PREMIUM ROTARY CUTTING TOOLS

RobbJack

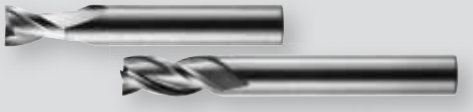
Applications Guide–2012

- ALUMINUM
- TITANIUM, STEEL & HIGH-TEMP ALLOYS
- COMPOSITES & PLASTICS
- DIE/MOLD & HARDENED MATERIALS
- MINIATURES
- MULTIPLE APPLICATIONS
- SAWS

2012

RobbJack Corporation Lincoln, California USA

RobbJack's got the Solution for Your Next Machining Project

Maximum Removal Rates in Aluminum?	A1 Series		12
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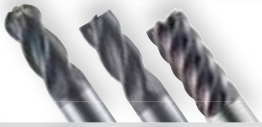
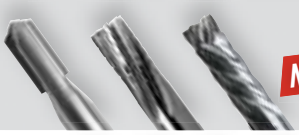
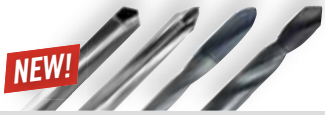
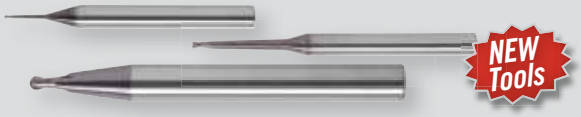
Machining High-Temperature Alloys?	XG and XF Series		35
Routing Composites?	PCD and New CPCD CR Compression and CE Routers		57
Drilling Holes in Composites?	New RJ PCD Drills Diamond-Coated Carbide Drills		57
Cutting Hardened Die Steels?	RobbJack's DM, TM, and HM Tool Series		67
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Catalog Sections at a Glance

Speed & 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 & Plastics			
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
in^3/min	=	Width x Depth × Inches per Minute
Horsepower	=	1.341 × kW
kW	=	.7457 × Horsepower

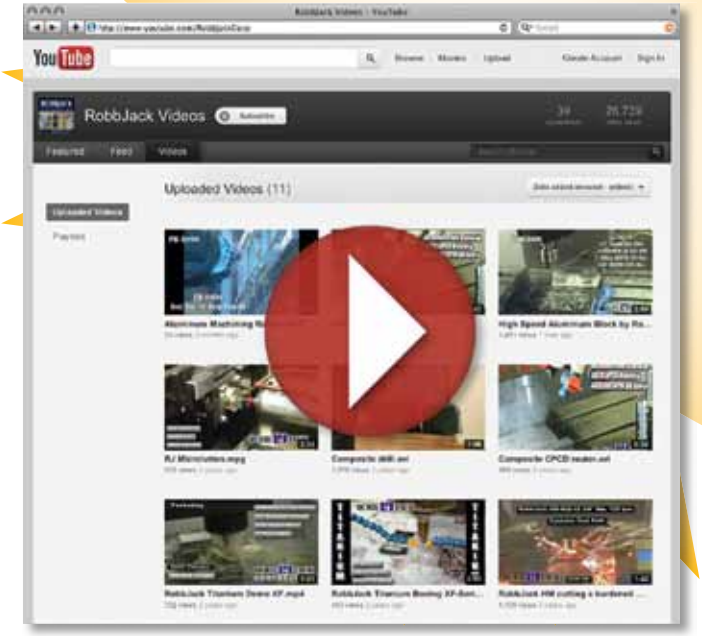
METRIC SIZES		
Surface Meters per Minute	=	RPM x .00314 × Tool Diameter
RPM	=	$\frac{\text{Surface Meters per Minute x 318.057}}{\text{Tool Diameter}}$
Feedrate (mm/min.)	=	RPM × Chip Load per Tooth × Number of Flutes
cm^3/min	=	$\frac{\text{Width (mm) Depth (mm) Feedrate (mm/min)}}{1000}$
Horsepower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

See RobbJack Videos at

www.youtube.com/RobbJackCorp

or

www.robbjack.com/videos



Visit RobbJack's New Website!

www.robbjack.com

Visit Our New Website With Dynamic Tool Search

1 Click Here for Tool Search!

Click on the Red Search Tab and Find the Exact Tool You're Looking For!

Click on an Icon or Enter Your Specifications.

Make Your Selections Here!

Find a Tool by:
Tool Type
Your Specifications
Tool Characteristics
Materials
Application

See Search Results Here!

Make changes in your search criteria, see new results here immediately!

5 Complete Tool Description

Prices, available coatings, specifications, tolerances, features, speed and feeds, videos and much more!

4 Click on a Tool Number

Now Online!

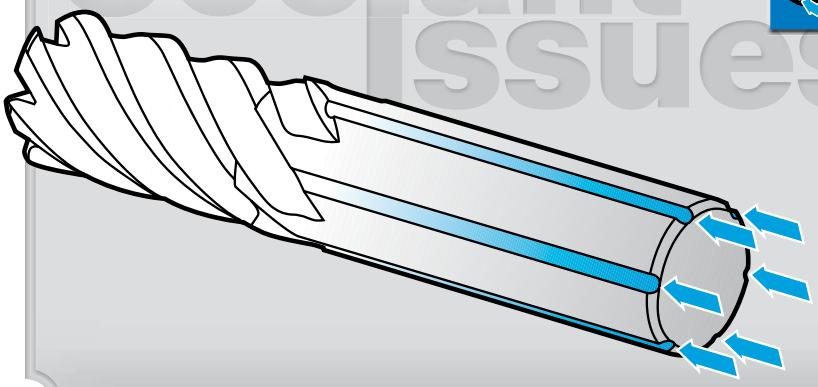
Speed & Feed Calculations now online at www.robbjack.com/speedfeed

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

ROBBJACK'S Speed & Feed

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 *Part Number*, and add *-CG.*

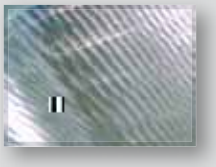
Example:
An A1-201-12 with coolant grooves is Part Number:

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 *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 *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

End Mill Modifications

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 *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 is 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 to maintain the strongest tool possible.

Feather Blend™

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

Feather Blend

Standard Neck

Applications

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

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.

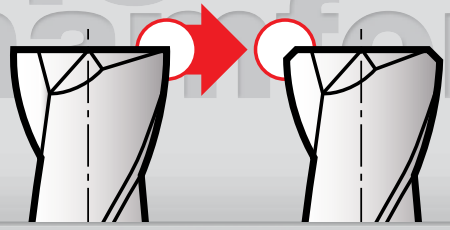
Pros: A Wiper Flat gives better floor finishes.
Cons: Wiper Flats will increase surface contact, not for use on thin floors.

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

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

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

45° Chamfer



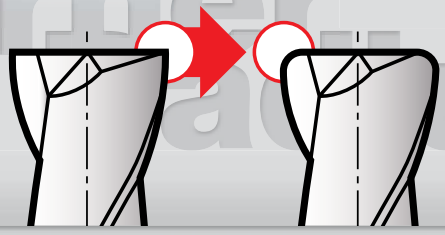
To order a RobbJack tool with a **45° Chamfer**, use the existing *Part Number*, add *-CH* and amount of *Chamfer.*

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

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

End Mill Modifications

Corner Radius

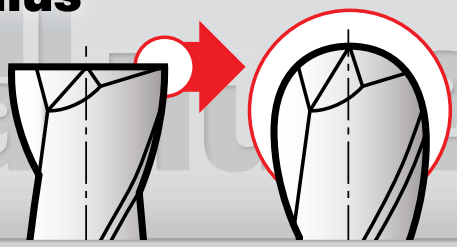


To order a RobbJack tool with a **Corner Radius**, use the existing *Part Number*, add *-CR* and desired *Radius Size.*

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

A1-201-12-CR .005
See price sheet for pricing

Full Radius



To order a RobbJack tool with a **Full Radius** (or Ball End), use the existing *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 *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 usually 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/reservice/feedback_form.html to get started. Or email or call us!

Phone: **(916) 645-6045** *sales@robbjack.com*
Toll-Free: **(800) 527-8883** *sherry@robbjack.com*
Fax: **(916) 645-0146**

TOOLS FOR Aluminum Applications

TOOLS FOR Aluminum Applications

Aluminum Applications Tools

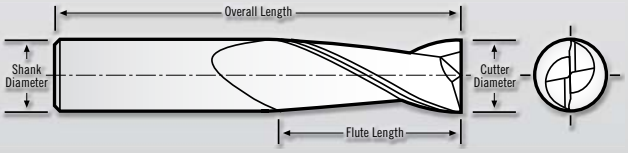
A1/MA1 2 Flute High Performance Tools for Aluminum

Characteristics

Applications

Materials

Coatings



A1 Series Tolerances:
Cutting Dia. = –.001/–.0015"
Shank Dia. = –.0001/–.0002"
LOC = +.060/–.000"
OAL = +/– .060"

MA1 Series Tolerances:
Cutting Dia. = –0.025/–0.038mm
Shank Dia. = –0.002/–0.005mm
LOC (<10D) = +0.75/–0.000mm
(>10D) = +1.5/–0.000mm
OAL = +/–1.000mm

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"	15/16"	.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**

See RobbJack Videos on
YouTube™
www.youtube.com/RobbJackCorp
or
www.robbjack.com/videos

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**

2 Flute High Performance Tools for Aluminum A1/MA1

A1-201 SPEED & FEED

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

MA1-201 SPEED & FEED

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

Videos Online!

See RobbJack's high performance aluminum tools in action.

www.youtube.com/RobbJackCorp
or
www.robbjack.com/videos

A1/MA1 3 Flute High Performance Tools for Aluminum

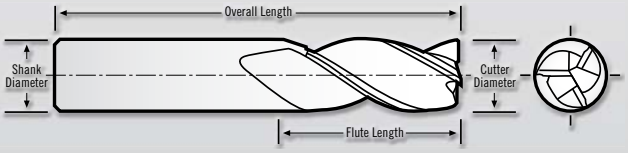
Characteristics: Square End, Corner Break, 3 Flute, 35° Helix, Mirror Edge, Polished

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

Materials: Aluminum, Copper, Magnesium, Brass

Coatings: Diamond-Like Carbon (DLC)

A1-303 Series: Polished & Mirror Edge!



A1 Series Tolerances:
Cutting Dia. = –.001/–.0015"
Shank Dia. = –.0001/–.0002"
LOC = +.060/–.000"
OAL = +/– .060"

MA1 Series Tolerances:
Cutting Dia. = –0.025/–0.038mm
Shank Dia. = –0.002/–0.005mm
LOC (<10D) = +0.750/–0.000mm
(>10D) = +1.500/–0.000mm
OAL = +/–1.000mm

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**

3 Flute High Performance Tools for Aluminum A1/MA1

A1-303 SPEED & FEED

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 SPEED & FEED

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.

FM 2 Flute High Performance Tools for Aluminum

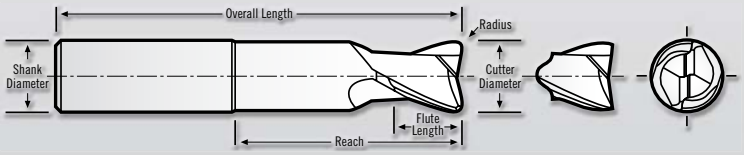
Characteristics: Square End, Corner Radius, Ball End, 2 Flute, 40° Helix, Feather Blend, Necked, Mirror Edge

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

Materials: Al Aluminum, Cu Copper, Mg Magnesium, Brass

Coatings: Diamond-Like Carbon (DLC)

FM Series comes with Mirror Edge! for Chatter Reduction



FM Series Tolerances:
Cutting Dia. = –.001/–.0015"
Shank Dia. = –.0001/–.0002"
LOC = +.060/–.000"
OAL = +/– .060"

NEW!

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	0.625"	3"	FM-201-08	FM-201-08 **DLC**	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	0.625"	3"	FM-201-08-030	FM-201-08-030 **DLC**	
	1/4"	1/4"	1/4"	0.06"	0.625"	3"	FM-201-08-060	FM-201-08-060 **DLC**	
	1/4"	1/4"	1/4"	0.09"	0.625"	3"	FM-201-08-090	FM-201-08-090 **DLC**	
	1/4"	1/4"	1/4"	Ball End	0.625"	3"	FM-201-08-BN	FM-201-08-BN **DLC**	
MEDIUM	1/4"	1/4"	1/4"	Sq. End	0.875"	3"	FM-202-08	FM-202-08 **DLC**	
	1/4"	1/4"	1/4"	0.03"	0.875"	3"	FM-202-08-030	FM-202-08-030 **DLC**	
	1/4"	1/4"	1/4"	0.06"	0.875"	3"	FM-202-08-060	FM-202-08-060 **DLC**	
	1/4"	1/4"	1/4"	0.09"	0.875"	3"	FM-202-08-090	FM-202-08-090 **DLC**	
	1/4"	1/4"	1/4"	Ball End	0.875"	3"	FM-202-08-BN	FM-202-08-BN **DLC**	
LONG	1/4"	1/4"	1/4"	Sq. End	1.063"	3"	FM-204-08	FM-204-08 **DLC**	
	1/4"	1/4"	1/4"	0.03"	1.063"	3"	FM-204-08-030	FM-204-08-030 **DLC**	
	1/4"	1/4"	1/4"	0.06"	1.063"	3"	FM-204-08-060	FM-204-08-060 **DLC**	
	1/4"	1/4"	1/4"	0.09"	1.063"	3"	FM-204-08-090	FM-204-08-090 **DLC**	
	1/4"	1/4"	1/4"	Ball End	1.063"	3"	FM-204-08-BN	FM-204-08-BN **DLC**	
EXTRA LONG	1/4"	1/4"	1/4"	Sq. End	1.500"	3"	FM-205-08	FM-205-08 **DLC**	
	1/4"	1/4"	1/4"	0.03"	1.500"	3"	FM-205-08-030	FM-205-08-030 **DLC**	
	1/4"	1/4"	1/4"	0.06"	1.500"	3"	FM-205-08-060	FM-205-08-060 **DLC**	
	1/4"	1/4"	1/4"	0.09"	1.500"	3"	FM-205-08-090	FM-205-08-090 **DLC**	
	1/4"	1/4"	1/4"	Ball End	1.500"	3"	FM-205-08-BN	FM-205-08-BN **DLC**	
SHORT	5/16"	5/16"	5/16"	Sq. End	0.875"	3-1/8"	FM-201-10	FM-201-10 **DLC**	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	0.875"	3-1/8"	FM-201-10-030	FM-201-10-030 **DLC**	
	5/16"	5/16"	5/16"	0.06"	0.875"	3-1/8"	FM-201-10-060	FM-201-10-060 **DLC**	
	5/16"	5/16"	5/16"	0.09"	0.875"	3-1/8"	FM-201-10-090	FM-201-10-090 **DLC**	
	5/16"	5/16"	5/16"	0.12"	0.875"	3-1/8"	FM-201-10-120	FM-201-10-120 **DLC**	
	5/16"	5/16"	5/16"	Ball End	0.875"	3-1/8"	FM-201-10-BN	FM-201-10-BN **DLC**	
MEDIUM	5/16"	5/16"	5/16"	Sq. End	1.094"	3-1/8"	FM-202-10	FM-202-10 **DLC**	
	5/16"	5/16"	5/16"	0.03"	1.094"	3-1/8"	FM-202-10-030	FM-202-10-030 **DLC**	
	5/16"	5/16"	5/16"	0.06"	1.094"	3-1/8"	FM-202-10-060	FM-202-10-060 **DLC**	
	5/16"	5/16"	5/16"	0.09"	1.094"	3-1/8"	FM-202-10-090	FM-202-10-090 **DLC**	
	5/16"	5/16"	5/16"	0.12"	1.094"	3-1/8"	FM-202-10-120	FM-202-10-120 **DLC**	
	5/16"	5/16"	5/16"	Ball End	1.094"	3-1/8"	FM-202-10-BN	FM-202-10-BN **DLC**	

**Other Reach Lengths available upon request.*

CONTINUED ON NEXT PAGE—

2 Flute High Performance Tools for Aluminum FM

NEW!

