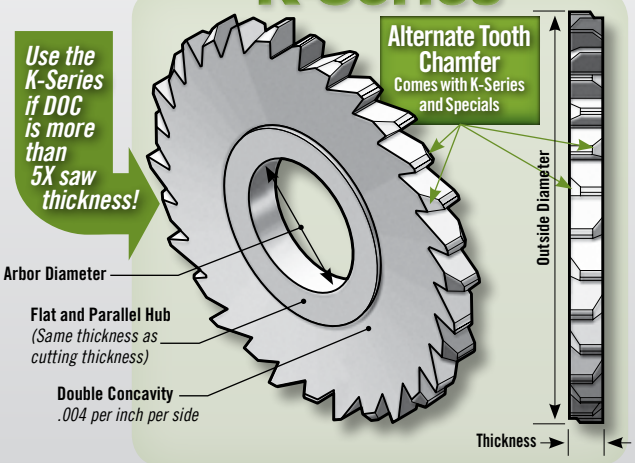
C-Series Concavity
- **Saws .010 and under:** Are flat and parallel
- **Saw thickness (T) under .020:** Concavity (c) = .001 per inch per side
- **Saw thickness (T) .020 and over:** Concavity (c) = .002 per inch per side

BEST PERFORMANCE!

K-Series

Use the K-Series if DOC is more than 5X saw thickness!

Alternate Tooth Chamfer Comes with K-Series and Specials



Formulas

INCH SIZES		
Surface Feet per Minute	=	RPM x .262 x Tool Diameter
RPM	=	Surface Feet per Minute x 3.82 / Tool Diameter
Feed Rate (in/min.)	=	RPM x Chip Load per Tooth x Number of Teeth
Chip Load Per Tooth	=	in/min. / RPM x Number of Teeth
in³/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	=	Surface Meters per Minute x 318.057 / Tool Diameter
Feed Rate (mm/min.)	=	RPM x Chip Load per Tooth x Number of Teeth
Chip Load Per Tooth	=	mm/min. / RPM x Number of Teeth
cm³/min	=	Width (mm) x Depth (mm) x 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

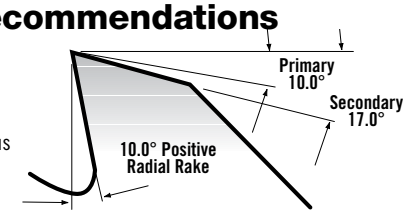
Application Guidelines

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)
Keyways:	Generally not used with solid carbide slitting saws, but are available upon request

Tooth Recommendations

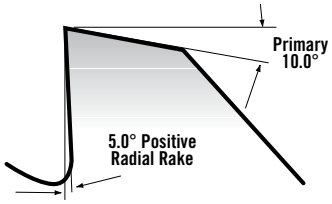
Coarse Pitch

Coarse Tooth recommended for use in non-ferrous materials.



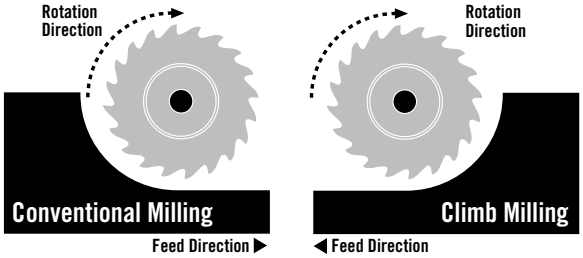
Fine Pitch

Fine Tooth recommended for use in ferrous materials.



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

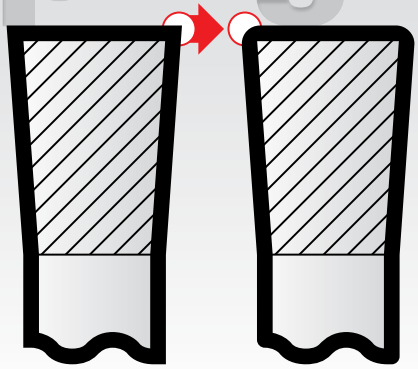
Material	Max Axial Depth/Pass (Times Thickness)	Teeth	Inch				Metric			
			SFM Surface Feet/Minute	Chip Load per Tooth – Standard			SMM Surface Meters/Minute	Chip Load per Tooth – Metric		
				Saw Thickness .002-.031	Saw Thickness .031-.100	Saw Thickness >.100		Saw Thickness .05mm-1.0mm	Saw Thickness 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

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.

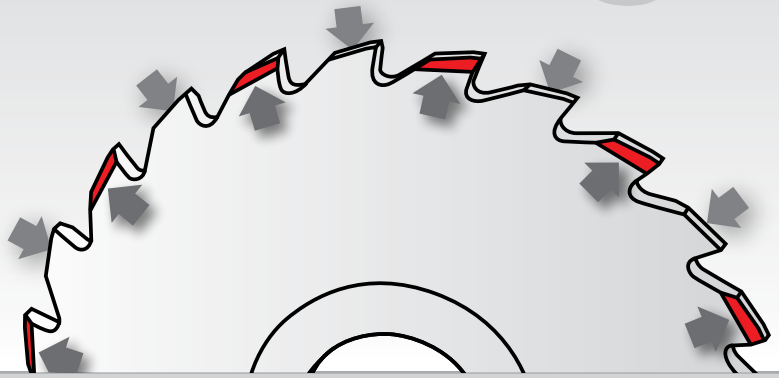
Cons: T-Process will bring up a burr in certain materials, it is not for materials that like a sharp edge, such as aluminum and plastics.

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?



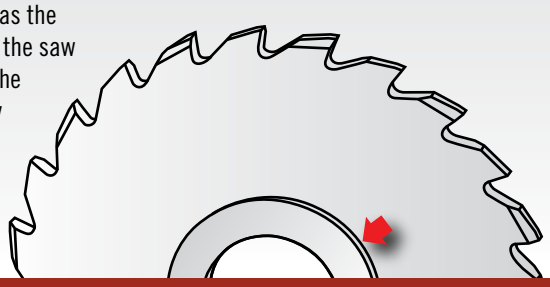
Alternate Tooth Chamfer

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?

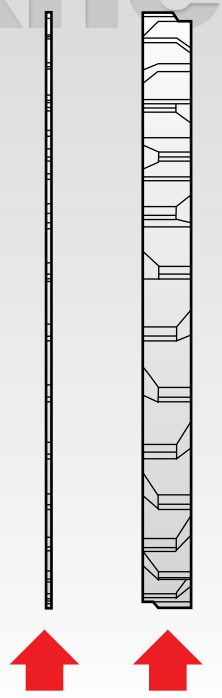
Saw Thickness

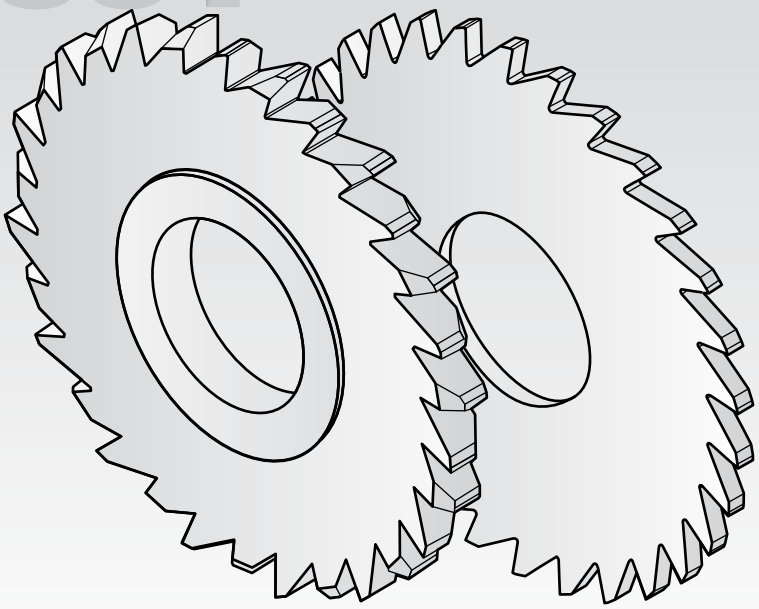
Any thickness from 0.0020" to 0.2500" is standard. To order any saw thickness in ten-thousandths of an inch, replace the middle 4 digits in the part number.