FM 2 Flute (Short to Long Reach) —CONTINUED FROM PREVIOUS

	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	1.313"	3-1/8"	FM-204-10	FM-204-10 **DLC**	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	1.313"	3-1/8"	FM-204-10-030	FM-204-10-030 **DLC**	
	5/16"	5/16"	5/16"	0.06"	1.313"	3-1/8"	FM-204-10-060	FM-204-10-060 **DLC**	
	5/16"	5/16"	5/16"	0.09"	1.313"	3-1/8"	FM-204-10-090	FM-204-10-090 **DLC**	
	5/16"	5/16"	5/16"	0.12"	1.313"	3-1/8"	FM-204-10-120	FM-204-10-120 **DLC**	
	5/16"	5/16"	5/16"	Ball End	1.313"	3-1/8"	FM-204-10-BN	FM-204-10-BN **DLC**	
EXTRA LONG	5/16"	5/16"	5/16"	Sq. End	1.625"	3-1/8"	FM-205-10	FM-205-10 **DLC**	
	5/16"	5/16"	5/16"	0.03"	1.625"	3-1/8"	FM-205-10-030	FM-205-10-030 **DLC**	
	5/16"	5/16"	5/16"	0.06"	1.625"	3-1/8"	FM-205-10-060	FM-205-10-060 **DLC**	
	5/16"	5/16"	5/16"	0.09"	1.625"	3-1/8"	FM-205-10-090	FM-205-10-090 **DLC**	
	5/16"	5/16"	5/16"	0.12"	1.625"	3-1/8"	FM-205-10-120	FM-205-10-120 **DLC**	
	5/16"	5/16"	5/16"	Ball End	1.625"	3-1/8"	FM-205-10-BN	FM-205-10-BN **DLC**	
SHORT	3/8"	3/8"	3/8"	Sq. End	1.000"	4"	FM-201-12	FM-201-12 **DLC**	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	1.000"	4"	FM-201-12-030	FM-201-12-030 **DLC**	
	3/8"	3/8"	3/8"	0.06"	1.000"	4"	FM-201-12-060	FM-201-12-060 **DLC**	
	3/8"	3/8"	3/8"	0.09"	1.000"	4"	FM-201-12-090	FM-201-12-090 **DLC**	
	3/8"	3/8"	3/8"	0.12"	1.000"	4"	FM-201-12-120	FM-201-12-120 **DLC**	
	3/8"	3/8"	3/8"	Ball End	1.000"	4"	FM-201-12-BN	FM-201-12-BN **DLC**	
MEDIUM	3/8"	3/8"	3/8"	Sq. End	1.250"	4"	FM-202-12	FM-202-12 **DLC**	
	3/8"	3/8"	3/8"	0.03"	1.250"	4"	FM-202-12-030	FM-202-12-030 **DLC**	
	3/8"	3/8"	3/8"	0.06"	1.250"	4"	FM-202-12-060	FM-202-12-060 **DLC**	
	3/8"	3/8"	3/8"	0.09"	1.250"	4"	FM-202-12-090	FM-202-12-090 **DLC**	
	3/8"	3/8"	3/8"	0.12"	1.250"	4"	FM-202-12-120	FM-202-12-120 **DLC**	
	3/8"	3/8"	3/8"	Ball End	1.250"	4"	FM-202-12-BN	FM-202-12-BN **DLC**	
LONG	3/8"	3/8"	3/8"	Sq. End	1.563"	4"	FM-204-12	FM-204-12 **DLC**	
	3/8"	3/8"	3/8"	0.03"	1.563"	4"	FM-204-12-030	FM-204-12-030 **DLC**	
	3/8"	3/8"	3/8"	0.06"	1.563"	4"	FM-204-12-060	FM-204-12-060 **DLC**	
	3/8"	3/8"	3/8"	0.09"	1.563"	4"	FM-204-12-090	FM-204-12-090 **DLC**	
	3/8"	3/8"	3/8"	0.12"	1.563"	4"	FM-204-12-120	FM-204-12-120 **DLC**	
	3/8"	3/8"	3/8"	Ball End	1.563"	4"	FM-204-12-BN	FM-204-12-BN **DLC**	
EXTRA LONG	3/8"	3/8"	3/8"	Sq. End	2.125"	4"	FM-205-12	FM-205-12 **DLC**	
	3/8"	3/8"	3/8"	0.03"	2.125"	4"	FM-205-12-030	FM-205-12-030 **DLC**	
	3/8"	3/8"	3/8"	0.06"	2.125"	4"	FM-205-12-060	FM-205-12-060 **DLC**	
	3/8"	3/8"	3/8"	0.09"	2.125"	4"	FM-205-12-090	FM-205-12-090 **DLC**	
	3/8"	3/8"	3/8"	0.12"	2.125"	4"	FM-205-12-120	FM-205-12-120 **DLC**	
	3/8"	3/8"	3/8"	Ball End	2.125"	4"	FM-205-12-BN	FM-205-12-BN **DLC**	
SHORT	1/2"	1/2"	1/2"	Sq. End	1.250"	5"	FM-201-16	FM-201-16 **DLC**	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	1.250"	5"	FM-201-16-030	FM-201-16-030 **DLC**	
	1/2"	1/2"	1/2"	0.06"	1.250"	5"	FM-201-16-060	FM-201-16-060 **DLC**	
	1/2"	1/2"	1/2"	0.09"	1.250"	5"	FM-201-16-090	FM-201-16-090 **DLC**	
	1/2"	1/2"	1/2"	0.12"	1.250"	5"	FM-201-16-120	FM-201-16-120 **DLC**	
	1/2"	1/2"	1/2"	Ball End	1.250"	5"	FM-201-16-BN	FM-201-16-BN **DLC**	
MEDIUM	1/2"	1/2"	1/2"	Sq. End	1.625"	5"	FM-202-16	FM-202-16 **DLC**	
	1/2"	1/2"	1/2"	0.03"	1.625"	5"	FM-202-16-030	FM-202-16-030 **DLC**	
	1/2"	1/2"	1/2"	0.06"	1.625"	5"	FM-202-16-060	FM-202-16-060 **DLC**	
	1/2"	1/2"	1/2"	0.09"	1.625"	5"	FM-202-16-090	FM-202-16-090 **DLC**	
	1/2"	1/2"	1/2"	0.12"	1.625"	5"	FM-202-16-120	FM-202-16-120 **DLC**	
	1/2"	1/2"	1/2"	Ball End	1.625"	5"	FM-202-16-BN	FM-202-16-BN **DLC**	
LONG	1/2"	1/2"	1/2"	Sq. End	2.125"	5"	FM-204-16	FM-204-16 **DLC**	
	1/2"	1/2"	1/2"	0.03"	2.125"	5"	FM-204-16-030	FM-204-16-030 **DLC**	
	1/2"	1/2"	1/2"	0.06"	2.125"	5"	FM-204-16-060	FM-204-16-060 **DLC**	
	1/2"	1/2"	1/2"	0.09"	2.125"	5"	FM-204-16-090	FM-204-16-090 **DLC**	
	1/2"	1/2"	1/2"	0.12"	2.125"	5"	FM-204-16-120	FM-204-16-120 **DLC**	
	1/2"	1/2"	1/2"	Ball End	2.125"	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

NEW!

FM 2 Flute (Short to Long Reach) —CONTINUED FROM PREVIOUS

	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	2.625"	5"	FM-205-16	FM-205-16 **DLC**	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	2.625"	5"	FM-205-16-030	FM-205-16-030 **DLC**	
	1/2"	1/2"	1/2"	0.06"	2.625"	5"	FM-205-16-060	FM-205-16-060 **DLC**	
	1/2"	1/2"	1/2"	0.09"	2.625"	5"	FM-205-16-090	FM-205-16-090 **DLC**	
	1/2"	1/2"	1/2"	0.12"	2.625"	5"	FM-205-16-120	FM-205-16-120 **DLC**	
	1/2"	1/2"	1/2"	Ball End	2.625"	5"	FM-205-16-BN	FM-205-16-BN **DLC**	
SHORT	5/8"	5/8"	5/8"	Sq. End	1.500"	6"	FM-201-20	FM-201-20 **DLC**	5/8" DIAMETER
	5/8"	5/8"	5/8"	0.03"	1.500"	6"	FM-201-20-030	FM-201-20-030 **DLC**	
	5/8"	5/8"	5/8"	0.06"	1.500"	6"	FM-201-20-060	FM-201-20-060 **DLC**	
	5/8"	5/8"	5/8"	0.09"	1.500"	6"	FM-201-20-090	FM-201-20-090 **DLC**	
	5/8"	5/8"	5/8"	0.12"	1.500"	6"	FM-201-20-120	FM-201-20-120 **DLC**	
	5/8"	5/8"	5/8"	Ball End	1.500"	6"	FM-201-20-BN	FM-201-20-BN **DLC**	
MEDIUM	5/8"	5/8"	5/8"	Sq. End	2.063"	6"	FM-202-20	FM-202-20 **DLC**	
	5/8"	5/8"	5/8"	0.03"	2.063"	6"	FM-202-20-030	FM-202-20-030 **DLC**	
	5/8"	5/8"	5/8"	0.06"	2.063"	6"	FM-202-20-060	FM-202-20-060 **DLC**	
	5/8"	5/8"	5/8"	0.09"	2.063"	6"	FM-202-20-090	FM-202-20-090 **DLC**	
	5/8"	5/8"	5/8"	0.12"	2.063"	6"	FM-202-20-120	FM-202-20-120 **DLC**	
	5/8"	5/8"	5/8"	Ball End	2.063"	6"	FM-202-20-BN	FM-202-20-BN **DLC**	
LONG	5/8"	5/8"	5/8"	Sq. End	2.625"	6"	FM-204-20	FM-204-20 **DLC**	
	5/8"	5/8"	5/8"	0.03"	2.625"	6"	FM-204-20-030	FM-204-20-030 **DLC**	
	5/8"	5/8"	5/8"	0.06"	2.625"	6"	FM-204-20-060	FM-204-20-060 **DLC**	
	5/8"	5/8"	5/8"	0.09"	2.625"	6"	FM-204-20-090	FM-204-20-090 **DLC**	
	5/8"	5/8"	5/8"	0.12"	2.625"	6"	FM-204-20-120	FM-204-20-120 **DLC**	
	5/8"	5/8"	5/8"	Ball End	2.625"	6"	FM-204-20-BN	FM-204-20-BN **DLC**	
EXTRA LONG	5/8"	5/8"	5/8"	Sq. End	3.125"	6"	FM-205-20	FM-205-20 **DLC**	
	5/8"	5/8"	5/8"	0.03"	3.125"	6"	FM-205-20-030	FM-205-20-030 **DLC**	
	5/8"	5/8"	5/8"	0.06"	3.125"	6"	FM-205-20-060	FM-205-20-060 **DLC**	
	5/8"	5/8"	5/8"	0.09"	3.125"	6"	FM-205-20-090	FM-205-20-090 **DLC**	
	5/8"	5/8"	5/8"	0.12"	3.125"	6"	FM-205-20-120	FM-205-20-120 **DLC**	
	5/8"	5/8"	5/8"	Ball End	3.125"	6"	FM-205-20-BN	FM-205-20-BN **DLC**	
SHORT	3/4"	3/4"	3/4"	Sq. End	2.000"	6"	FM-201-24	FM-201-24 **DLC**	3/4" DIAMETER
	3/4"	3/4"	3/4"	0.03"	2.000"	6"	FM-201-24-030	FM-201-24-030 **DLC**	
	3/4"	3/4"	3/4"	0.06"	2.000"	6"	FM-201-24-060	FM-201-24-060 **DLC**	
	3/4"	3/4"	3/4"	0.09"	2.000"	6"	FM-201-24-090	FM-201-24-090 **DLC**	
	3/4"	3/4"	3/4"	0.12"	2.000"	6"	FM-201-24-120	FM-201-24-120 **DLC**	
	3/4"	3/4"	3/4"	Ball End	2.000"	6"	FM-201-24-BN	FM-201-24-BN **DLC**	
MEDIUM	3/4"	3/4"	3/4"	Sq. End	2.563"	6"	FM-202-24	FM-202-24 **DLC**	
	3/4"	3/4"	3/4"	0.03"	2.563"	6"	FM-202-24-030	FM-202-24-030 **DLC**	
	3/4"	3/4"	3/4"	0.06"	2.563"	6"	FM-202-24-060	FM-202-24-060 **DLC**	
	3/4"	3/4"	3/4"	0.09"	2.563"	6"	FM-202-24-090	FM-202-24-090 **DLC**	
	3/4"	3/4"	3/4"	0.12"	2.563"	6"	FM-202-24-120	FM-202-24-120 **DLC**	
	3/4"	3/4"	3/4"	Ball End	2.563"	6"	FM-202-24-BN	FM-202-24-BN **DLC**	
LONG	3/4"	3/4"	3/4"	Sq. End	3.125"	6"	FM-204-24	FM-204-24 **DLC**	
	3/4"	3/4"	3/4"	0.03"	3.125"	6"	FM-204-24-030	FM-204-24-030 **DLC**	
	3/4"	3/4"	3/4"	0.06"	3.125"	6"	FM-204-24-060	FM-204-24-060 **DLC**	
	3/4"	3/4"	3/4"	0.09"	3.125"	6"	FM-204-24-090	FM-204-24-090 **DLC**	
	3/4"	3/4"	3/4"	0.12"	3.125"	6"	FM-204-24-120	FM-204-24-120 **DLC**	
	3/4"	3/4"	3/4"	Ball End	3.125"	6"	FM-204-24-BN	FM-204-24-BN **DLC**	
EXTRA LONG	3/4"	3/4"	3/4"	Sq. End	3.750"	6"	FM-205-24	FM-205-24 **DLC**	
	3/4"	3/4"	3/4"	0.03"	3.750"	6"	FM-205-24-030	FM-205-24-030 **DLC**	
	3/4"	3/4"	3/4"	0.06"	3.750"	6"	FM-205-24-060	FM-205-24-060 **DLC**	
	3/4"	3/4"	3/4"	0.09"	3.750"	6"	FM-205-24-090	FM-205-24-090 **DLC**	
	3/4"	3/4"	3/4"	0.12"	3.750"	6"	FM-205-24-120	FM-205-24-120 **DLC**	
	3/4"	3/4"	3/4"	Ball End	3.750"	6"	FM-205-24-BN	FM-205-24-BN **DLC**	

*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—

2 Flute High Performance Tools for Aluminum FM

NEW!

FM 2 Flute (Short to Long Reach) —CONTINUED FROM PREVIOUS

	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	2.000"	6"	FM-201-32	FM-201-32 **DLC**
	1"	1"	1"	0.03"	2.000"	6"	FM-201-32-030	FM-201-32-030 **DLC**
	1"	1"	1"	0.06"	2.000"	6"	FM-201-32-060	FM-201-32-060 **DLC**
	1"	1"	1"	0.09"	2.000"	6"	FM-201-32-090	FM-201-32-090 **DLC**
	1"	1"	1"	0.12"	2.000"	6"	FM-201-32-120	FM-201-32-120 **DLC**
	1"	1"	1"	Ball End	2.000"	6"	FM-201-32-BN	FM-201-32-BN **DLC**
MEDIUM	1"	1"	1"	Sq. End	3.000"	6"	FM-202-32	FM-202-32 **DLC**
	1"	1"	1"	0.03"	3.000"	6"	FM-202-32-030	FM-202-32-030 **DLC**
	1"	1"	1"	0.06"	3.000"	6"	FM-202-32-060	FM-202-32-060 **DLC**
	1"	1"	1"	0.09"	3.000"	6"	FM-202-32-090	FM-202-32-090 **DLC**
	1"	1"	1"	0.12"	3.000"	6"	FM-202-32-120	FM-202-32-120 **DLC**
	1"	1"	1"	Ball End	3.000"	6"	FM-202-32-BN	FM-202-32-BN **DLC**
LONG	1"	1"	1"	Sq. End	3.500"	6"	FM-203-32	FM-203-32 **DLC**
	1"	1"	1"	0.03"	3.500"	6"	FM-203-32-030	FM-203-32-030 **DLC**
	1"	1"	1"	0.06"	3.500"	6"	FM-203-32-060	FM-203-32-060 **DLC**
	1"	1"	1"	0.09"	3.500"	6"	FM-203-32-090	FM-203-32-090 **DLC**
	1"	1"	1"	0.12"	3.500"	6"	FM-203-32-120	FM-203-32-120 **DLC**
	1"	1"	1"	Ball End	3.500"	6"	FM-203-32-BN	FM-203-32-BN **DLC**
EXTRA LONG	1"	1"	1"	Sq. End	4.000"	6"	FM-204-32	FM-204-32 **DLC**
	1"	1"	1"	0.03"	4.000"	6"	FM-204-32-030	FM-204-32-030 **DLC**
	1"	1"	1"	0.06"	4.000"	6"	FM-204-32-060	FM-204-32-060 **DLC**
	1"	1"	1"	0.09"	4.000"	6"	FM-204-32-090	FM-204-32-090 **DLC**
	1"	1"	1"	0.12"	4.000"	6"	FM-204-32-120	FM-204-32-120 **DLC**
	1"	1"	1"	Ball End	4.000"	6"	FM-204-32-BN	FM-204-32-BN **DLC**

1" DIAMETER

Other Reach Lengths available upon request.