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.

Solid Carbide SAWS

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

Aluminum | Copper | Magnesium | Plastics | Composites | Brass

Use if DOC is more than 5X saw thickness

10 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity ½" 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.

Titanium | Cast Iron | Steel | Stainless Steel | Super Alloys

Use if DOC is more than 5X saw thickness

20 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity ½" 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 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.

1" Diameter — 3/8" Arbor

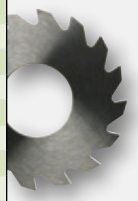
Proper Max Depth of Cut:
Using AB Arbor = .1375
Using NAB Arbor = .095

Aluminum | Copper | Magnesium | Plastics | Composites | Brass

Use if DOC is more than 5X saw thickness

12 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer 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

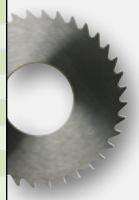


Titanium | Cast Iron | Steel | Stainless Steel | Super Alloys

Use if DOC is more than 5X saw thickness

24 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer 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 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+

1¼" Diameter ½" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .200
Using NAB Arbor = .1475

Al Aluminum | Cu Copper | Mg Magnesium | Plastics Plastics | Composites | Brass Brass

Use if DOC is more than 5X saw thickness

16 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 3/4" HUB Diameter
.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

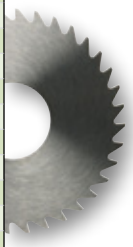
Any Saw Thickness Available

Ti Titanium | Cast Iron Cast Iron | Steel Steel | Stainless Steel Stainless Steel | Super Alloys Super Alloys

Use if DOC is more than 5X saw thickness

36 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 3/4" HUB Diameter
.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 0.0020" to 0.2500" **is standard.**

To order, **replace the middle 4 digits** in the part number.

Solid carbide spacers and flanges for 1-1/4" 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.

1½" Diameter ½" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .325
Using NAB Arbor = .2725

Al Aluminum | Cu Copper | Mg Magnesium | Plastics Plastics | Composites | Brass Brass

Use if DOC is more than 5X saw thickness

16 TEETH

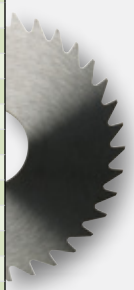
Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 3/4" HUB Diameter
.0020"	C15-0020-16-16*	–
.0040"	C15-0040-16-16*	–
.0060"	C15-0060-16-16*	–
.0080"	C15-0080-16-16*	–
.0100"	C15-0100-16-16*	–
.0120"	C15-0120-16-16	–
.0140"	C15-0140-16-16	–
.0156"	C15-0156-16-16	–
.0180"	C15-0180-16-16	–
.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

Ti Titanium | Cast Iron Cast Iron | Steel Steel | Stainless Steel Stainless Steel | Super Alloys Super Alloys

Use if DOC is more than 5X saw thickness

36 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 3/4" HUB Diameter
.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 1-1/2" 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.

1¾" Diameter 1/2" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .450
Using NAB Arbor = .3975

Al Aluminum | Cu Copper | Mg Magnesium | Plastics | Composites | Brass

Use if DOC is more than 5X saw thickness

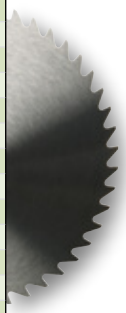
24 TEETH		Alternate Tooth Chamfer Double Concavity 3/4" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C17-0020-16-24*	–
.0040"	C17-0040-16-24*	–
.0060"	C17-0060-16-24*	–
.0080"	C17-0080-16-24*	–
.0100"	C17-0100-16-24*	–
.0120"	C17-0120-16-24	–
.0140"	C17-0140-16-24	–
.0156"	C17-0156-16-24	–
.0180"	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

Ti Titanium | Cast Iron | Steel | Stainless Steel | Super Alloys

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"	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.

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.

1¾" Diameter 5/8" Arbor

Proper Max Depth of Cut:
AB Arbor = .325
NAB Arbor = .2875

Al Aluminum | Cu Copper | Mg Magnesium | Plastics | Composites | Brass

Use if DOC is more than 5X saw thickness

24 TEETH		Alternate Tooth Chamfer Double Concavity 1" HUB Diameter
Saw Thickness	Standard Concavity	
.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

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Use if DOC is more than 5X saw thickness

36 TEETH		Alternate Tooth Chamfer Double Concavity 1" HUB Diameter
Saw Thickness	Standard Concavity	
.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 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 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

Aluminum · Copper · Magnesium · Plastics · Composites · Brass

Use if DOC is more than 5X saw thickness

24 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer 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

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Use if DOC is more than 5X saw thickness

36 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer 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

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.

2" Diameter 1/2" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .575
Using NAB Arbor = .5225

Aluminum · Copper · Magnesium · Plastics · Composites · Brass

Use if DOC is more than 5X saw thickness

24 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer 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

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Use if DOC is more than 5X saw thickness

48 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer 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

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+

Solid Carbide SAWS

Any Saw Thickness Available

2" Diameter 1" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .200
Using NAB Arbor = .210

Aluminum | Copper | Magnesium | Plastics | Composites | Brass

24 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.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

Titanium | Cast Iron | Steel | Stainless Steel | Super Alloys

48 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.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

Use if DOC is more than 5X saw thickness

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.

2¼" Diameter 5/8" Arbor

Proper Max Depth of Cut:
AB Arbor = .575
NAB Arbor = .5375

Aluminum | Copper | Magnesium | Plastics | Composites | Brass

28 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1" HUB Diameter
.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

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56 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1" HUB Diameter
.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 Solid Carbide

Any Saw Thickness Available

QUANTITY DISCOUNTS
Available at Qty 3, 7 and 25+

2½" Diameter 1" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .450
Using NAB Arbor = .460

Al Aluminum | Cu Copper | Mg Magnesium | Plastics Plastics | Composites | Brass Brass

Use if DOC is more than 5X saw thickness

28 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.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

Ti Titanium | Cast Iron Cast Iron | Steel Steel | Stainless Steel Stainless Steel | Super Alloys Super Alloys

Use if DOC is more than 5X saw thickness

56 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.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

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.

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.

2¾" Diameter 1" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .575
Using NAB Arbor = .585

Al Aluminum | Cu Copper | Mg Magnesium | Plastics Plastics | Composites | Brass Brass

Use if DOC is more than 5X saw thickness

30 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.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

Ti Titanium | Cast Iron Cast Iron | Steel Steel | Stainless Steel Stainless Steel | Super Alloys Super Alloys

Use if DOC is more than 5X saw thickness

60 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.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

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

Any Saw Thickness Available

3" Diameter 1" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .700
Using NAB Arbor = .710

Al Aluminum | Cu Copper | Mg Magnesium | Plastics Plastics | Composites | Brass Brass

Use if DOC is more than 5X saw thickness

30 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.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

Ti Titanium | Cast Iron Cast Iron | Steel Steel | Stainless Steel Stainless Steel | Super Alloys Super Alloys

Use if DOC is more than 5X saw thickness

60 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.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

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.

4" Diameter 1" Arbor

Proper Max Depth of Cut:
Using AB Arbor = 1.200
Using NAB Arbor = 1.210

Al Aluminum | Cu Copper | Mg Magnesium | Plastics Plastics | Composites | Brass Brass

Use if DOC is more than 5X saw thickness

36 TEETH

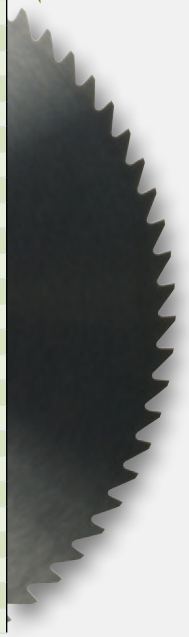
Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.0020"	C40-0020-32-36*	–
.0040"	C40-0040-32-36*	–
.0060"	C40-0060-32-36*	–
.0080"	C40-0080-32-36*	–
.0100"	C40-0100-32-36*	–
.0120"	C40-0120-32-36	–
.0140"	C40-0140-32-36	–
.0156"	C40-0156-32-36	–
.0180"	C40-0180-32-36	–
.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

Ti Titanium | Cast Iron Cast Iron | Steel Steel | Stainless Steel Stainless Steel | Super Alloys Super Alloys

Use if DOC is more than 5X saw thickness

72 TEETH

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 1-1/2" HUB Diameter
.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



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

Al Aluminum | Cu Copper | Mg Magnesium | Plastics | Composites | Brass

Use if DOC is more than 5X saw thickness

10 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 12mm HUB Diameter
.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

Ti Titanium | Cast Iron | Steel | Stainless Steel | Super Alloys

Use if DOC is more than 5X saw thickness

20 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 12mm HUB Diameter
.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

Solid carbide spacers and flanges available. See back of Saws section.

25 mm Diameter 8 mm Arbor

Proper Max Depth of Cut: Using MSA Arbor = 4.0 mm

Al Aluminum | Cu Copper | Mg Magnesium | Plastics | Composites | Brass

Use if DOC is more than 5X saw thickness

12 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 16mm HUB Diameter
.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

Ti Titanium | Cast Iron | Steel | Stainless Steel | Super Alloys

Use if DOC is more than 5X saw thickness

24 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 16mm HUB Diameter
.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.

NEW Coatings Available! TiN TiCN AlTiN

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

Solid Carbide SAWS

32 mm Diameter 8 mm Arbor

Proper Max Depth of Cut:
Using MSA Arbor = 7.5 mm

Al Aluminum | Cu Copper | Mg Magnesium | Plastics | Composites | Brass

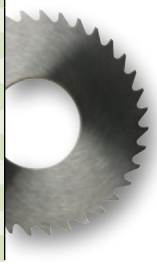
Use if DOC is more than 5X saw thickness

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

Ti Titanium | Cast Iron | Steel | Stainless Steel | Super Alloys

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



Solid carbide spacers and flanges available. See back of Saws section.

40 mm Diameter 10 mm Arbor

Proper Max Depth of Cut:
Using MSA Arbor = 10.5 mm

Al Aluminum | Cu Copper | Mg Magnesium | Plastics | Composites | Brass

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

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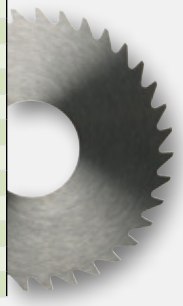
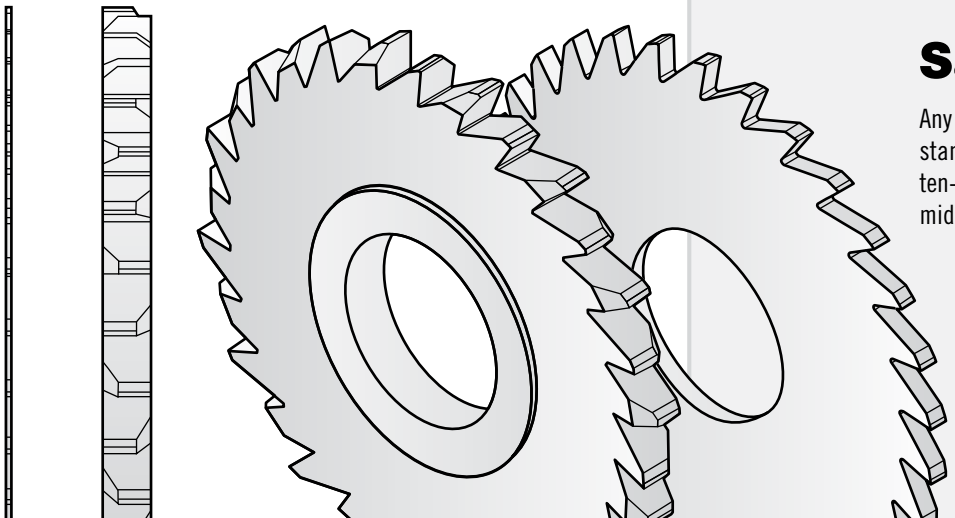
Use if DOC is more than 5X saw thickness

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.



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

Any Saw Thickness Available

50 mm Diameter 13 mm Arbor

Proper Max Depth of Cut: Using MSA Arbor = 14.5 mm

Al Aluminum · Cu Copper · Mg Magnesium · Plastics Plastics · Composites · Brass Brass

Use if DOC is more than 5X saw thickness

24 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 20mm HUB Diameter
.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

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Use if DOC is more than 5X saw thickness

48 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 20mm HUB Diameter
.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

Solid carbide spacers and flanges available. See back of Saws section.

63 mm Diameter 16 mm Arbor

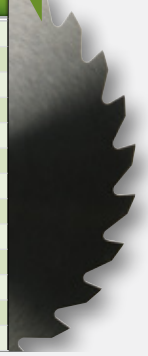
Proper Max Depth of Cut: Using MSA Arbor = 18.5 mm

Al Aluminum · Cu Copper · Mg Magnesium · Plastics Plastics · Composites · Brass Brass

Use if DOC is more than 5X saw thickness

28 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 25mm HUB Diameter
.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



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Use if DOC is more than 5X saw thickness

56 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 25mm HUB Diameter
.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.