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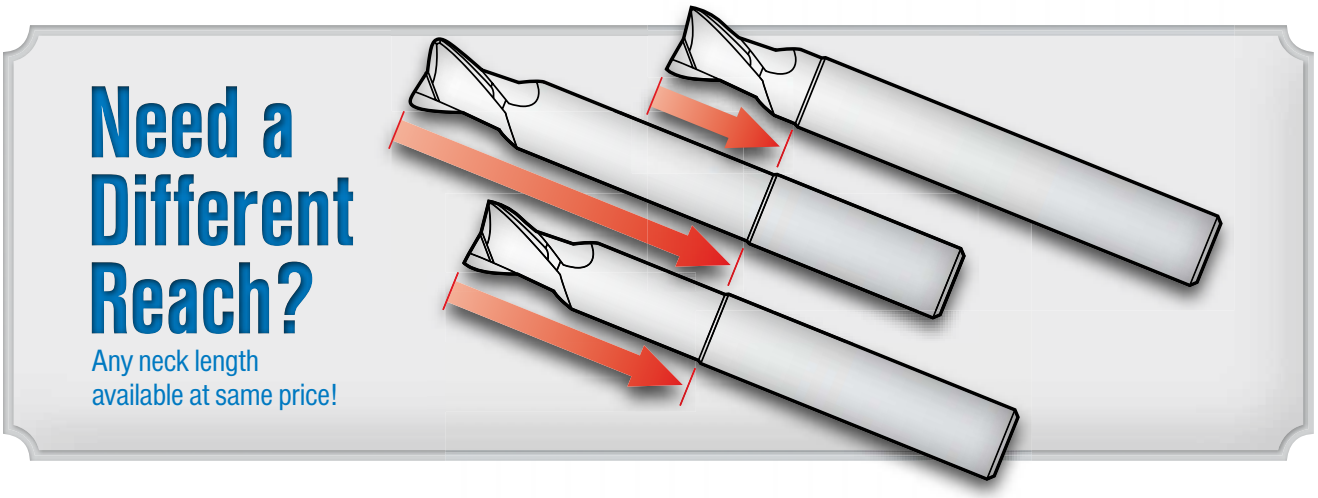


FM SERIES SPEED & FEED

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"	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

FM 3 Flute High Performance Tools for Aluminum

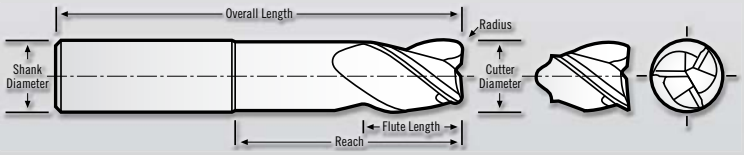
Characteristics: Square End, Corner Radius, Ball End, 3 Flute, 40° Helix, Feather Blend, Necked, Mirror Edge

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

Materials: Al Aluminum, Cu Copper, Mg Magnesium, Brass

Coatings: Diamond-Like Carbon (DLC)

FM Series comes with Mirror Edge! for Chatter Reduction



FM Series Tolerances:
Cutting Dia. = –.001/–.0015"
Shank Dia. = –.0001/–.0002"
LOC = +.060/–.000"
OAL = ±.060"

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	0.625"	3"	FM-301-08	FM-301-08 **DLC**	1/4" DIAMETER
	1/4"	1/4"	1/4"	0.03"	0.625"	3"	FM-301-08-030	FM-301-08-030 **DLC**	
	1/4"	1/4"	1/4"	0.06"	0.625"	3"	FM-301-08-060	FM-301-08-060 **DLC**	
	1/4"	1/4"	1/4"	0.09"	0.625"	3"	FM-301-08-090	FM-301-08-090 **DLC**	
	1/4"	1/4"	1/4"	Ball End	0.625"	3"	FM-301-08-BN	FM-301-08-BN **DLC**	
MEDIUM	1/4"	1/4"	1/4"	Sq. End	0.875"	3"	FM-302-08	FM-302-08 **DLC**	
	1/4"	1/4"	1/4"	0.03"	0.875"	3"	FM-302-08-030	FM-302-08-030 **DLC**	
	1/4"	1/4"	1/4"	0.06"	0.875"	3"	FM-302-08-060	FM-302-08-060 **DLC**	
	1/4"	1/4"	1/4"	0.09"	0.875"	3"	FM-302-08-090	FM-302-08-090 **DLC**	
	1/4"	1/4"	1/4"	Ball End	0.875"	3"	FM-302-08-BN	FM-302-08-BN **DLC**	
LONG	1/4"	1/4"	1/4"	Sq. End	1.063"	3"	FM-304-08	FM-304-08 **DLC**	
	1/4"	1/4"	1/4"	0.03"	1.063"	3"	FM-304-08-030	FM-304-08-030 **DLC**	
	1/4"	1/4"	1/4"	0.06"	1.063"	3"	FM-304-08-060	FM-304-08-060 **DLC**	
	1/4"	1/4"	1/4"	0.09"	1.063"	3"	FM-304-08-090	FM-304-08-090 **DLC**	
	1/4"	1/4"	1/4"	Ball End	1.063"	3"	FM-304-08-BN	FM-304-08-BN **DLC**	
EXTRA LONG	1/4"	1/4"	1/4"	Sq. End	1.500"	3"	FM-305-08	FM-305-08 **DLC**	
	1/4"	1/4"	1/4"	0.03"	1.500"	3"	FM-305-08-030	FM-305-08-030 **DLC**	
	1/4"	1/4"	1/4"	0.06"	1.500"	3"	FM-305-08-060	FM-305-08-060 **DLC**	
	1/4"	1/4"	1/4"	0.09"	1.500"	3"	FM-305-08-090	FM-305-08-090 **DLC**	
	1/4"	1/4"	1/4"	Ball End	1.500"	3"	FM-305-08-BN	FM-305-08-BN **DLC**	
SHORT	5/16"	5/16"	5/16"	Sq. End	0.875"	3-1/8"	FM-301-10	FM-301-10 **DLC**	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	0.875"	3-1/8"	FM-301-10-030	FM-301-10-030 **DLC**	
	5/16"	5/16"	5/16"	0.06"	0.875"	3-1/8"	FM-301-10-060	FM-301-10-060 **DLC**	
	5/16"	5/16"	5/16"	0.09"	0.875"	3-1/8"	FM-301-10-090	FM-301-10-090 **DLC**	
	5/16"	5/16"	5/16"	0.12"	0.875"	3-1/8"	FM-301-10-120	FM-301-10-120 **DLC**	
	5/16"	5/16"	5/16"	Ball End	0.875"	3-1/8"	FM-301-10-BN	FM-301-10-BN **DLC**	
MEDIUM	5/16"	5/16"	5/16"	Sq. End	1.094"	3-1/8"	FM-302-10	FM-302-10 **DLC**	
	5/16"	5/16"	5/16"	0.03"	1.094"	3-1/8"	FM-302-10-030	FM-302-10-030 **DLC**	
	5/16"	5/16"	5/16"	0.06"	1.094"	3-1/8"	FM-302-10-060	FM-302-10-060 **DLC**	
	5/16"	5/16"	5/16"	0.09"	1.094"	3-1/8"	FM-302-10-090	FM-302-10-090 **DLC**	
	5/16"	5/16"	5/16"	0.12"	1.094"	3-1/8"	FM-302-10-120	FM-302-10-120 **DLC**	
	5/16"	5/16"	5/16"	Ball End	1.094"	3-1/8"	FM-302-10-BN	FM-302-10-BN **DLC**	

*Other Reach Lengths available on request.

CONTINUED ON NEXT PAGE—

3 Flute High Performance Tools for Aluminum FM

NEW!

FM 3 Flute (Short to Long Reach) —CONTINUED FROM PREVIOUS

	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	1.313"	3-1/8"	FM-304-10	FM-304-10 **DLC**	5/16" DIAMETER
	5/16"	5/16"	5/16"	0.03"	1.313"	3-1/8"	FM-304-10-030	FM-304-10-030 **DLC**	
	5/16"	5/16"	5/16"	0.06"	1.313"	3-1/8"	FM-304-10-060	FM-304-10-060 **DLC**	
	5/16"	5/16"	5/16"	0.09"	1.313"	3-1/8"	FM-304-10-090	FM-304-10-090 **DLC**	
	5/16"	5/16"	5/16"	0.12"	1.313"	3-1/8"	FM-304-10-120	FM-304-10-120 **DLC**	
	5/16"	5/16"	5/16"	Ball End	1.313"	3-1/8"	FM-304-10-BN	FM-304-10-BN **DLC**	
EXTRA LONG	5/16"	5/16"	5/16"	Sq. End	1.625"	3-1/8"	FM-305-10	FM-305-10 **DLC**	
	5/16"	5/16"	5/16"	0.03"	1.625"	3-1/8"	FM-305-10-030	FM-305-10-030 **DLC**	
	5/16"	5/16"	5/16"	0.06"	1.625"	3-1/8"	FM-305-10-060	FM-305-10-060 **DLC**	
	5/16"	5/16"	5/16"	0.09"	1.625"	3-1/8"	FM-305-10-090	FM-305-10-090 **DLC**	
	5/16"	5/16"	5/16"	0.12"	1.625"	3-1/8"	FM-305-10-120	FM-305-10-120 **DLC**	
	5/16"	5/16"	5/16"	Ball End	1.625"	3-1/8"	FM-305-10-BN	FM-305-10-BN **DLC**	
SHORT	3/8"	3/8"	3/8"	Sq. End	1.000"	4"	FM-301-12	FM-301-12 **DLC**	3/8" DIAMETER
	3/8"	3/8"	3/8"	0.03"	1.000"	4"	FM-301-12-030	FM-301-12-030 **DLC**	
	3/8"	3/8"	3/8"	0.06"	1.000"	4"	FM-301-12-060	FM-301-12-060 **DLC**	
	3/8"	3/8"	3/8"	0.09"	1.000"	4"	FM-301-12-090	FM-301-12-090 **DLC**	
	3/8"	3/8"	3/8"	0.12"	1.000"	4"	FM-301-12-120	FM-301-12-120 **DLC**	
	3/8"	3/8"	3/8"	Ball End	1.000"	4"	FM-301-12-BN	FM-301-12-BN **DLC**	
MEDIUM	3/8"	3/8"	3/8"	Sq. End	1.250"	4"	FM-302-12	FM-302-12 **DLC**	
	3/8"	3/8"	3/8"	0.03"	1.250"	4"	FM-302-12-030	FM-302-12-030 **DLC**	
	3/8"	3/8"	3/8"	0.06"	1.250"	4"	FM-302-12-060	FM-302-12-060 **DLC**	
	3/8"	3/8"	3/8"	0.09"	1.250"	4"	FM-302-12-090	FM-302-12-090 **DLC**	
	3/8"	3/8"	3/8"	0.12"	1.250"	4"	FM-302-12-120	FM-302-12-120 **DLC**	
	3/8"	3/8"	3/8"	Ball End	1.250"	4"	FM-302-12-BN	FM-302-12-BN **DLC**	
LONG	3/8"	3/8"	3/8"	Sq. End	1.563"	4"	FM-304-12	FM-304-12 **DLC**	
	3/8"	3/8"	3/8"	0.03"	1.563"	4"	FM-304-12-030	FM-304-12-030 **DLC**	
	3/8"	3/8"	3/8"	0.06"	1.563"	4"	FM-304-12-060	FM-304-12-060 **DLC**	
	3/8"	3/8"	3/8"	0.09"	1.563"	4"	FM-304-12-090	FM-304-12-090 **DLC**	
	3/8"	3/8"	3/8"	0.12"	1.563"	4"	FM-304-12-120	FM-304-12-120 **DLC**	
	3/8"	3/8"	3/8"	Ball End	1.563"	4"	FM-304-12-BN	FM-304-12-BN **DLC**	
EXTRA LONG	3/8"	3/8"	3/8"	Sq. End	2.125"	4"	FM-305-12	FM-305-12 **DLC**	
	3/8"	3/8"	3/8"	0.03"	2.125"	4"	FM-305-12-030	FM-305-12-030 **DLC**	
	3/8"	3/8"	3/8"	0.06"	2.125"	4"	FM-305-12-060	FM-305-12-060 **DLC**	
	3/8"	3/8"	3/8"	0.09"	2.125"	4"	FM-305-12-090	FM-305-12-090 **DLC**	
	3/8"	3/8"	3/8"	0.12"	2.125"	4"	FM-305-12-120	FM-305-12-120 **DLC**	
	3/8"	3/8"	3/8"	Ball End	2.125"	4"	FM-305-12-BN	FM-305-12-BN **DLC**	
SHORT	1/2"	1/2"	1/2"	Sq. End	1.250"	5"	FM-301-16	FM-301-16 **DLC**	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	1.250"	5"	FM-301-16-030	FM-301-16-030 **DLC**	
	1/2"	1/2"	1/2"	0.06"	1.250"	5"	FM-301-16-060	FM-301-16-060 **DLC**	
	1/2"	1/2"	1/2"	0.09"	1.250"	5"	FM-301-16-090	FM-301-16-090 **DLC**	
	1/2"	1/2"	1/2"	0.12"	1.250"	5"	FM-301-16-120	FM-301-16-120 **DLC**	
	1/2"	1/2"	1/2"	Ball End	1.250"	5"	FM-301-16-BN	FM-301-16-BN **DLC**	
MEDIUM	1/2"	1/2"	1/2"	Sq. End	1.625"	5"	FM-302-16	FM-302-16 **DLC**	
	1/2"	1/2"	1/2"	0.03"	1.625"	5"	FM-302-16-030	FM-302-16-030 **DLC**	
	1/2"	1/2"	1/2"	0.06"	1.625"	5"	FM-302-16-060	FM-302-16-060 **DLC**	
	1/2"	1/2"	1/2"	0.09"	1.625"	5"	FM-302-16-090	FM-302-16-090 **DLC**	
	1/2"	1/2"	1/2"	0.12"	1.625"	5"	FM-302-16-120	FM-302-16-120 **DLC**	
	1/2"	1/2"	1/2"	Ball End	1.625"	5"	FM-302-16-BN	FM-302-16-BN **DLC**	
LONG	1/2"	1/2"	1/2"	Sq. End	2.125"	5"	FM-304-16	FM-304-16 **DLC**	
	1/2"	1/2"	1/2"	0.03"	2.125"	5"	FM-304-16-030	FM-304-16-030 **DLC**	
	1/2"	1/2"	1/2"	0.06"	2.125"	5"	FM-304-16-060	FM-304-16-060 **DLC**	
	1/2"	1/2"	1/2"	0.09"	2.125"	5"	FM-304-16-090	FM-304-16-090 **DLC**	
	1/2"	1/2"	1/2"	0.12"	2.125"	5"	FM-304-16-120	FM-304-16-120 **DLC**	
	1/2"	1/2"	1/2"	Ball End	2.125"	5"	FM-304-16-BN	FM-304-16-BN **DLC**	

*Other Reach Lengths available upon request.

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FM 3 Flute High Performance Tools for Aluminum

NEW!