Saw Thickness

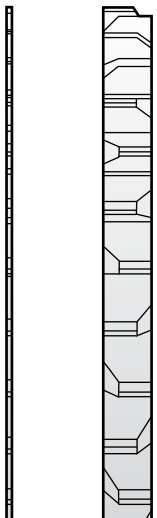
Any thickness from 0.10mm to 6.00mm is standard. To order any saw thickness in ten-thousandths of an inch, replace the middle 4 digits in the part number.

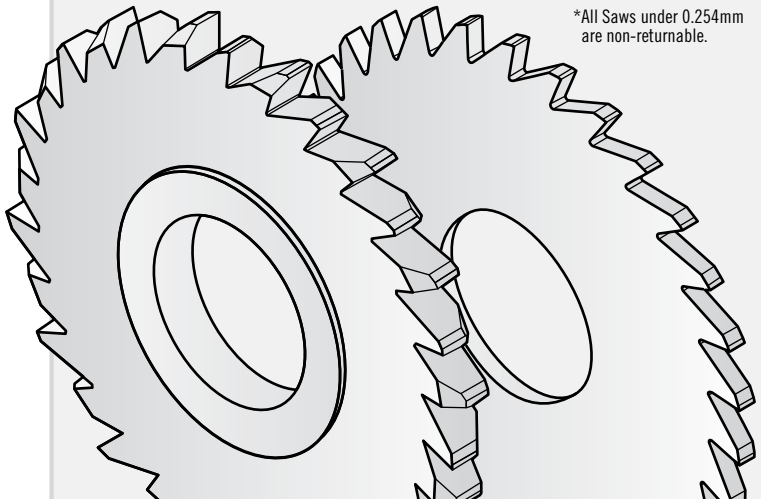
Example:

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

Al Aluminum · Cu Copper · Mg Magnesium · Plastics Plastics · Composites · Brass Brass

Use if DOC is more than 5X saw thickness

30 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 35mm HUB Diameter
.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

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Use if DOC is more than 5X saw thickness

60 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 35mm HUB Diameter
.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.

100 mm Diameter 22 mm Arbor

Proper Max Depth of Cut: Using MSA Arbor = 31.5 mm

Al Aluminum · Cu Copper · Mg Magnesium · Plastics Plastics · Composites · Brass Brass

Use if DOC is more than 5X saw thickness

36 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 35mm HUB Diameter
.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

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Use if DOC is more than 5X saw thickness

72 TEETH METRIC

Saw Thickness	Standard Concavity	Alternate Tooth Chamfer Double Concavity 35mm HUB Diameter
.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.

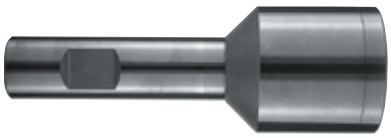
NEW Coatings Available! TiN TiCN AlTiN

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

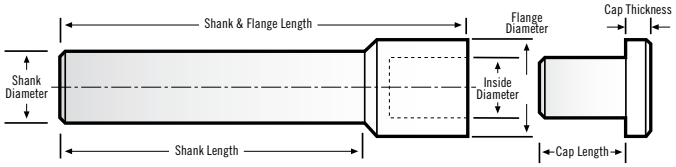


AB Arbors

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"	8-32×1" 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"	10-32×1.5" 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"	1/4-20×1.5" 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"	1/4-20×2" 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"	5/16-18×2.5" Socket head cap screw	415 in-lb	1/4"	AB-875
1"	3/4"	1-1/2"	1"	4"	2-3/8"	1/4"	5/16-18×2.5" Socket head cap screw	415 in-lb	1/4"	AB-1000
1"	1"	1-1/2"	1"	5"	3-1/2"	1/4"	5/16-18×2.5" 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"	1/2-13×3" 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	M3×25 Flat-Head Socket Cap Screw	1.25 nm	2mm	MSA-05
8mm	12mm	16mm	10mm	75mm	61mm	6mm	M3×25 Flat-Head Socket Cap Screw	1.25 nm	2mm	MSA-08
10mm	12mm	18mm	10mm	75mm	59.6mm	6mm	M5×30 Flat-Head Socket Cap Screw	6.9 nm	3mm	MSA-10
13mm	12mm	20mm	10mm	75mm	58.7mm	6mm	M5×30 Flat-Head Socket Cap Screw	6.9 nm	3mm	MSA-13
16mm	16mm	25mm	22mm	100mm	70.4mm	6mm	M5×45 Socket head cap screw	12 nm	4mm	MSA-16
22mm	20mm	35mm	22mm	100mm	67.4mm	6mm	M6×45 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

Inside Diameter concentric to Shank Diameter within .005 mm

Notes:
Total thickness of saws/spacers should not exceed 50% of Cap Length.

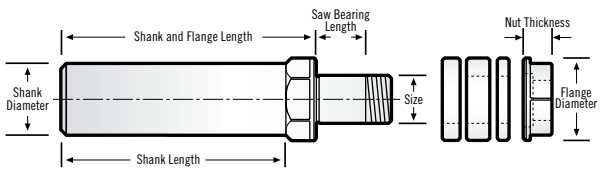
Arbor caps with longer Cap Length dimension available. (Excludes Metric)

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
1/4"	1/2"	0.57	0.26	2.2	1.7"	.250	.0625" .125 .1875"	8 ft-lbs	NAB-250	NAB-250-TC
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
1-1/4"	1-1/4"	2	.5	3.5	3.08"	.440	.0625" .1875" .25	50 ft-lbs	NAB-1250	NAB-1250-TC

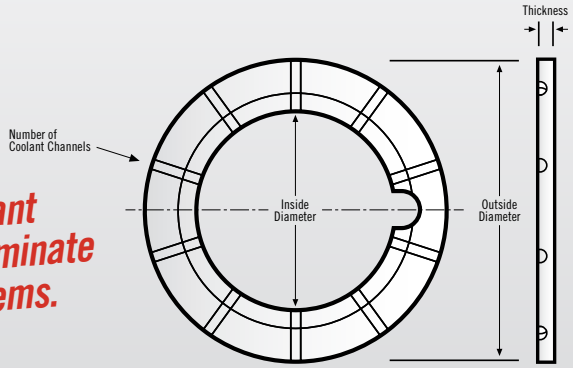
Keyway Size (Removable)
Special – available upon request
1/8"
1/8"
1/8"
1/4"
5/16"



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

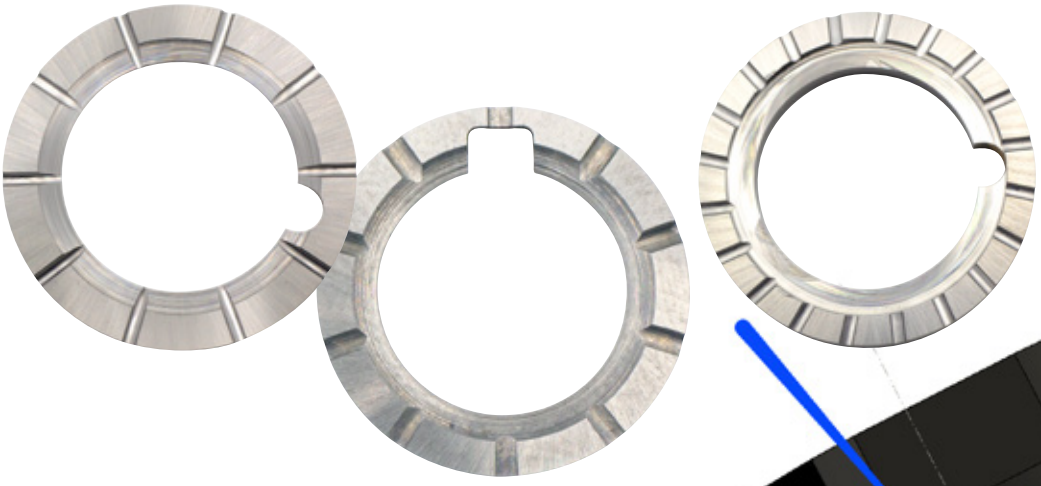
CF Solid Carbide Thru-Coolant Saw Flanges

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!

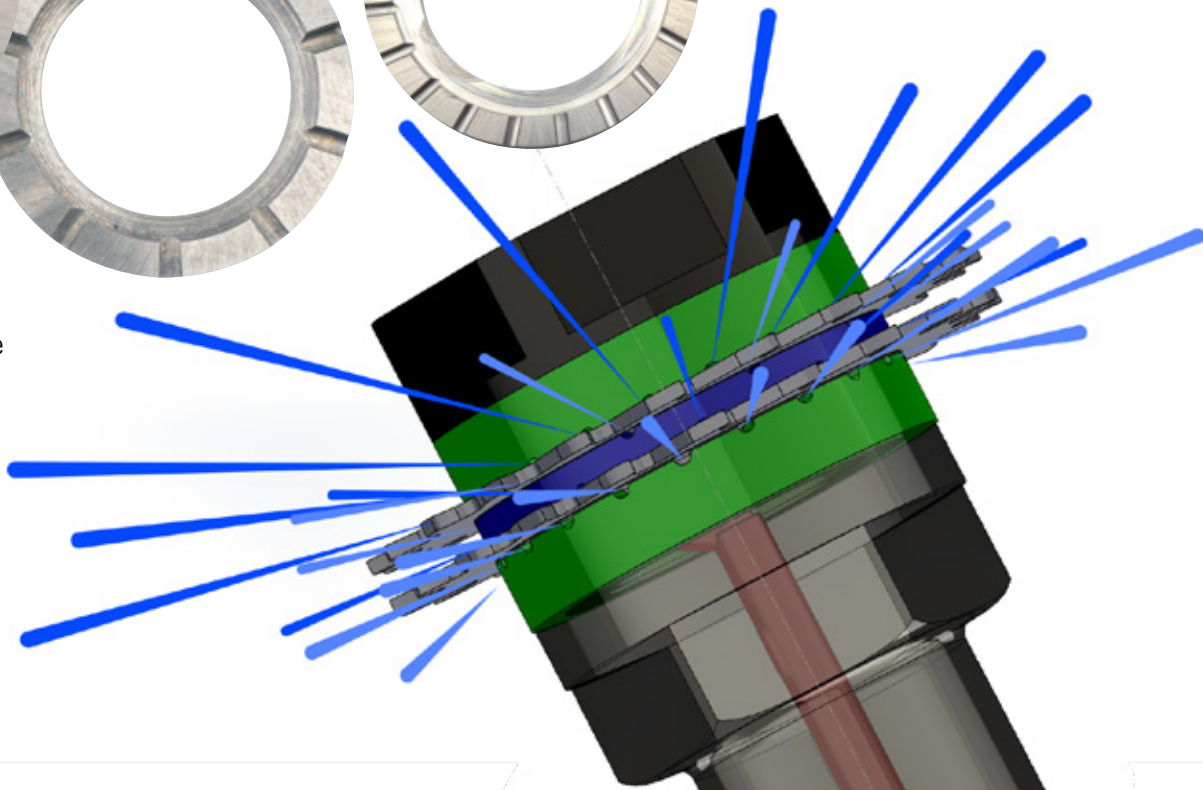
Two solid carbide coolant flanges are needed for Thru-Coolant arbors.

Sold in Pairs.



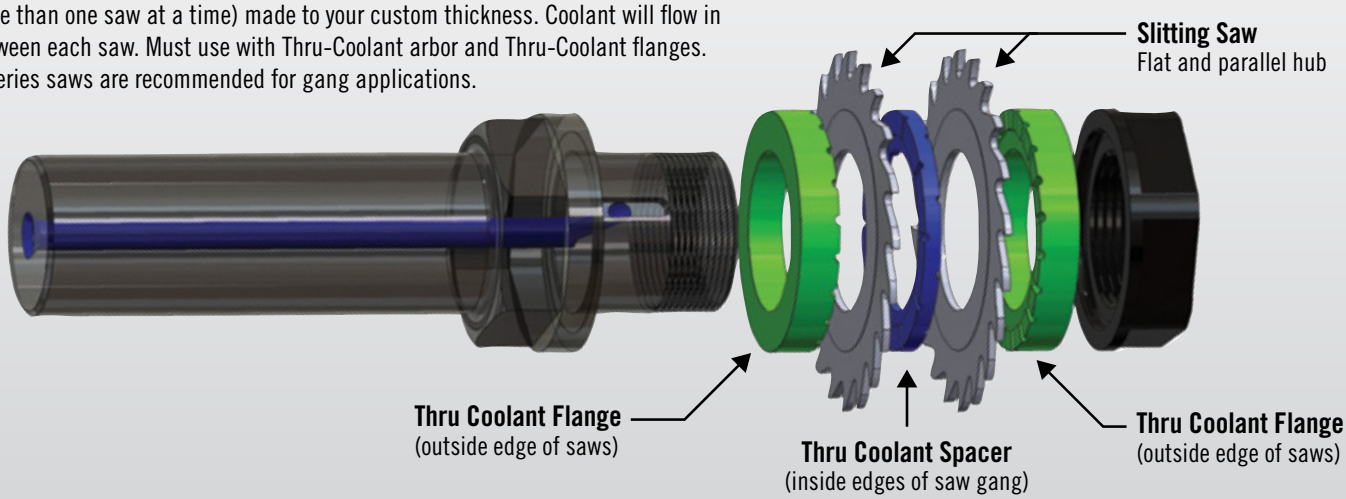
Keyways in images are not standard they are available upon request

Watch video on how to use tand 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

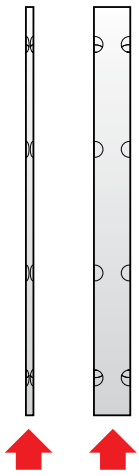
Any thickness from 0.0020" to 0.2500" is standard. To order any spacer thickness in ten thousandths of an inch, replace the 4 digits in the part number.