FM 3 Flute (Short to Long Reach) —CONTINUED FROM PREVIOUS

	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	2.625"	5"	FM-305-16	FM-305-16 **DLC**	1/2" DIAMETER
	1/2"	1/2"	1/2"	0.03"	2.625"	5"	FM-305-16-030	FM-305-16-030 **DLC**	
	1/2"	1/2"	1/2"	0.06"	2.625"	5"	FM-305-16-060	FM-305-16-060 **DLC**	
	1/2"	1/2"	1/2"	0.09"	2.625"	5"	FM-305-16-090	FM-305-16-090 **DLC**	
	1/2"	1/2"	1/2"	0.12"	2.625"	5"	FM-305-16-120	FM-305-16-120 **DLC**	
	1/2"	1/2"	1/2"	Ball End	2.625"	5"	FM-305-16-BN	FM-305-16-BN **DLC**	
SHORT	5/8"	5/8"	5/8"	Sq. End	1.500"	6"	FM-301-20	FM-301-20 **DLC**	5/8" DIAMETER
	5/8"	5/8"	5/8"	0.03"	1.500"	6"	FM-301-20-030	FM-301-20-030 **DLC**	
	5/8"	5/8"	5/8"	0.06"	1.500"	6"	FM-301-20-060	FM-301-20-060 **DLC**	
	5/8"	5/8"	5/8"	0.09"	1.500"	6"	FM-301-20-090	FM-301-20-090 **DLC**	
	5/8"	5/8"	5/8"	0.12"	1.500"	6"	FM-301-20-120	FM-301-20-120 **DLC**	
	5/8"	5/8"	5/8"	Ball End	1.500"	6"	FM-301-20-BN	FM-301-20-BN **DLC**	
MEDIUM	5/8"	5/8"	5/8"	Sq. End	2.063"	6"	FM-302-20	FM-302-20 **DLC**	
	5/8"	5/8"	5/8"	0.03"	2.063"	6"	FM-302-20-030	FM-302-20-030 **DLC**	
	5/8"	5/8"	5/8"	0.06"	2.063"	6"	FM-302-20-060	FM-302-20-060 **DLC**	
	5/8"	5/8"	5/8"	0.09"	2.063"	6"	FM-302-20-090	FM-302-20-090 **DLC**	
	5/8"	5/8"	5/8"	0.12"	2.063"	6"	FM-302-20-120	FM-302-20-120 **DLC**	
	5/8"	5/8"	5/8"	Ball End	2.063"	6"	FM-302-20-BN	FM-302-20-BN **DLC**	
LONG	5/8"	5/8"	5/8"	Sq. End	2.625"	6"	FM-304-20	FM-304-20 **DLC**	
	5/8"	5/8"	5/8"	0.03"	2.625"	6"	FM-304-20-030	FM-304-20-030 **DLC**	
	5/8"	5/8"	5/8"	0.06"	2.625"	6"	FM-304-20-060	FM-304-20-060 **DLC**	
	5/8"	5/8"	5/8"	0.09"	2.625"	6"	FM-304-20-090	FM-304-20-090 **DLC**	
	5/8"	5/8"	5/8"	0.12"	2.625"	6"	FM-304-20-120	FM-304-20-120 **DLC**	
	5/8"	5/8"	5/8"	Ball End	2.625"	6"	FM-304-20-BN	FM-304-20-BN **DLC**	
EXTRA LONG	5/8"	5/8"	5/8"	Sq. End	3.125"	6"	FM-305-20	FM-305-20 **DLC**	
	5/8"	5/8"	5/8"	0.03"	3.125"	6"	FM-305-20-030	FM-305-20-030 **DLC**	
	5/8"	5/8"	5/8"	0.06"	3.125"	6"	FM-305-20-060	FM-305-20-060 **DLC**	
	5/8"	5/8"	5/8"	0.09"	3.125"	6"	FM-305-20-090	FM-305-20-090 **DLC**	
	5/8"	5/8"	5/8"	0.12"	3.125"	6"	FM-305-20-120	FM-305-20-120 **DLC**	
	5/8"	5/8"	5/8"	Ball End	3.125"	6"	FM-305-20-BN	FM-305-20-BN **DLC**	
SHORT	3/4"	3/4"	3/4"	Sq. End	2.000"	6"	FM-301-24	FM-301-24 **DLC**	3/4" DIAMETER
	3/4"	3/4"	3/4"	0.03"	2.000"	6"	FM-301-24-030	FM-301-24-030 **DLC**	
	3/4"	3/4"	3/4"	0.06"	2.000"	6"	FM-301-24-060	FM-301-24-060 **DLC**	
	3/4"	3/4"	3/4"	0.09"	2.000"	6"	FM-301-24-090	FM-301-24-090 **DLC**	
	3/4"	3/4"	3/4"	0.12"	2.000"	6"	FM-301-24-120	FM-301-24-120 **DLC**	
	3/4"	3/4"	3/4"	Ball End	2.000"	6"	FM-301-24-BN	FM-301-24-BN **DLC**	
MEDIUM	3/4"	3/4"	3/4"	Sq. End	2.563"	6"	FM-302-24	FM-302-24 **DLC**	
	3/4"	3/4"	3/4"	0.03"	2.563"	6"	FM-302-24-030	FM-302-24-030 **DLC**	
	3/4"	3/4"	3/4"	0.06"	2.563"	6"	FM-302-24-060	FM-302-24-060 **DLC**	
	3/4"	3/4"	3/4"	0.09"	2.563"	6"	FM-302-24-090	FM-302-24-090 **DLC**	
	3/4"	3/4"	3/4"	0.12"	2.563"	6"	FM-302-24-120	FM-302-24-120 **DLC**	
	3/4"	3/4"	3/4"	Ball End	2.563"	6"	FM-302-24-BN	FM-302-24-BN **DLC**	
LONG	3/4"	3/4"	3/4"	Sq. End	3.125"	6"	FM-304-24	FM-304-24 **DLC**	
	3/4"	3/4"	3/4"	0.03"	3.125"	6"	FM-304-24-030	FM-304-24-030 **DLC**	
	3/4"	3/4"	3/4"	0.06"	3.125"	6"	FM-304-24-060	FM-304-24-060 **DLC**	
	3/4"	3/4"	3/4"	0.09"	3.125"	6"	FM-304-24-090	FM-304-24-090 **DLC**	
	3/4"	3/4"	3/4"	0.12"	3.125"	6"	FM-304-24-120	FM-304-24-120 **DLC**	
	3/4"	3/4"	3/4"	Ball End	3.125"	6"	FM-304-24-BN	FM-304-24-BN **DLC**	
EXTRA LONG	3/4"	3/4"	3/4"	Sq. End	3.750"	6"	FM-305-24	FM-305-24 **DLC**	
	3/4"	3/4"	3/4"	0.03"	3.750"	6"	FM-305-24-030	FM-305-24-030 **DLC**	
	3/4"	3/4"	3/4"	0.06"	3.750"	6"	FM-305-24-060	FM-305-24-060 **DLC**	
	3/4"	3/4"	3/4"	0.09"	3.750"	6"	FM-305-24-090	FM-305-24-090 **DLC**	
	3/4"	3/4"	3/4"	0.12"	3.750"	6"	FM-305-24-120	FM-305-24-120 **DLC**	
	3/4"	3/4"	3/4"	Ball End	3.750"	6"	FM-305-24-BN	FM-304-24-BN **DLC**	

**Other Reach Lengths available upon request.*

CONTINUED ON NEXT PAGE—

3 Flute High Performance Tools for Aluminum FM

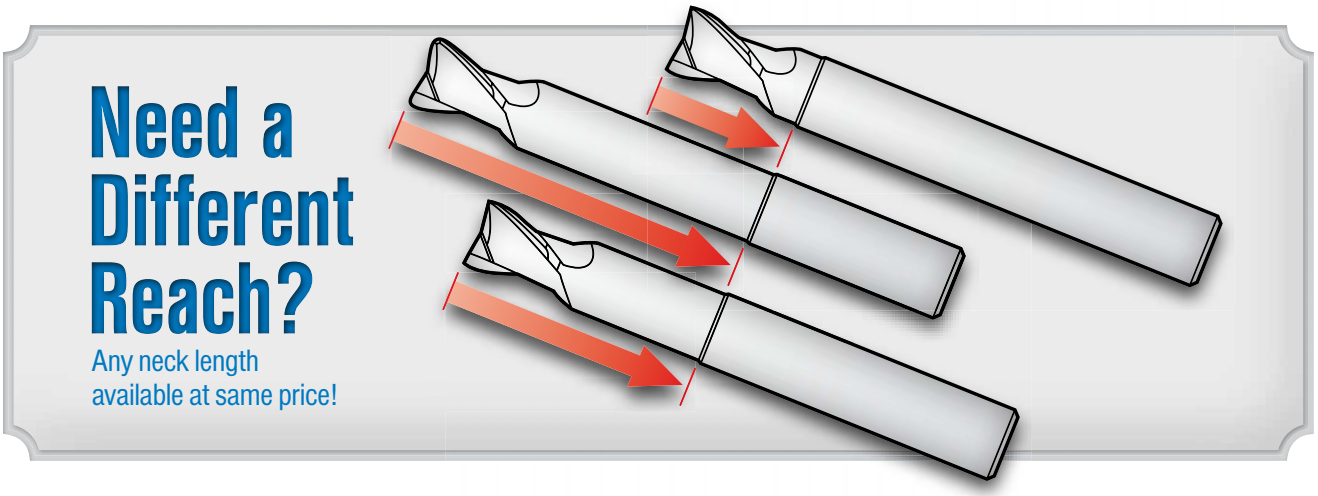
NEW!

FM 3 Flute (Short to Long Reach) —CONTINUED FROM PREVIOUS

	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	2.000"	6"	FM-301-32	FM-301-32 **DLC**
	1"	1"	1"	0.03"	2.000"	6"	FM-301-32-030	FM-301-32-030 **DLC**
	1"	1"	1"	0.06"	2.000"	6"	FM-301-32-060	FM-301-32-060 **DLC**
	1"	1"	1"	0.09"	2.000"	6"	FM-301-32-090	FM-301-32-090 **DLC**
	1"	1"	1"	0.12"	2.000"	6"	FM-301-32-120	FM-301-32-120 **DLC**
	1"	1"	1"	Ball End	2.000"	6"	FM-301-32-BN	FM-301-32-BN **DLC**
MEDIUM	1"	1"	1"	Sq. End	3.000"	6"	FM-302-32	FM-302-32 **DLC**
	1"	1"	1"	0.03"	3.000"	6"	FM-302-32-030	FM-302-32-030 **DLC**
	1"	1"	1"	0.06"	3.000"	6"	FM-302-32-060	FM-302-32-060 **DLC**
	1"	1"	1"	0.09"	3.000"	6"	FM-302-32-090	FM-302-32-090 **DLC**
	1"	1"	1"	0.12"	3.000"	6"	FM-302-32-120	FM-302-32-120 **DLC**
	1"	1"	1"	Ball End	3.000"	6"	FM-302-32-BN	FM-302-32-BN **DLC**
LONG	1"	1"	1"	Sq. End	3.500"	6"	FM-303-32	FM-303-32 **DLC**
	1"	1"	1"	0.03"	3.500"	6"	FM-303-32-030	FM-303-32-030 **DLC**
	1"	1"	1"	0.06"	3.500"	6"	FM-303-32-060	FM-303-32-060 **DLC**
	1"	1"	1"	0.09"	3.500"	6"	FM-303-32-090	FM-303-32-090 **DLC**
	1"	1"	1"	0.12"	3.500"	6"	FM-303-32-120	FM-303-32-120 **DLC**
	1"	1"	1"	Ball End	3.500"	6"	FM-303-32-BN	FM-303-32-BN **DLC**
EXTRA LONG	1"	1"	1"	Sq. End	4.000"	6"	FM-304-32	FM-304-32 **DLC**
	1"	1"	1"	0.03"	4.000"	6"	FM-304-32-030	FM-304-32-030 **DLC**
	1"	1"	1"	0.06"	4.000"	6"	FM-304-32-060	FM-304-32-060 **DLC**
	1"	1"	1"	0.09"	4.000"	6"	FM-304-32-090	FM-304-32-090 **DLC**
	1"	1"	1"	0.12"	4.000"	6"	FM-304-32-120	FM-304-32-120 **DLC**
	1"	1"	1"	Ball End	4.000"	6"	FM-304-32-BN	FM-304-32-BN **DLC**

1" DIAMETER

Other Reach Lengths available upon request.



FM SERIES SPEED & FEED

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"	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 Metric 2 Flute High Performance Tools for Aluminum

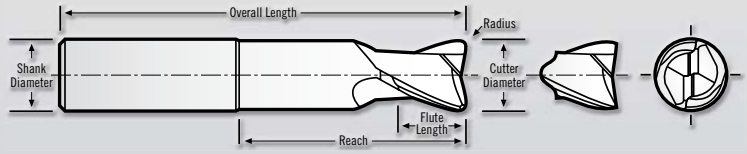
Characteristics: Corner Radius · 2 Flute · 40° Helix · Feather Blend · Necked · Mirror Edge

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



MFM Series Tolerances:
Cutting Dia. = –0.025/–0.038 mm
Shank Dia. = –0.002/–0.005 mm
LOC (<10D) = +0.750/–.000 mm
(>10D) = +1.500/–.000 mm
OAL = +/– 1.000 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**	6mm 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**	8mm 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.*

CONTINUED ON NEXT PAGE—

Metric 2 Flute High Performance Tools for Aluminum MFM

MFM 2 Flute Metric (Short to Long Reach) METRIC

—CONTINUED FROM PREVIOUS

	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 FROM PREVIOUS

	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**	

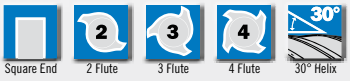
MFM SERIES SPEED & FEED

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

C-2 Grade Carbide End Mills S1/MS1

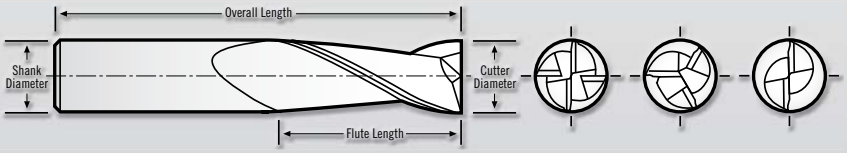
Characteristics



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"
LOC (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
LOC = +0.500/+1.500mm
OAL = ±1.000mm

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"	3-1/2"	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**

S1 C-2 Grade Carbide End Mills

S1-301 3 Flute C-2 Grade Stub Length

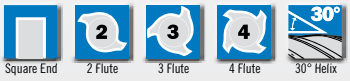
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/8"	1/8"	1-1/2"	S1-301-02	S1-301-02 **DLC**
3/32"	1/8"	3/16"	1-1/2"	S1-301-03	S1-301-03 **DLC**
1/8"	1/8"	1/4"	1-1/2"	S1-301-04	S1-301-04 **DLC**
3/16"	3/16"	3/8"	2"	S1-301-06	S1-301-06 **DLC**
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**

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"	3-1/2"	S1-401-24	S1-401-24 **DLC**

C-2 Grade Carbide End Mills C1/MC1

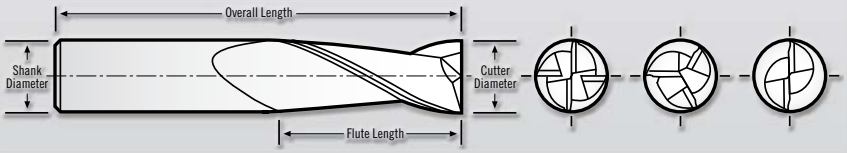
Characteristics



Applications

Materials

Coatings



C1 Tolerances

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

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**

C1/MC1 C-2 Grade Carbide End Mills

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

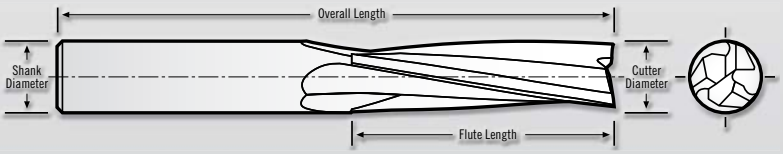
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number DLC Coated
1/16"	1/8"	3/16"	1-1/2"	C1-401-02	C1-401-02 **DLC**
3/32"	1/8"	3/8"	1-1/2"	C1-401-03	C1-401-03 **DLC**
1/8"	1/8"	1/2"	1-1/2"	C1-401-04	C1-401-04 **DLC**
5/32"	3/16"	9/16"	2"	C1-401-05	C1-401-05 **DLC**
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**

Router for Aluminum Aircraft Skins WU1/WD1

Characteristics

Applications

Materials



WU1/WD1 Tolerances

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

WU1-310 Up Shear 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"	5-1/4"	WU1-310-24

WD1-310 Down Shear 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"	5-1/4"	WD1-310-24

See Page 6

Aluminum Tools in Other Sections

SB / B 201/203 **MSB / MB** 201/203	2 Flute Ball End (See Multiple Applications)		100
C8 201/203/301/303	2 & 3 Flute on ¼" Shank (See Multiple Applications)		93
NR / MNR 204/303/404	2, 3 and 4 Flute (See Multiple Applications)		102
PM / PMD Routers	Single Flute (See Composites & Plastics)		63
PCD 203 Routers	2 Flute PCD Diamond (See Composites & Plastics)		59
PCD-BN 201 Routers	2 Flute PCD Diamond, Ball End (See Composites & Plastics)		59
MINIATURES	(See Miniatures Applications)		77
SAWS	(See Saws Applications)		108

TOOLS FOR Titanium, Steel & High-Temp Alloys

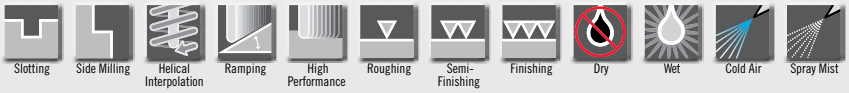
TOOLS FOR Titanium, Steel & High-Temp Alloys

Titanium, Steel & High-Temp Alloys Tools

XG/MXG Tuffy Grade Carbide End Mills

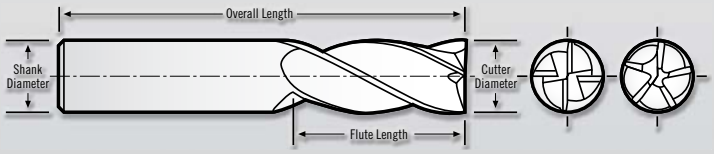
Characteristics

Applications



Materials

Coatings



XG/XF Tolerances
Cutting Dia. = –.001/–.002"
Shank Dia. = –.0001/–.0002"
LOC = +.060/–.000"
OAL = +/–.060"

MXG Tolerances
Cutting Dia. = –.025/–.050mm
Shank Dia. = –.002/–.005mm
LOC = +0.50/+1.50mm
OAL = +/– 1.00mm

Add Flats for High Torque Cuts!