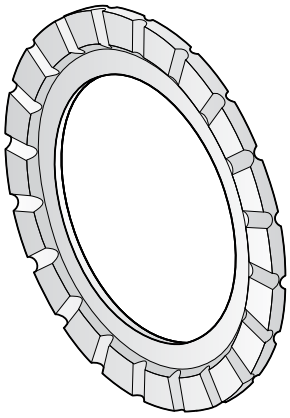
Example:

1 inside diameter spacer made to work with NAB-1000-TC at .0456 thickness

CSP-1000-0456-20

See price sheet for pricing

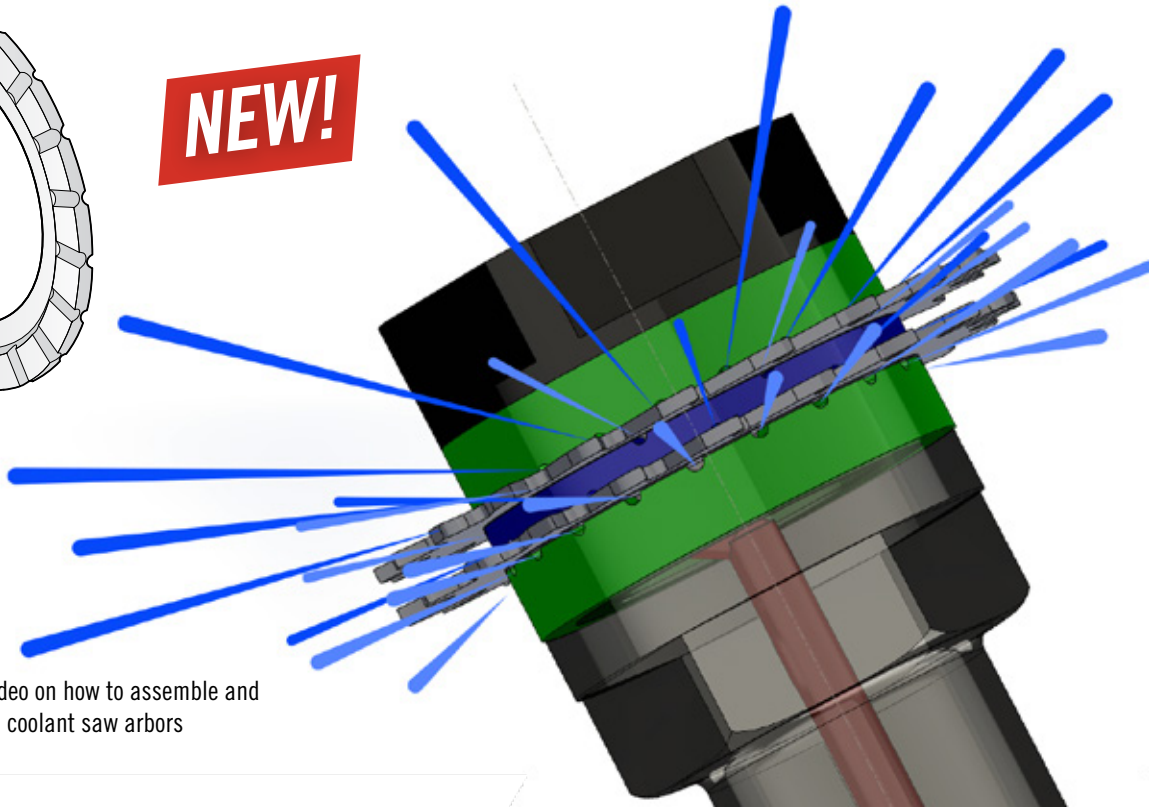




CSP Solid Carbide Thru-Coolant Saw Spacers

Inside Diameter	Thickness	Outside Diameter	# of coolant channels	Part Number
1/4"	Specify Thickness by replacing the red digits	0.57"	10	CSP-250-XXXX-10
3/8"		0.71"	10	CSP-375-XXXX-10
1/2"		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)

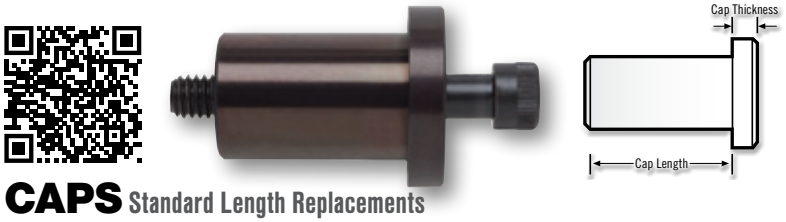
Flange Diameter	Flange Part Number
1.75–2	FLANGES-2
2.125–2.5	FLANGES-2.5
2.5–3	FLANGES-3
3–3.5	FLANGES-3.5
3.5–4	FLANGES-4

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.



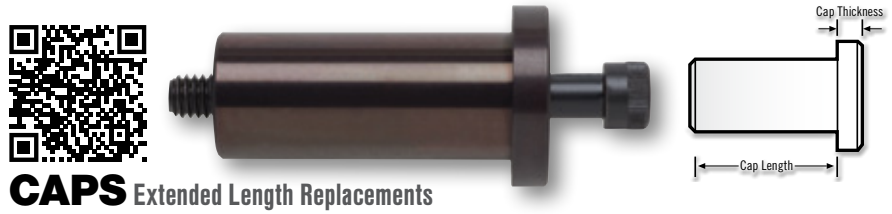
CAPS Standard Length Replacements

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

Notes:

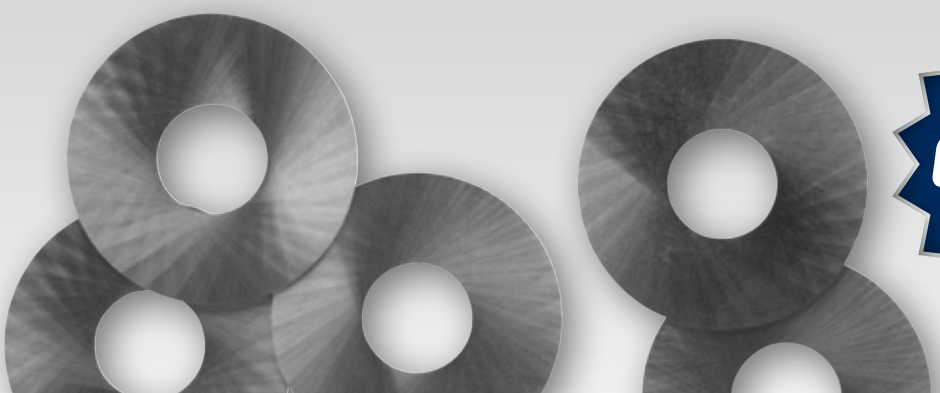
Total thickness of saws/spacers should not exceed 50% of Cap Length.

Replacement caps with longer Cap Length dimension available.



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



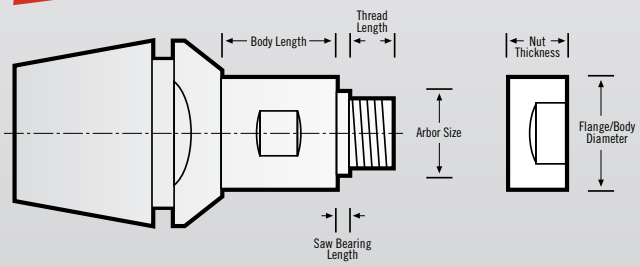
Special Gang Carbide Spacers Available!

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!



ER11

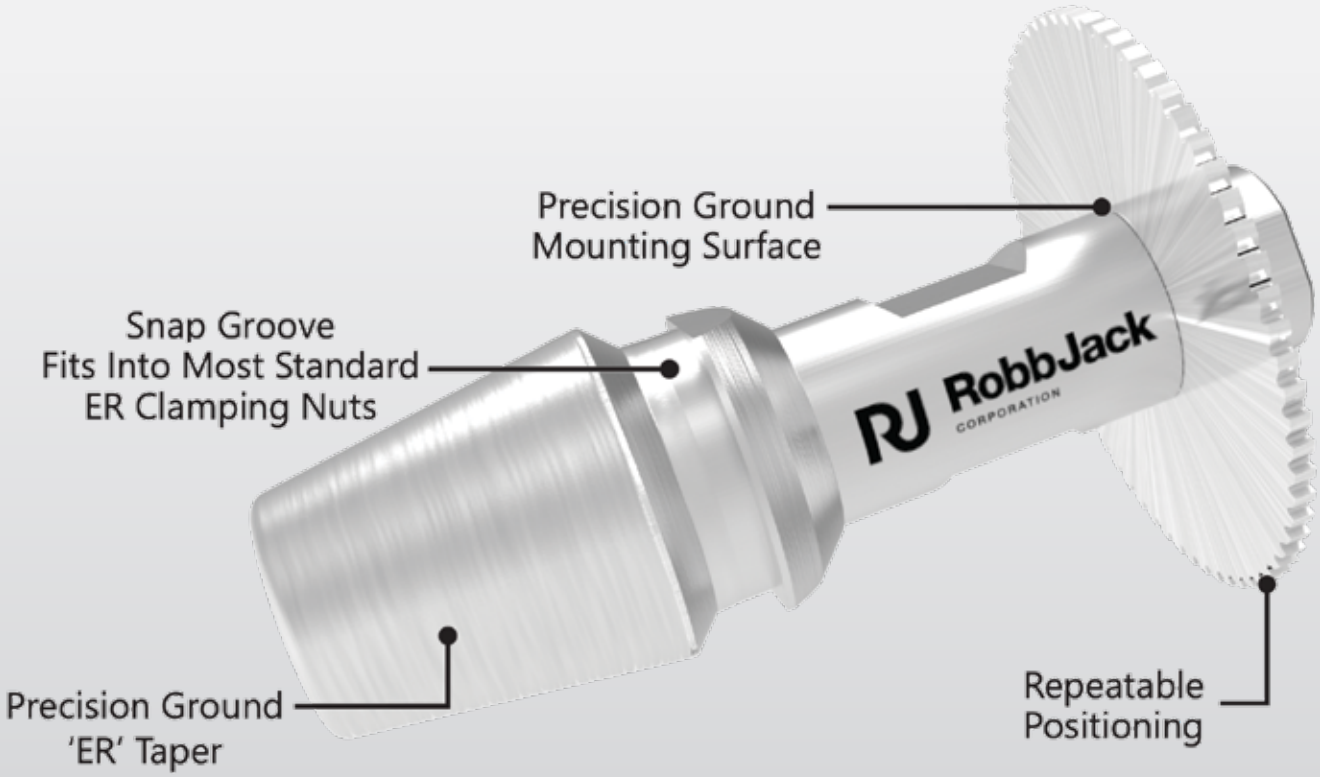
SA-ER11 Collet Integrated Saw Arbor

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-08
1/4"	0.945"	0.05"	1/4"	0.256"	3/8"	SA-ER16-L-08
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

Scan this code to:

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

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

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
C8 / CD8 201/202/301/303	2 & 3 Flute C-2 Grade Carbide End Mill 2 Flute Solid Carbide Spiral Routers		198
HB 401/402/404	2+2 Flute Compression Herringbone Routers		200
PM / MPM / PMD Routers	1 Flute Polished Flute Carbide Routers		201
GTS	1 Flute Straight Flute Carbide Routers		201
ET2 / ET3 / ET4	1 Flute Plunge Tip, Ball Tip and Standard Engraving Tools		202
ACH / MAH **ACH-M**	NEW! Accuhold End Mill Ultra Precision Extension Holders		203
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PCD 203 Routers	2 Flute PCD Diamond (See Composites & Plastics)		109
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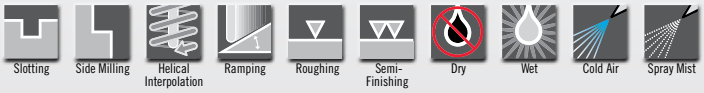
W Precision Spiral Routers for CNC Production

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

UP Shear

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

Shear DN

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

UP Shear

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

Shear DN

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

UP Shear

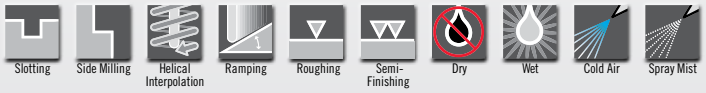
WTL-303 3 Flute Extra Long Solid Carbide Length Upshear

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

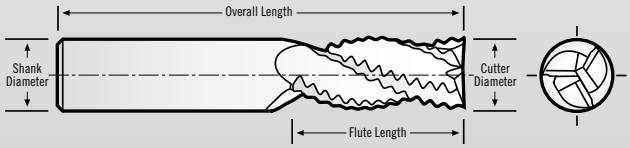
Characteristics

Applications



Materials

Coatings



WRU/WRD Tolerances

Cutting Dia.= –.003/–.007
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = ±.060

UP Shear

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

Shear DN

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

UP Shear

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

Shear DN

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

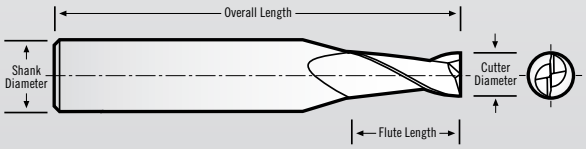
CD8 Series

Characteristics
Square End · Chamfer · 2 Flute · 3 Flute · 30° Helix

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

Materials
Wood · Aluminum · Copper · Magnesium · Brass

Coatings
Diamond-Like Carbon (DLC)



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

All Sizes on 1/4" Shanks to Fit Router Collets

UP Shear

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

Shear DN

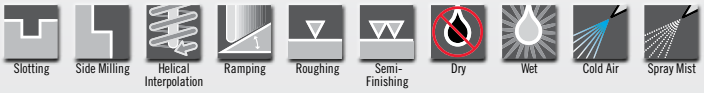
CD8-201 2 Flute Stub Length Solid Carbide Spiral Router

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**

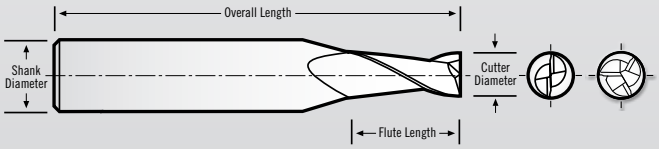
Characteristics

Applications



Materials

Coatings



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

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

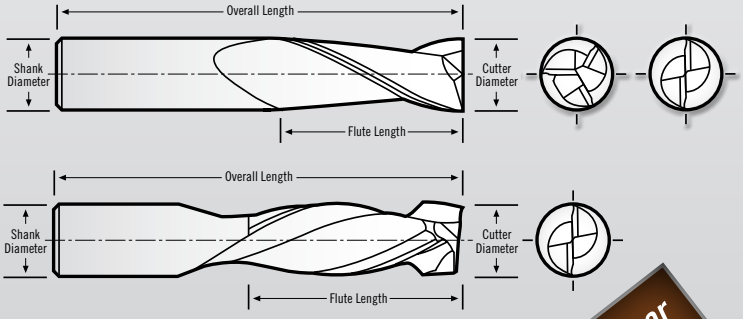
HB 2+2 Herringbone Routers

Characteristics
Square End | Chamfer | 2 Flute | 30° Helix

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

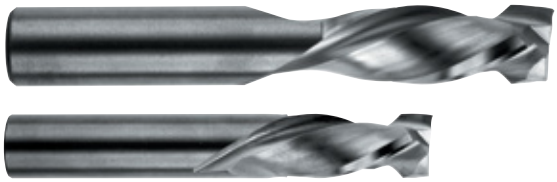
Materials
Wood | Aluminum | Copper | Magnesium | Brass