XG-400 4 Flute Stub Length

Cutting Diameter	Corner Radius	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN Coated
1/4"	.017–.019"	1/4"	3/8"	2-1/2"	XG-400-08 **FL**	XG-400-08
5/16"	.020–.022"	5/16"	7/16"	2-1/2"	XG-400-10 **FL**	XG-400-10
3/8"	.023–.025"	3/8"	1/2"	2-1/2"	XG-400-12 **FL**	XG-400-12
1/2"	.025–.027"	1/2"	5/8"	3"	XG-400-16 **FL**	XG-400-16
5/8"	.027–.029"	5/8"	3/4"	3-1/2"	XG-400-20 **FL**	XG-400-20
3/4"	.028–.030"	3/4"	1"	4"	XG-400-24 **FL**	XG-400-24
1"	.028–.030"	1"	1-1/8"	5"	XG-400-32 **FL**	XG-400-32

XG-402 4 Flute Standard Length

Cutting Diameter	Corner Radius	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN Coated
1/4"	.017–.019"	1/4"	3/4"	2-1/2"	XG-402-08 **FL**	XG-402-08
5/16"	.020–.022"	5/16"	13/16"	2-1/2"	XG-402-10 **FL**	XG-402-10
3/8"	.023–.025"	3/8"	7/8"	2-1/2"	XG-402-12 **FL**	XG-402-12
1/2"	.025–.027"	1/2"	1"	3"	XG-402-16 **FL**	XG-402-16
5/8"	.027–.029"	5/8"	1-1/4"	3-1/2"	XG-402-20 **FL**	XG-402-20
3/4"	.028–.030"	3/4"	1-1/2"	4"	XG-402-24 **FL**	XG-402-24
1"	.028–.030"	1"	2"	5"	XG-402-32 **FL**	XG-402-32

MXG-402 Metric 4 Flute Standard Length METRIC

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

NOTE: Metric tools do not have flats.

Tuffy Grade Carbide End Mills XG/MXG

Add Flats for High Torque Cuts!

XG-500 5 Flute Stub Length

Cutting Diameter	Corner Radius	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN Coated
1/4"	.017–.019"	1/4"	3/8"	2-1/2"	XG-500-08 **FL**	XG-500-08
5/16"	.020–.022"	5/16"	7/16"	2-1/2"	XG-500-10 **FL**	XG-500-10
3/8"	.023–.025"	3/8"	1/2"	2-1/2"	XG-500-12 **FL**	XG-500-12
1/2"	.025–.027"	1/2"	5/8"	3"	XG-500-16 **FL**	XG-500-16
5/8"	.027–.029"	5/8"	3/4"	3-1/2"	XG-500-20 **FL**	XG-500-20
3/4"	.028–.030"	3/4"	1"	4"	XG-500-24 **FL**	XG-500-24
1"	.028–.030"	1"	1-1/8"	5"	XG-500-32 **FL**	XG-500-32

XG-502 5 Flute Standard Length

Cutting Diameter	Corner Radius	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN Coated
1/4"	.017–.019"	1/4"	3/4"	2-1/2"	XG-502-08 **FL**	XG-502-08
5/16"	.020–.022"	5/16"	13/16"	2-1/2"	XG-502-10 **FL**	XG-502-10
3/8"	.023–.025"	3/8"	7/8"	2-1/2"	XG-502-12 **FL**	XG-502-12
1/2"	.025–.027"	1/2"	1"	3"	XG-502-16 **FL**	XG-502-16
5/8"	.027–.029"	5/8"	1-1/4"	3-1/2"	XG-502-20 **FL**	XG-502-20
3/4"	.028–.030"	3/4"	1-1/2"	4"	XG-502-24 **FL**	XG-502-24
1"	.028–.030"	1"	2"	5"	XG-502-32 **FL**	XG-502-32

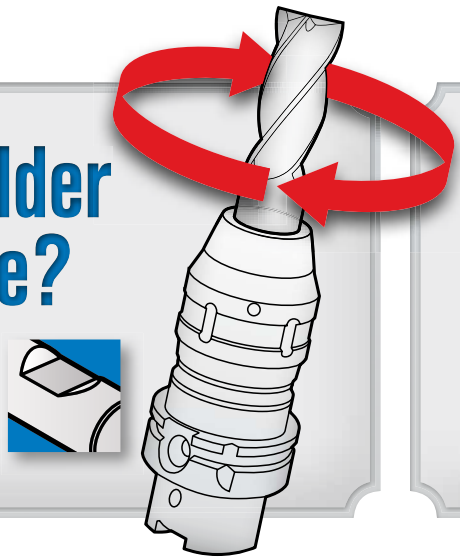
MXG-502 Metric 5 Flute Standard Length METRIC

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

NOTE: Metric tools do not have flats.

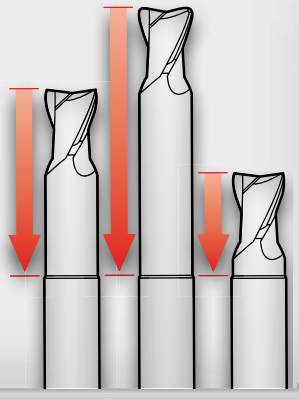
Tool Holder Slippage?

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



Need Reach?

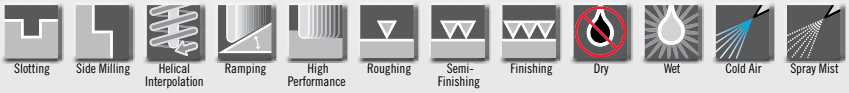
See End Mill Modifications (page 7)



XG/MXG Tuffy Grade Carbide End Mills

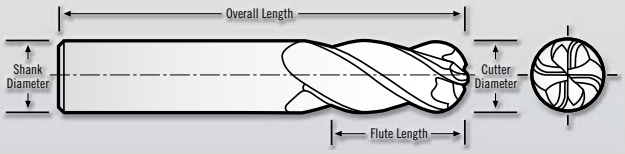
Characteristics

Applications



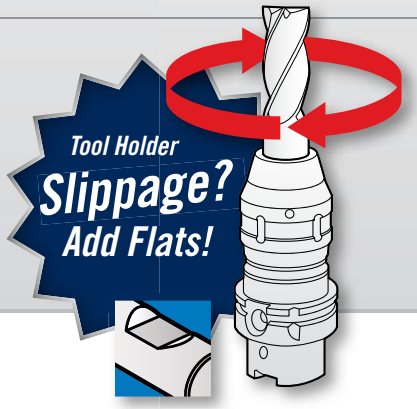
Materials

Coatings



XG-BN Tolerances

Cutting Dia. = –.001/–.002"
LOC = +.060/–.000"
Shank Dia. = –.0001/–.0002"
OAL = +/–.060"



Add Flats for High Torque Cuts!

XG-402BN 4 Flute Ball End Standard Length

Cutting Diameter	Corner Radius	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN Coated
1/4"	–	1/4"	3/4"	2-1/2"	XG-402-08BN **FL**	XG-402-08BN
5/16"	–	5/16"	13/16"	2-1/2"	XG-402-10BN **FL**	XG-402-10BN
3/8"	–	3/8"	7/8"	2-1/2"	XG-402-12BN **FL**	XG-402-12BN
1/2"	–	1/2"	1"	3"	XG-402-16BN **FL**	XG-402-16BN
5/8"	–	5/8"	1-1/4"	3-1/2"	XG-402-20BN **FL**	XG-402-20BN
3/4"	–	3/4"	1-1/2"	4"	XG-402-24BN **FL**	XG-402-24BN
1"	–	1"	2"	5"	XG-402-32BN **FL**	XG-402-32BN

MXG-402BN Metric 4 Flute Ball End Standard Length METRIC

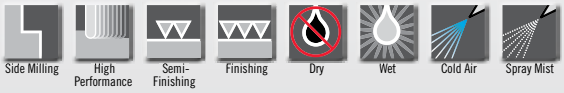
Cutting Diameter	Corner Radius	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, AlTiN Coated	Tool Number No Flats, AlTiN Coated
6mm	–	6mm	14mm	57mm	–	MXG-402-06BN
8mm	–	8mm	16mm	63mm	–	MXG-402-08BN
10mm	–	10mm	20mm	72mm	–	MXG-402-10BN
12mm	–	12mm	25mm	83mm	–	MXG-402-12BN
16mm	–	16mm	32mm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

NOTE: Metric tools do not have flats.

Tuffy Grade Carbide End Mills XF/MXF

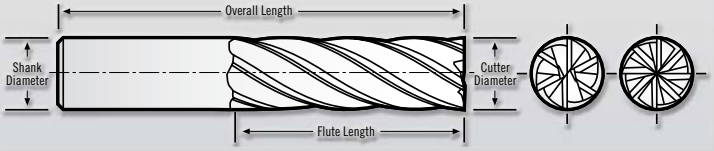
Characteristics

Applications



Materials

Coatings



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

MXF Tolerances
Cutting Dia. = –.025/–.050mm
LOC = +0.500/+1.500mm
Shank Dia. = –.002/–.005mm
OAL = ±1.000mm

See RobbJack Videos on YouTube
www.youtube.com/RobbJackCorp or www.robbjack.com/videos

XF-602/802 6/8 Flute Standard Length

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

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

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

NOTE: Metric tools do not have flats.

XG/MXG Speed & Feed

XG SERIES SPEED & FEED

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 SERIES SPEED & FEED 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—

MXG SERIES SPEED & FEED METRIC

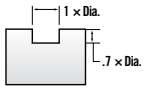
—CONTINUED FROM PREVIOUS

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

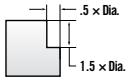
General Guidelines

- Speed 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



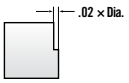
Profiling



XF SERIES SPEED & FEED

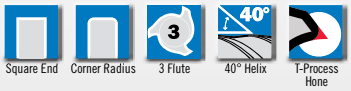
Material	Surface Feet	3/8"		1/2"		5/8"		3/4"		1"	
		RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min	RPM	in/min
CAST IRON											
Ductile	400	4075	58	3056	64	2445	58	2037	68	1528	60
Gray	525	5348	86	4011	96	3209	86	2674	102	2006	90
INCONEL											
625/718	150	1528	12	1146	14	917	12	764	16	573	14
STEEL											
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

Finish Profiling



ST/MST Super Tuffy Grade Carbide End Mills

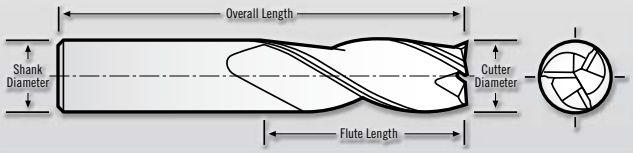
Characteristics



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

MST-341 Tolerances

Cutting Dia. = +.000/–.075mm
Shank Dia. = –.002/–.005mm
OAL = ±1.000mm
LOC = +0.500/+1.500mm

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 TiN 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**

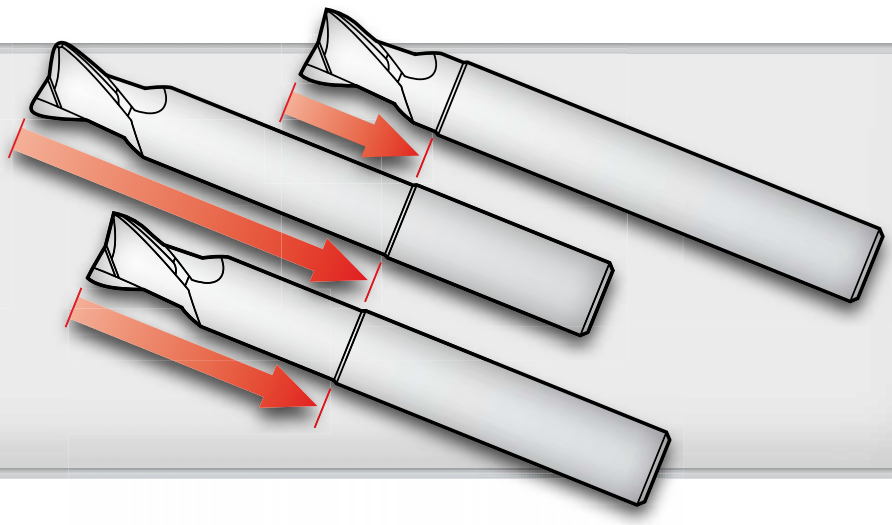
HONED EDGE!

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**

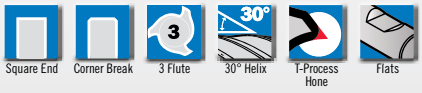
Need Reach?

See End Mill Modifications (page 7)

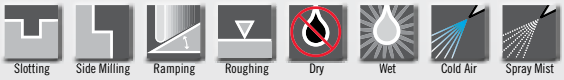


STR/MSTR 3 Flute Super Tuffy Grade Carbide Ruffers

Characteristics



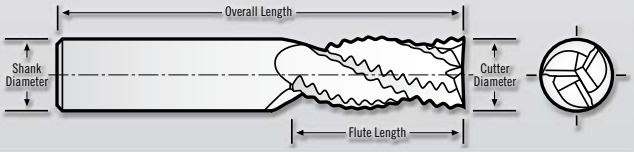
Applications



Materials

Coatings

STR Series comes with T-Process Honed Edges



STR Series Tolerances

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

MSTR Tolerances

Cutting Dia. = –.075/–.180mm
Shank Dia. = –.002/–.005mm
OAL = ±1.000mm
LOC = +0.500/+1.500mm

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 Metric 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.

3 Flute Super Tuffy Grade Carbide Ruffers STR/MSTR

HONED EDGE!

STR-303 3 Flute Super Tuffy Carbide Ruffer Standard Length

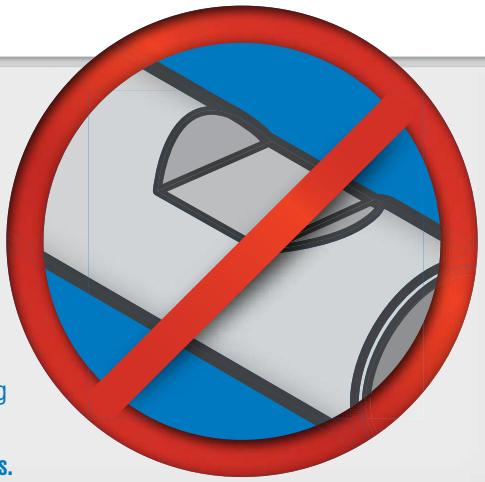
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/4"	1/4"	3/4"	2-1/2"	STR-303-08*	STR-303-08 **T***	STR-303-08 **C***	STR-303-08 **A***
9/32"	5/16"	3/4"	2-1/2"	STR-303-09*	STR-303-09 **T***	STR-303-09 **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 Metric 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.



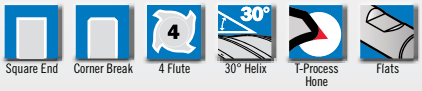
Need Without Flats?

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

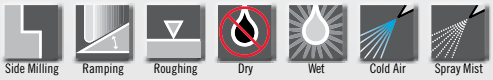
NOTE: Metric sizes do not come with flats.

STR/MSTR 4 Flute Super Tuffy Grade Carbide Ruffers

Characteristics

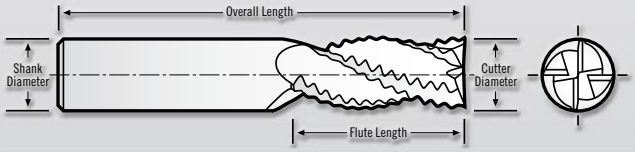


Applications



Materials

Coatings

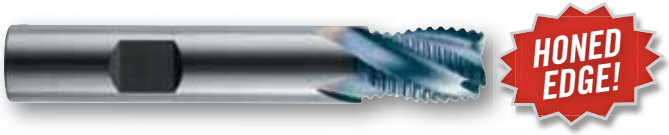


STR Series Tolerances

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

MSTR Tolerances

Cutting Dia. = –.075/–.180mm
Shank Dia. = –.002/–.005mm
OAL = ±1.000mm
LOC = +0.500/+1.500mm



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 Metric 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-401-16 **T**	MSTR-401-16 **C**	MSTR-401-16 **A**

NOTE: Metric tools do not have flats.

4 Flute Super Tuffy Grade Carbide Ruffers STR/MSTR

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 TiN 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***
9/32"	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 Metric 4 Flute Super Tuffy Carbide Ruffer Standard Length METRIC

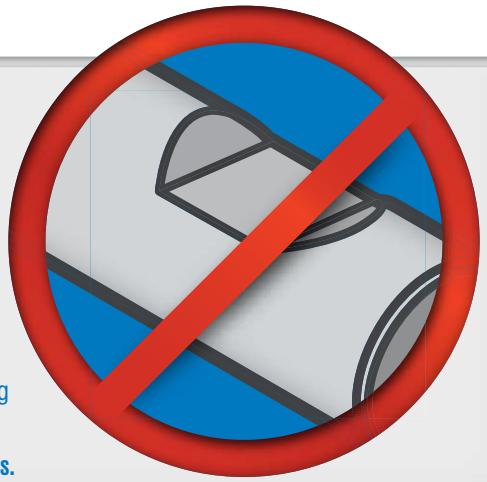
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
6mm	6mm	14mm	57mm	MSTR-404-06	MSTR-404-06 **T**	MSTR-404-06 **C**	MSTR-404-06 **A**
8mm	8mm	16mm	63mm	MSTR-404-08	MSTR-404-08 **T**	MSTR-404-08 **C**	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?

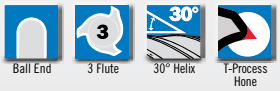
Order any tool without flats by adding **"NF"** to end of Tool Number!

NOTE: Metric sizes do not come with flats.

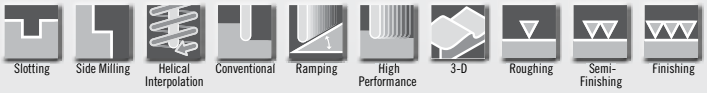


B 3 Flute Tuffy Grade Carbide Ball End Mills

Characteristics

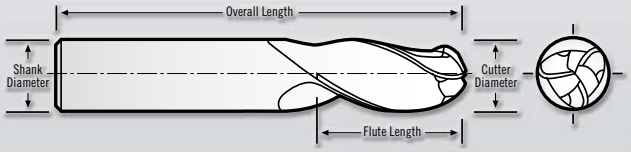


Applications



Materials

Coatings



B Series Tolerances

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

B-300 3 Flute Tuffy Ball End Stub Length

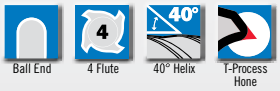
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/4"	1-1/2"	B-300-04	B-300-04**T**	B-300-04**C**	B-300-04**A**
3/16"	3/16"	5/16"	2"	B-300-06	B-300-06**T**	B-300-06**C**	B-300-06**A**
1/4"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

B-330 3 Flute Tuffy Ball End Standard Length

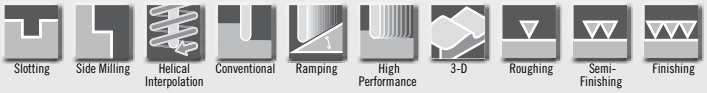
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/2"	1-1/2"	B-330-04	B-330-04**T**	B-330-04**C**	B-330-04**A**
3/16"	3/16"	5/8"	2"	B-330-06	B-330-06**T**	B-330-06**C**	B-330-06**A**
1/4"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

4 Flute Tuffy Grade Carbide Ball End Mills B/MB

Characteristics

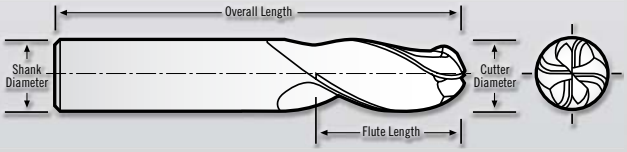


Applications



Materials

Coatings



B Series Tolerances

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

MB Tolerances

Cutting Dia. = +.000/–.075mm
Shank Dia. = –.002/–.005mm
OAL = ±1.000mm
LOC = +0.500/+1.500mm

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**

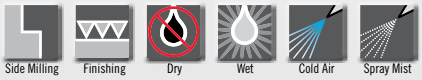
MB-440 Metric 4 Flute Tuffy Ball End Standard Length 40° Helix METRIC

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

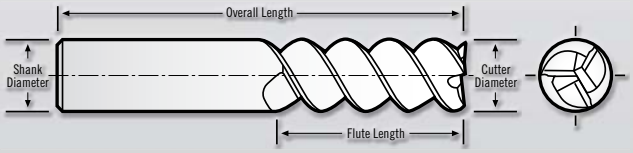
Characteristics

Applications



Materials

Coatings



ST-360 Tolerances

Cutting Dia. = +.000/–.003"
Shank Dia. = –.0001/–.0002"
LOC (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
LOC = +0.500/+1.500mm
OAL = ±1.000mm

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**

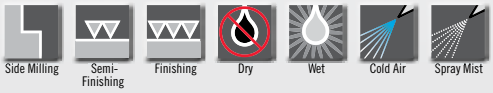
MST-360 Metric 3 Flute Super Tuffy Carbide Standard Length METRIC

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

Applications

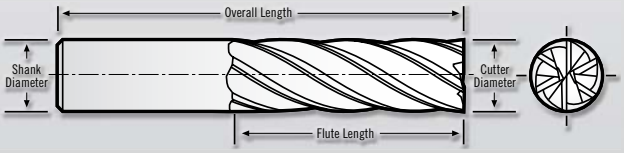


Materials

Coatings

Available with **Coolant Grooves**

See Page 6



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

MST-646 Tolerances
Cutting Dia. = +.025/–.000mm
Shank Dia. = –.002/–.005mm
LOC = +0.500/+1.500mm
OAL = ±1.000mm

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 Metric 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

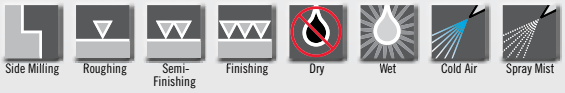
ST-630 6 Flute Super Tuffy Carbide Standard Length

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

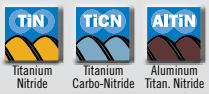
Characteristics

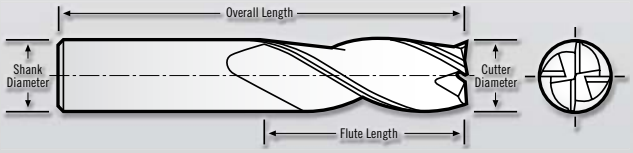
Applications



Materials

Coatings





ST-430/434 Tolerances
Cutting Dia. = +.001/–.000"
Shank Dia. = –.0001/–.0002"
LOC (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
LOC = +0.500/+1.500mm
OAL = ±1.000mm

Sharp Edges

+ Tolerances

ST-430 4 Flute Super Tuffy Carbide Standard Length

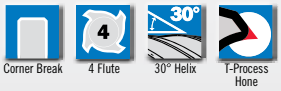
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
1/8"	1/8"	1/2"	1-1/2"	ST-430-04	ST-430-04 **T**	ST-430-04 **C**	ST-430-04 **A**
5/32"	3/16"	9/16"	2"	ST-430-05	ST-430-05 **T**	ST-430-05 **C**	ST-430-05 **A**
3/16"	3/16"	5/8"	2"	ST-430-06	ST-430-06 **T**	ST-430-06 **C**	ST-430-06 **A**
7/32"	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**
9/32"	5/16"	3/4"	2-1/2"	ST-430-09	ST-430-09 **T**	ST-430-09 **C**	ST-430-09 **A**
5/16"	5/16"	13/16"	2-1/2"	ST-430-10	ST-430-10 **T**	ST-430-10 **C**	ST-430-10 **A**
3/8"	3/8"	7/8"	2-1/2"	ST-430-12	ST-430-12 **T**	ST-430-12 **C**	ST-430-12 **A**
7/16"	7/16"	1"	2-3/4"	ST-430-14	ST-430-14 **T**	ST-430-14 **C**	ST-430-14 **A**
1/2"	1/2"	1"	3"	ST-430-16	ST-430-16 **T**	ST-430-16 **C**	ST-430-16 **A**
9/16"	9/16"	1-1/4"	3-1/2"	ST-430-18	ST-430-18 **T**	ST-430-18 **C**	ST-430-18 **A**
5/8"	5/8"	1-1/4"	3-1/2"	ST-430-20	ST-430-20 **T**	ST-430-20 **C**	ST-430-20 **A**
3/4"	3/4"	1-1/2"	4"	ST-430-24	ST-430-24 **T**	ST-430-24 **C**	ST-430-24 **A**

MST-430 Metric 4 Flute Super Tuffy Carbide Standard Length METRIC

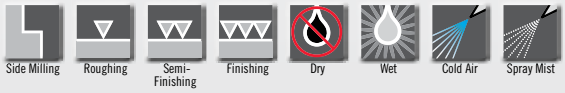
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated
3mm	3mm	12mm	38mm	MST-430-03	MST-430-03 **T**	MST-430-03 **C**	MST-430-03 **A**
4mm	4mm	12mm	50mm	MST-430-04	MST-430-04 **T**	MST-430-04 **C**	MST-430-04 **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

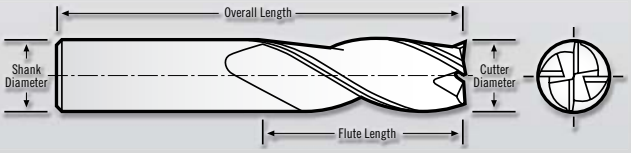


Applications



Materials

Coatings



ST-430/434 Tolerances

Cutting Dia. = +.001/–.000"
Shank Dia. = –.0001/–.0002"
LOC (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
LOC = +0.500/+1.500mm
OAL = ±1.000mm

+ 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 Metric 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**

Hi-Temp Alloys Tools in Other Sections

TS / MTS 201/301/401	(See Multiple Applications)		**94**
TR 303/404/606	(See Multiple Applications)		**96**
MINIATURES	(See Miniatures Applications)		**77**
SAWS	(See Saws Applications)		**108**

TOOLS FOR Composites & Plastics

TOOLS FOR Composites & Plastics

Composites & Plastics Tools

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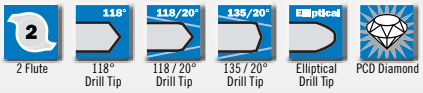
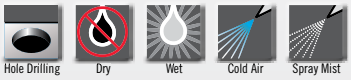
PCD PCD-Tipped Diamond Drills

Characteristics

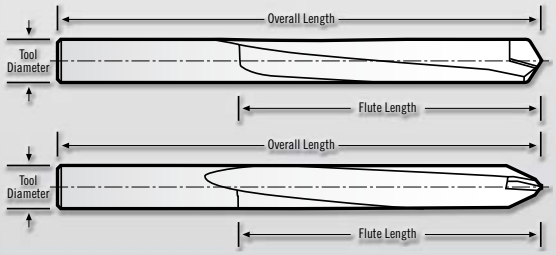


Applications



Materials

10-20X Tool Life Over Carbide!



PCD-Tipped Drills Tolerances

Tool Dia. = +.0000/–.0005"
Shank Dia. = –.0001/–.0002"
LOC = +.030"
OAL = +.060"

See RobbJack Videos on YouTube™

www.youtube.com/RobbJackCorp
or
www.robbjack.com/videos

NEW!

118°

PCD 118° PCD-Tipped Standard Length – 4 Facet

Tool Diameter	Flute Length	Overall Length	Tool Number
.1655"	1.4"	2.7"	PCD-118-166
.1915"	1.4"	2.7"	PCD-118-192
.2210"	1.4"	2.7"	PCD-118-221
.2510"	1.4"	2.7"	PCD-118-251
.3125"	1.5"	2.7"	PCD-118-313
.3765"	1.5"	2.7"	PCD-118-377

135/20°

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

Tool Diameter	Flute Length	Overall Length	Tool Number
.1655"	1.4"	2.7"	PCD-13520-166
.1915"	1.4"	2.7"	PCD-13520-192
.2210"	1.4"	2.7"	PCD-13520-221
.2510"	1.4"	2.7"	PCD-13520-251
.3125"	1.5"	2.7"	PCD-13520-313
.3765"	1.5"	2.7"	PCD-13520-377

118/20°

PCD 118/20° PCD-Tipped Standard Length – 8 Facet

Tool Diameter	Flute Length	Overall Length	Tool Number
.1655"	1.4"	2.7"	PCD-11820-166
.1915"	1.4"	2.7"	PCD-11820-192
.2210"	1.4"	2.7"	PCD-11820-221
.2510"	1.4"	2.7"	PCD-11820-251
.3125"	1.5"	2.7"	PCD-11820-313
.3765"	1.5"	2.7"	PCD-11820-377

Elliptical

PCD Elliptical PCD-Tipped Standard Length

Tool Diameter	Flute Length	Overall Length	Tool Number
.1655"	1.4"	2.7"	PCD-360-166
.1915"	1.4"	2.7"	PCD-360-192
.2210"	1.4"	2.7"	PCD-360-221
.2510"	1.4"	2.7"	PCD-360-251
.3125"	1.5"	2.7"	PCD-360-313
.3765"	1.5"	2.7"	PCD-360-377

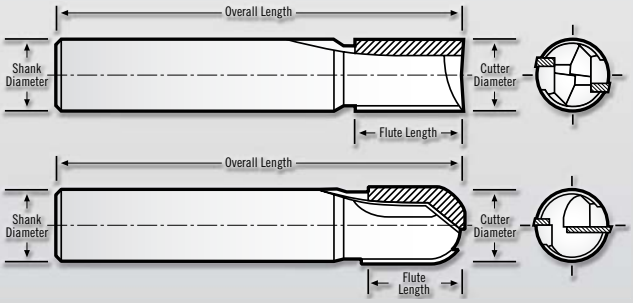
PCD-Tipped Router Bits PCD/CPCD

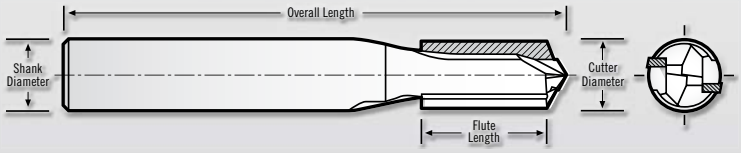
Characteristics: Square End, Ball End, 2 Flute, 118° Drill Tip, PCD Diamond

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!





PCD Tolerances

Cutting Dia. = ±.003"
Shank Dia. = –.0001/–.0002"
LOC = ±.030"
OAL = ±.060"

CPCD-203 Composite 2 Flute 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

CPCD-203 Specifically Designed for CFRP Materials

See Robblack Videos on YouTube
www.youtube.com/RobblackCorp
or
www.robbjack.com/videos

NEW!

New PCD Grade & Geometries specifically designed for CFRP Materials

PCD-203 2 Flute Standard Length

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

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

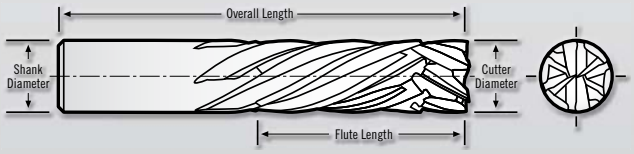
CR Compression Router

Characteristics

Applications

Materials

Coatings



CR Tolerances

Cutting Dia. = –.001/–.003"
Shank Dia. = –.0001/–.0002"
LOC (<5/16") = +.020/+.030"
(>5/16") = +.030/+.060"
OAL = ±.060"

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

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**

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**

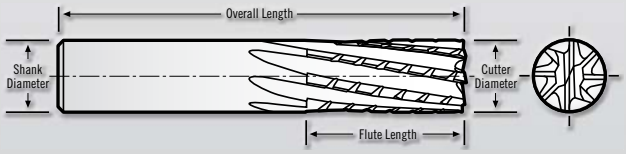
Carbide Composite Router CE

Characteristics

Applications

Materials

Coatings



CE Tolerances

Cutting Dia. = –.001/–.003"
Shank Dia. = –.0001/–.0002"
LOC (<5/16") = +.020/+.030"
(>5/16") = +.030/+.060"
OAL = ±.060"

NEW!

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

Diamond-Like Carbon (DLC)

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**

Diamond Coated (DCC)

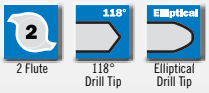
10-20X Tool Life!

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**

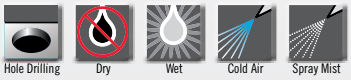
P810/F104 Diamond Coated Aircraft Drills

Characteristics



2 Flute | 118° Drill Tip | Elliptical Drill Tip

Applications



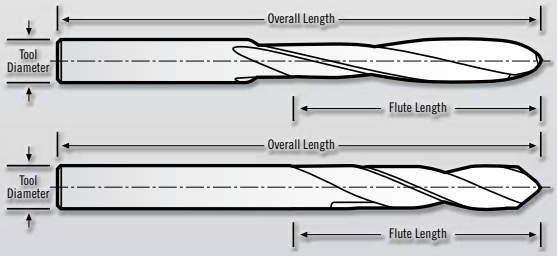
Hole Drilling | Dry | Wet | Cold Air | Spray Mist

Materials

Aluminum | Copper | Magnesium | Plastics | Composites | Brass

Coatings

Diamond Coated (DCC)



P810/F104 Drills Tolerances

Tool Dia. = +.0000/–.0005"
Shank Dia. = –.0001/–.0002"
LOC = +.030"
OAL = +.060"

10-20X Tool Life Over Carbide!