Coatings
Diamond-Like Carbon (DLC)



HB 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

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

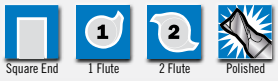
Cutting Diameter	Shank Diameter	Flute Length	Upshear Length	Overall Length	Uncoated
1/4"	1/4"	3/4"	1/2"	2-1/2"	HB-402-08
3/8"	3/8"	1"	5/8"	2-1/2"	HB-402-12
1/2"	1/2"	1-1/8"	9/16"	3"	HB-402-16
5/8"	5/8"	1-5/16"	3/4"	4"	HB-402-20
3/4"	3/4"	1-5/16"	3/4"	4"	HB-402-24

HB-404 2+2 Flute Long Length Compression Herringbone Router

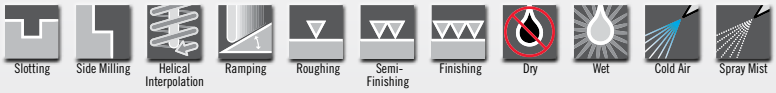
Cutting Diameter	Shank Diameter	Flute Length	Upshear Length	Overall Length	Uncoated
1/2"	1/2"	1-5/16"	3/4"	3-1/2"	HB-404-16

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

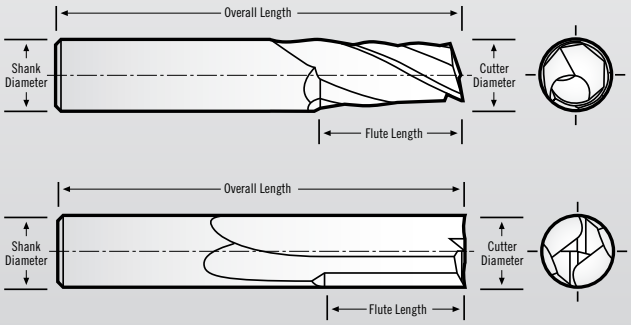
Characteristics



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/–.075mm
Shank Dia. = –.002/–.005mm
Flute Length = +1/2"/+1.500mm
OAL = ±10mm

GTS Series Tolerances
Cutting Dia. = +.000/–.002
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = ±.060

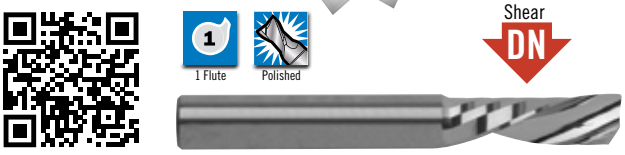
Polished
Best Tool for Plastics
Eliminates Material Sticking to Tool and Melting in the Cut

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

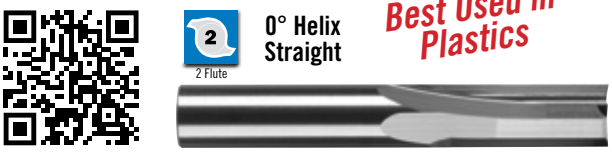
MPM 1 Flute Upshear Tuffy Grade Carbide Router Polished Flute

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



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

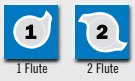


GTS 2 Flute Tuffy Grade Straight Flute Router

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

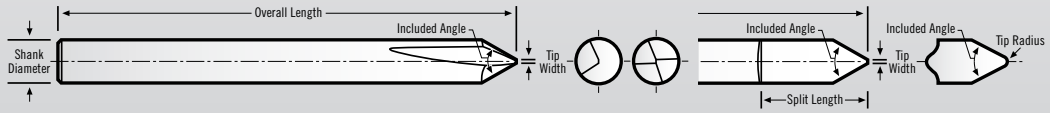
ET Engraving Tools

Characteristics



Applications

Materials



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

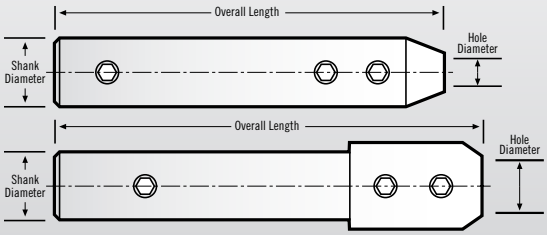
Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Uncoated
.010"	1/4"	60°	.650"	2"	ET4-01060
.020"	1/4"	60°	.650"	2"	ET4-02060
.030"	1/4"	60°	.650"	2"	ET4-03060
.050"	1/4"	60°	.650"	2"	ET4-05060
.060"	1/4"	60°	.650"	2"	ET4-06060
.010"	1/4"	90°	.650"	2"	ET4-01090
.020"	1/4"	90°	.650"	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/–.00000
Shank Dia. = –.0001/–.0003
OAL = ±.060

MAH Tolerances
Hole Dia. = +.004/–.000 mm
Shank Dia. = +.000/–.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

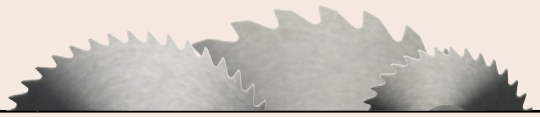
Material	RPM (1/4")	Feed Inches/Minute
Plastics, Others		
Solid Surface	15,300	70–130
Fiberglass	15,300	80–150
Phenolic	15,300	80–150
Aluminum (Soft)	18,000	90–120
Aluminum (Aircraft Grade)	18,000	180–230
Copper	9,200	45–60
Foam	18,000	150–300
Plastics (Soft)	18,000	180–250
Plastics (Hard)	18,000	150–200

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.

Wood Tools in Other Sections

MINIATURES (See Miniatures Applications)  132

SAWS (See Saws Applications)  170

S1 / MS1 301 2, 3 and 4 Flute  66

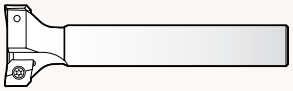
A1 / MA1 201 (See Aluminum Applications)  28

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)

RobbJack CORPORATION

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Delivery is NOW Faster Than Ever

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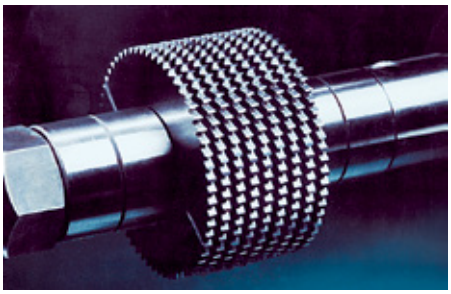
Email us: quotes@robbjack.com

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: _____

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