P810 118° Diamond Coated Standard Length Drills – 4 Facet

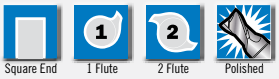
Tool Diameter	Flute Length	Overall Length	Tool Number Diamond Coated
0.0980"	1.4"	2.7"	P810-100345-1
0.1285"	1.4"	2.7"	P810-100344-1
0.1421"	1.4"	2.7"	P810-100402-1
0.1560"	1.4"	2.7"	P810-100409-1
0.1655"	1.4"	2.7"	P810-100335-1
0.1734"	1.4"	2.7"	P810-100404-1
0.1900"	1.4"	2.7"	P810-100400-1
0.1915"	1.4"	2.7"	P810-100336-1
0.1990"	1.4"	2.7"	P810-100411-1
0.2055"	1.4"	2.7"	P810-100405-1
0.2210"	1.4"	2.7"	P810-100346-1
0.2515"	1.4"	2.7"	P810-100337-1
0.2590"	1.4"	2.7"	P810-100406-1
0.2710"	1.4"	2.7"	P810-100407-1
0.2770"	1.4"	2.7"	P810-100412-1
0.2800"	1.4"	2.7"	P810-100408-1
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
0.1421"	1.4"	2.7"	F104-100005-1
0.1560"	1.4"	2.7"	F104-100006-1
0.1655"	1.4"	2.7"	F104-100007-1
0.1734"	1.4"	2.7"	F104-100008-1
0.1900"	1.4"	2.7"	F104-100009-1
0.1915"	1.4"	2.7"	F104-100010-1
0.1990"	1.4"	2.7"	F104-100011-1
0.2055"	1.4"	2.7"	F104-100012-1
0.2210"	1.4"	2.7"	F104-100004-1
0.2515"	1.4"	2.7"	F104-100002-1
0.2590"	1.4"	2.7"	F104-100013-1
0.2710"	1.4"	2.7"	F104-100014-1
0.2770"	1.4"	2.7"	F104-100015-1
0.2800"	1.4"	2.7"	F104-100016-1
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

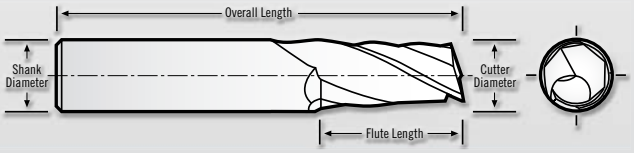
Tuffy Grade Carbide Router Bits PM/GTS

Characteristics



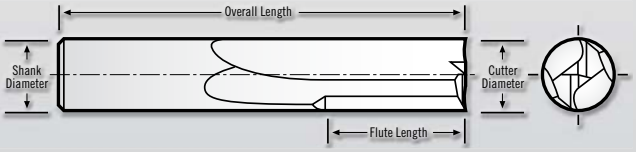
Applications

Materials



PM Series Tolerances

Cutting Dia. = +.000/–.002"
Shank Dia. = –.0001/–.0002"
LOC = +.060/ –.000"
OAL = ±.060"



GTS Series Tolerances

Cutting Dia. = +.000/–.002"
Shank Dia. = –.0001/–.0002"
LOC = +.060/–.000"
OAL = ±.060"

PM Up Shear 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 Down Shear 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

GTS 2 Flute Tuffy Grade Straight Flute

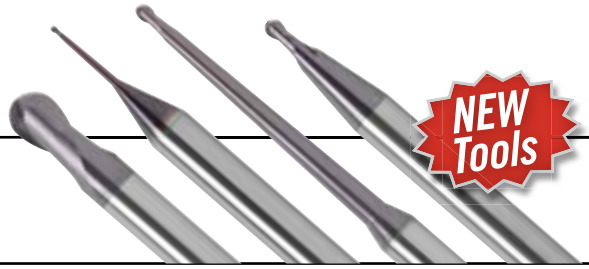
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/4"	1/2"	2"	GTS-201-04
1/4"	1/4"	3/4"	2-1/2"	GTS-201-08
3/8"	3/8"	7/8"	2-1/2"	GTS-201-12
1/2"	1/2"	1"	3"	GTS-201-16

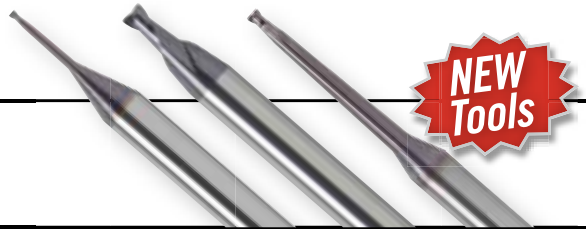
Composites & Plastics Tools in Other Sections

TOOLS FOR Die/Mold & Hardened Materials

TOOLS FOR Die/Mold & Hardened Materials

Die/Mold & Hardened Materials Tools

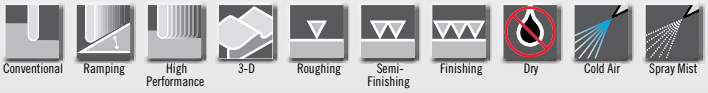




DM Die/Mold End Mills

Characteristics

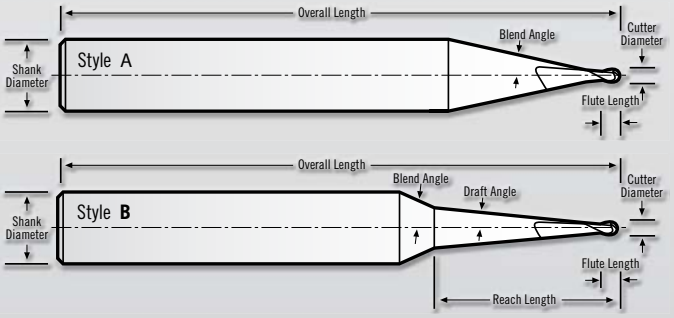
Applications

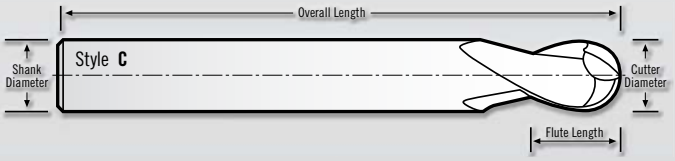


NEW Sizes Now Available!

Materials

Coatings





DM Tolerances

Cutting Dia. (1/32"–3/16") = ±.0003"
(1/4"–1/2") = –.0007/–.0013"
Shank Dia. = –.0001/–.0002"
LOC (1/32"–1/2") = +.000/+.020"
OAL = ±.060"

MDM Tolerances

Cutting Dia. (0.5–5.0) = ±.008mm
(6.0–12.0) = –.018/ –.033mm
Shank Dia. = –.002/–.005mm
LOC (0.5–12.0) = +.000/+.500mm
OAL = ±1.000mm

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 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	3-1/4"	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 Die/Mold End Mills

DM SERIES SPEED & FEED (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 SPEED & FEED (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 SPEED & FEED (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

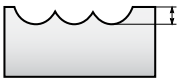
- Special diameters and lengths are available on a make-to-order basis.
- Air or mist coolant on materials greater than 40 HRc.

Radial Step Over

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

Radial Step Over for finishing depends on finish requirements.

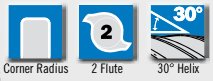
Axial Depth



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

Solid Carbide Toroid Style End Mills TM

Characteristics

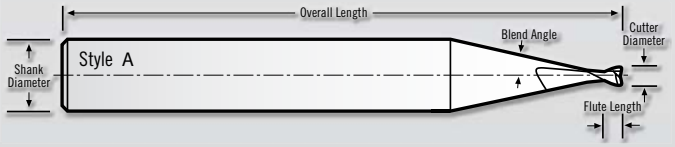


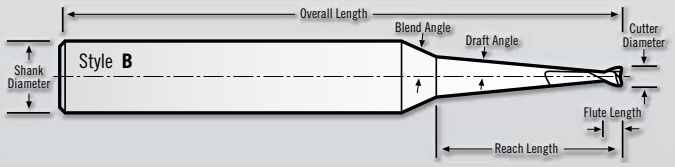
Applications

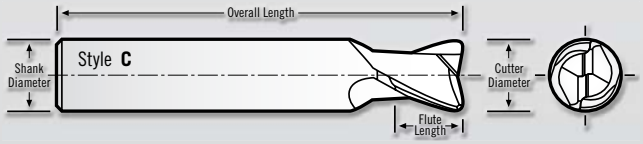
Materials

Coatings

Best Tool for Helical Bores or Tight Corners







TM Tolerances:

Cutting Dia. = –.001/ –.002"
Shank Dia. = –.0001/ –.0002"
LOC (1/32" to 1/2") = +.000/+.020"
OAL = ±.060"

NEW Sizes Now Available!

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	3-1/4"	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

TM/MTM Solid Carbide Toroid Style End Mills

NEW Sizes Now Available!

MTM Metrics 2 Flute Tuffy Grade Toroid End Mill METRIC

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

TM SERIES SPEED & FEED (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

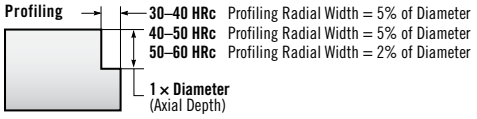
(Use maximum RPM if suggested RPM is higher than the machine's capabilities)

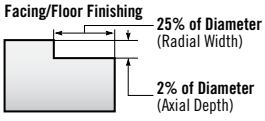
Additional Notes

- 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

- Speed 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.





Die/Mold End Mills HM/MHM

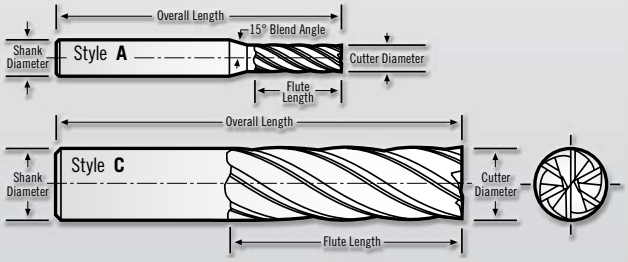
Characteristics

Applications

Materials

Coatings

Best Tool for Open Areas of Floors & Walls



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

MHM Tolerances
Cutting Dia. = –.025/–.050mm
Shank Dia. = –.002/–.005mm
LOC = +0.50/+1.50mm
OAL = ±1.000mm

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 Die/Mold End Mills

HM SERIES SPEED & FEED (Semi-Finishing & Finishing)

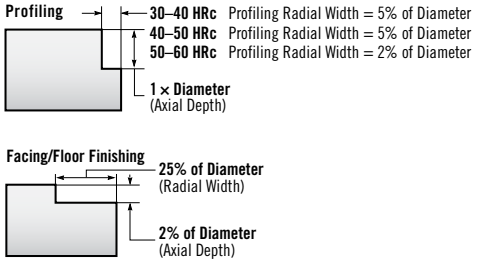
Tool Number	Cutter Diameter	Steels 30–40 HRc		Steels 40–50 HRc		Steels 50–60 HRc	
		RPM	CLPT	RPM	CLPT	RPM	CLPT
HM-402-04	1/8"	17,000–20,000	0.0008–0.001	13,000–17,000	0.0007–0.0009	8,000–13,000	0.0006–0.0008
HM-402-06	3/16"	12,000–14,000	0.0011–0.0015	9,000–12,000	0.0010–0.0014	5,300–9,000	0.0009–0.0012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

- Speed 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)

TOOLS FOR Miniatures Applications

TOOLS FOR Miniatures Applications

Miniatures Applications Tools

SS-2 2 Flute Miniature End Mills

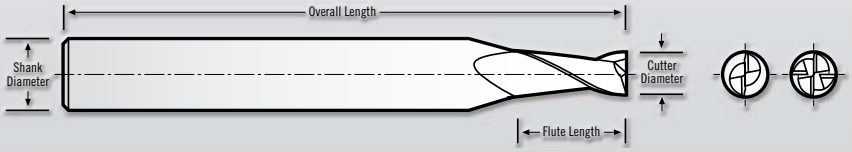
Characteristics
Square End · 2 Flute · 30° Helix

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

Materials
Aluminum · Copper · 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)

Hand-Select +/-.0002" Available



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

MSS/MSR Tolerances
Cutting Dia. = ±.010mm
Shank Dia. = –.002/–.005mm
LOC = +0.10/–0.00mm
OAL = +1.00/–0.00mm

Tight Tolerances

SS-2 2 Flute Tuffy Grade Stub Length

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

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

Tight Tolerances

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

Tight Tolerances

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	C-MSS-2-015 **T**	C-MSS-2-015 **C**	C-MSS-2-015 **A**	C-MSS-2-015 **DLC**
.20mm	3mm	.300mm	38mm	MSS-2-020	C-MSS-2-020 **T**	C-MSS-2-020 **C**	C-MSS-2-020 **A**	C-MSS-2-020 **DLC**
.25mm	3mm	.375mm	38mm	MSS-2-025	C-MSS-2-025 **T**	C-MSS-2-025 **C**	C-MSS-2-025 **A**	C-MSS-2-025 **DLC**
.30mm	3mm	.450mm	38mm	MSS-2-030	C-MSS-2-030 **T**	C-MSS-2-030 **C**	C-MSS-2-030 **A**	C-MSS-2-030 **DLC**
.35mm	3mm	.525mm	38mm	MSS-2-035	C-MSS-2-035 **T**	C-MSS-2-035 **C**	C-MSS-2-035 **A**	C-MSS-2-035 **DLC**
.40mm	3mm	.600mm	38mm	MSS-2-040	C-MSS-2-040 **T**	C-MSS-2-040 **C**	C-MSS-2-040 **A**	C-MSS-2-040 **DLC**
.45mm	3mm	.675mm	38mm	MSS-2-045	C-MSS-2-045 **T**	C-MSS-2-045 **C**	C-MSS-2-045 **A**	C-MSS-2-045 **DLC**
.50mm	3mm	.750mm	38mm	MSS-2-050	C-MSS-2-050 **T**	C-MSS-2-050 **C**	C-MSS-2-050 **A**	C-MSS-2-050 **DLC**
.55mm	3mm	.825mm	38mm	MSS-2-055	C-MSS-2-055 **T**	C-MSS-2-055 **C**	C-MSS-2-055 **A**	C-MSS-2-055 **DLC**
.60mm	3mm	.900mm	38mm	MSS-2-060	C-MSS-2-060 **T**	C-MSS-2-060 **C**	C-MSS-2-060 **A**	C-MSS-2-060 **DLC**
.65mm	3mm	.975mm	38mm	MSS-2-065	C-MSS-2-065 **T**	C-MSS-2-065 **C**	C-MSS-2-065 **A**	C-MSS-2-065 **DLC**
.70mm	3mm	1.05mm	38mm	MSS-2-070	C-MSS-2-070 **T**	C-MSS-2-070 **C**	C-MSS-2-070 **A**	C-MSS-2-070 **DLC**
.80mm	3mm	1.20mm	38mm	MSS-2-080	C-MSS-2-080 **T**	C-MSS-2-080 **C**	C-MSS-2-080 **A**	C-MSS-2-080 **DLC**
1.00mm	3mm	1.50mm	38mm	MSS-2-100	C-MSS-2-100 **T**	C-MSS-2-100 **C**	C-MSS-2-100 **A**	C-MSS-2-100 **DLC**
1.50mm	3mm	2.25mm	38mm	MSS-2-150	C-MSS-2-150 **T**	C-MSS-2-150 **C**	C-MSS-2-150 **A**	C-MSS-2-150 **DLC**

SR-2 2 Flute Miniature End Mills

Tight Tolerances

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

2 Flute Miniature End Mills MSR-2

Tight Tolerances

MSR-2 2 Flute Standard Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.25mm	3mm	.75mm	38mm	MSR-2-025	C-MSR-2-025**T**	C-MSR-2-025**C**	C-MSR-2-025**A**	C-MSR-2-025**DLC**
.30mm	3mm	.90mm	38mm	MSR-2-030	C-MSR-2-030**T**	C-MSR-2-030**C**	C-MSR-2-030**A**	C-MSR-2-030**DLC**
.35mm	3mm	1.05mm	38mm	MSR-2-035	C-MSR-2-035**T**	C-MSR-2-035**C**	C-MSR-2-035**A**	C-MSR-2-035**DLC**
.40mm	3mm	1.20mm	38mm	MSR-2-040	C-MSR-2-040**T**	C-MSR-2-040**C**	C-MSR-2-040**A**	C-MSR-2-040**DLC**
.45mm	3mm	1.35mm	38mm	MSR-2-045	C-MSR-2-045**T**	C-MSR-2-045**C**	C-MSR-2-045**A**	C-MSR-2-045**DLC**
.50mm	3mm	1.50mm	38mm	MSR-2-050	C-MSR-2-050**T**	C-MSR-2-050**C**	C-MSR-2-050**A**	C-MSR-2-050**DLC**
.55mm	3mm	1.65mm	38mm	MSR-2-055	C-MSR-2-055**T**	C-MSR-2-055**C**	C-MSR-2-055**A**	C-MSR-2-055**DLC**
.60mm	3mm	1.80mm	38mm	MSR-2-060	C-MSR-2-060**T**	C-MSR-2-060**C**	C-MSR-2-060**A**	C-MSR-2-060**DLC**
.65mm	3mm	1.95mm	38mm	MSR-2-065	C-MSR-2-065**T**	C-MSR-2-065**C**	C-MSR-2-065**A**	C-MSR-2-065**DLC**
.70mm	3mm	2.10mm	38mm	MSR-2-070	C-MSR-2-070**T**	C-MSR-2-070**C**	C-MSR-2-070**A**	C-MSR-2-070**DLC**
.80mm	3mm	2.40mm	38mm	MSR-2-080	C-MSR-2-080**T**	C-MSR-2-080**C**	C-MSR-2-080**A**	C-MSR-2-080**DLC**
1.00mm	3mm	3.00mm	38mm	MSR-2-100	C-MSR-2-100**T**	C-MSR-2-100**C**	C-MSR-2-100**A**	C-MSR-2-100**DLC**
1.50mm	3mm	4.50mm	38mm	MSR-2-150	C-MSR-2-150**T**	C-MSR-2-150**C**	C-MSR-2-150**A**	C-MSR-2-150**DLC**

Hand-Select +/-.0002" Available

Videos Online

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

ROBBJACK'S Speed & Feed

Speed & Feed

Speed & Feed Calculations
now online at:
www.robbjack.com/speedfeed

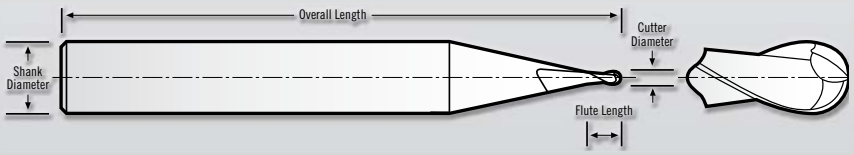
SS/SR-2BN 2 Flute Miniature Ball End Mills

Characteristics

Applications

Materials

Coatings



SS/SR Tolerances
Cutting Dia. = ±.0005"
Shank Dia. = –.0001/–.0002"
LOC = +.003/–.000"
OAL = ±.060"

MSS/MSR Tolerances
Cutting Dia. = ±.010 mm
Shank Dia. = –.002/–.005 mm
LOC = +0.10/–0.00 mm
OAL = +1.00/–0.00 mm

Tight Tolerances

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-2-010BN	C-SS-2-010BN **T**	C-SS-2-010BN **C**	C-SS-2-010BN **A**	C-SS-2-010BN **DLC**
.015"	1/8"	.0230"	1-1/2"	SS-2-015BN	C-SS-2-015BN **T**	C-SS-2-015BN **C**	C-SS-2-015BN **A**	C-SS-2-015BN **DLC**
.016"	1/8"	.0240"	1-1/2"	SS-2-016BN	C-SS-2-016BN **T**	C-SS-2-016BN **C**	C-SS-2-016BN **A**	C-SS-2-016BN **DLC**
.020"	1/8"	.0300"	1-1/2"	SS-2-020BN	C-SS-2-020BN **T**	C-SS-2-020BN **C**	C-SS-2-020BN **A**	C-SS-2-020BN **DLC**
.025"	1/8"	.0375"	1-1/2"	SS-2-025BN	C-SS-2-025BN **T**	C-SS-2-025BN **C**	C-SS-2-025BN **A**	C-SS-2-025BN **DLC**
.030"	1/8"	.0450"	1-1/2"	SS-2-030BN	C-SS-2-030BN **T**	C-SS-2-030BN **C**	C-SS-2-030BN **A**	C-SS-2-030BN **DLC**
.031"	1/8"	.0465"	1-1/2"	SS-2-031BN	C-SS-2-031BN **T**	C-SS-2-031BN **C**	C-SS-2-031BN **A**	C-SS-2-031BN **DLC**
.040"	1/8"	.0600"	1-1/2"	SS-2-040BN	C-SS-2-040BN **T**	C-SS-2-040BN **C**	C-SS-2-040BN **A**	C-SS-2-040BN **DLC**
.047"	1/8"	.0750"	1-1/2"	SS-2-047BN	C-SS-2-047BN **T**	C-SS-2-047BN **C**	C-SS-2-047BN **A**	C-SS-2-047BN **DLC**
.055"	1/8"	.0825"	1-1/2"	SS-2-055BN	C-SS-2-055BN **T**	C-SS-2-055BN **C**	C-SS-2-055BN **A**	C-SS-2-055BN **DLC**
.060"	1/8"	.0900"	1-1/2"	SS-2-060BN	C-SS-2-060BN **T**	C-SS-2-060BN **C**	C-SS-2-060BN **A**	C-SS-2-060BN **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-2-050BN	C-MSS-2-050BN **T**	C-MSS-2-050BN **C**	C-MSS-2-050BN **A**	C-MSS-2-050BN **DLC**
.60mm	3mm	.900mm	38mm	MSS-2-060BN	C-MSS-2-060BN **T**	C-MSS-2-060BN **C**	C-MSS-2-060BN **A**	C-MSS-2-060BN **DLC**
.70mm	3mm	1.05mm	38mm	MSS-2-070BN	C-MSS-2-070BN **T**	C-MSS-2-070BN **C**	C-MSS-2-070BN **A**	C-MSS-2-070BN **DLC**
.80mm	3mm	1.20mm	38mm	MSS-2-080BN	C-MSS-2-080BN **T**	C-MSS-2-080BN **C**	C-MSS-2-080BN **A**	C-MSS-2-080BN **DLC**
1.00mm	3mm	1.50mm	38mm	MSS-2-100BN	C-MSS-2-100BN **T**	C-MSS-2-100BN **C**	C-MSS-2-100BN **A**	C-MSS-2-100BN **DLC**
1.50mm	3mm	2.25mm	38mm	MSS-2-150BN	C-MSS-2-150BN **T**	C-MSS-2-150BN **C**	C-MSS-2-150BN **A**	C-MSS-2-150BN **DLC**

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

Tight Tolerances

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

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.010"	1/8"	.0300"	1-1/2"	SR-2-010BN	C-SR-2-010BN **T**	C-SR-2-010BN **C**	C-SR-2-010BN **A**	C-SR-2-010BN **DLC**
.015"	1/8"	.0450"	1-1/2"	SR-2-015BN	C-SR-2-015BN **T**	C-SR-2-015BN **C**	C-SR-2-015BN **A**	C-SR-2-015BN **DLC**
.016"	1/8"	.0480"	1-1/2"	SR-2-016BN	C-SR-2-016BN **T**	C-SR-2-016BN **C**	C-SR-2-016BN **A**	C-SR-2-016BN **DLC**
.020"	1/8"	.0600"	1-1/2"	SR-2-020BN	C-SR-2-020BN **T**	C-SR-2-020BN **C**	C-SR-2-020BN **A**	C-SR-2-020BN **DLC**
.025"	1/8"	.0750"	1-1/2"	SR-2-025BN	C-SR-2-025BN **T**	C-SR-2-025BN **C**	C-SR-2-025BN **A**	C-SR-2-025BN **DLC**
.030"	1/8"	.0900"	1-1/2"	SR-2-030BN	C-SR-2-030BN **T**	C-SR-2-030BN **C**	C-SR-2-030BN **A**	C-SR-2-030BN **DLC**
.031"	1/8"	.0930"	1-1/2"	SR-2-031BN	C-SR-2-031BN **T**	C-SR-2-031BN **C**	C-SR-2-031BN **A**	C-SR-2-031BN **DLC**
.040"	1/8"	.1200"	1-1/2"	SR-2-040BN	C-SR-2-040BN **T**	C-SR-2-040BN **C**	C-SR-2-040BN **A**	C-SR-2-040BN **DLC**
.047"	1/8"	.1410"	1-1/2"	SR-2-047BN	C-SR-2-047BN **T**	C-SR-2-047BN **C**	C-SR-2-047BN **A**	C-SR-2-047BN **DLC**
.050"	1/8"	.1500"	1-1/2"	SR-2-050BN	C-SR-2-050BN **T**	C-SR-2-050BN **C**	C-SR-2-050BN **A**	C-SR-2-050BN **DLC**
.055"	1/8"	.1650"	1-1/2"	SR-2-055BN	C-SR-2-055BN **T**	C-SR-2-055BN **C**	C-SR-2-055BN **A**	C-SR-2-055BN **DLC**
.060"	1/8"	.1800"	1-1/2"	SR-2-060BN	C-SR-2-060BN **T**	C-SR-2-060BN **C**	C-SR-2-060BN **A**	C-SR-2-060BN **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-2-050BN	C-MSR-2-050BN **T**	C-MSR-2-050BN **C**	C-MSR-2-050BN **A**	C-MSR-2-050BN **DLC**
.60mm	3mm	1.80mm	38mm	MSR-2-060BN	C-MSR-2-060BN **T**	C-MSR-2-060BN **C**	C-MSR-2-060BN **A**	C-MSR-2-060BN **DLC**
.70mm	3mm	2.10mm	38mm	MSR-2-070BN	C-MSR-2-070BN **T**	C-MSR-2-070BN **C**	C-MSR-2-070BN **A**	C-MSR-2-070BN **DLC**
.80mm	3mm	2.40mm	38mm	MSR-2-080BN	C-MSR-2-080BN **T**	C-MSR-2-080BN **C**	C-MSR-2-080BN **A**	C-MSR-2-080BN **DLC**
1.00mm	3mm	3.00mm	38mm	MSR-2-100BN	C-MSR-2-100BN **T**	C-MSR-2-100BN **C**	C-MSR-2-100BN **A**	C-MSR-2-100BN **DLC**
1.50mm	3mm	4.50mm	38mm	MSR-2-150BN	C-MSR-2-150BN **T**	C-MSR-2-150BN **C**	C-MSR-2-150BN **A**	C-MSR-2-150BN **DLC**

Videos Online

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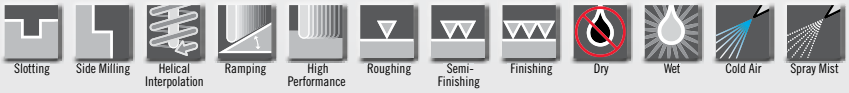
www.robbjack.com/videos

SS/MSS-4 4 Flute Miniature End Mills

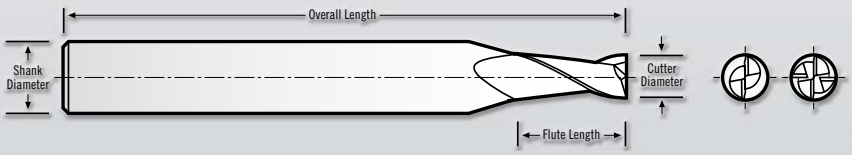
Characteristics

Applications



Materials

Coatings



SS/SR Tolerances

Cutting Dia. = ±.0005"
Shank Dia. = –.0001/–.0002"
LOC = +.003/–.000"
OAL = ±.060"

MSS/MSR Tolerances

Cutting Dia. = ±.010mm
Shank Dia. = –.002/–.005mm
LOC = +0.10/–0.00mm
OAL = +1.00/–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	C-SS-4-031 **T**	C-SS-4-031 **C**	C-SS-4-031 **A**	C-SS-4-031 **DLC**
.040"	1/8"	.0600"	1-1/2"	SS-4-040	C-SS-4-040 **T**	C-SS-4-040 **C**	C-SS-4-040 **A**	C-SS-4-040 **DLC**
.047"	1/8"	.0705"	1-1/2"	SS-4-047	C-SS-4-047 **T**	C-SS-4-047 **C**	C-SS-4-047 **A**	C-SS-4-047 **DLC**
.050"	1/8"	.0750"	1-1/2"	SS-4-050	C-SS-4-050 **T**	C-SS-4-050 **C**	C-SS-4-050 **A**	C-SS-4-050 **DLC**
.055"	1/8"	.0825"	1-1/2"	SS-4-055	C-SS-4-055 **T**	C-SS-4-055 **C**	C-SS-4-055 **A**	C-SS-4-055 **DLC**
.060"	1/8"	.0900"	1-1/2"	SS-4-060	C-SS-4-060 **T**	C-SS-4-060 **C**	C-SS-4-060 **A**	C-SS-4-060 **DLC**

MSS-4 Metric 4 Flute Tuffy Grade 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
.80mm	3mm	1.20mm	38mm	MSS-4-080	C-MSS-4-080 **T**	C-MSS-4-080 **C**	C-MSS-4-080 **A**	C-MSS-4-080 **DLC**
1.00mm	3mm	1.50mm	38mm	MSS-4-100	C-MSS-4-100 **T**	C-MSS-4-100 **C**	C-MSS-4-100 **A**	C-MSS-4-100 **DLC**
1.50mm	3mm	2.25mm	38mm	MSS-4-150	C-MSS-4-150 **T**	C-MSS-4-150 **C**	C-MSS-4-150 **A**	C-MSS-4-150 **DLC**

4 Flute Miniature End Mills SR/MSR-4

Tight Tolerances

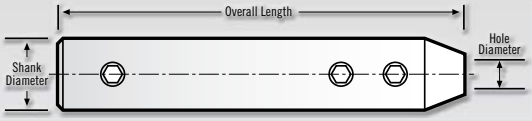
SR-4 4 Flute Tuffy Grade Standard Length

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	C-SR-4-031 **T**	C-SR-4-031 **C**	C-SR-4-031 **A**	C-SR-4-031 **DLC**
.040"	1/8"	.1200"	1-1/2"	SR-4-040	C-SR-4-040 **T**	C-SR-4-040 **C**	C-SR-4-040 **A**	C-SR-4-040 **DLC**
.047"	1/8"	.1410"	1-1/2"	SR-4-047	C-SR-4-047 **T**	C-SR-4-047 **C**	C-SR-4-047 **A**	C-SR-4-047 **DLC**
.050"	1/8"	.1500"	1-1/2"	SR-4-050	C-SR-4-050 **T**	C-SR-4-050 **C**	C-SR-4-050 **A**	C-SR-4-050 **DLC**
.055"	1/8"	.1650"	1-1/2"	SR-4-055	C-SR-4-055 **T**	C-SR-4-055 **C**	C-SR-4-055 **A**	C-SR-4-055 **DLC**
.060"	1/8"	.1800"	1-1/2"	SR-4-060	C-SR-4-060 **T**	C-SR-4-060 **C**	C-SR-4-060 **A**	C-SR-4-060 **DLC**

MSR-4 Metric 4 Flute Standard Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
.80mm	3mm	2.40mm	38mm	MSR-4-080	C-MSR-4-080 **T**	C-MSR-4-080 **C**	C-MSR-4-080 **A**	C-MSR-4-080 **DLC**
1.00mm	3mm	3.00mm	38mm	MSR-4-100	C-MSR-4-100 **T**	C-MSR-4-100 **C**	C-MSR-4-100 **A**	C-MSR-4-100 **DLC**
1.50mm	3mm	4.50mm	38mm	MSR-4-150	C-MSR-4-150 **T**	C-MSR-4-150 **C**	C-MSR-4-150 **A**	C-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 Extension Holder

Hole Diameter	Shank Diameter	Overall Length	Tool Number
1/8"	3/8"	3-1/4"	ACH-04
3/16"	1/2"	3-1/2"	ACH-06
1/4"	5/8"	4-1/4"	ACH-08
3/8"	3/4"	4-1/2"	ACH-12
1/2"	3/4"	4-3/4"	ACH-16
1/2"	1"	4-3/4"	ACH-16L

MAH Accuhold – Metric End Mill Extension Holder METRIC

Hole Diameter	Shank Diameter	Overall Length	Tool Number
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

TOOLS FOR Multiple Applications

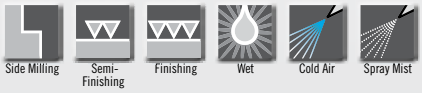
Multiple Application Tools

NR / MNR 204/303/404	2, 3 and 4 Flute Nominal Plus Diameter Tolerance		102
TS / MTS 201/301/401	2, 3 and 4 Flute		94
TR 303/404/606	3, 4 and 6 Flute		96
T6 200/202/400/402	2 and 4 Flute Double End		89
C8 201/203	2 Flute		93
C8 301/303	3 Flute		93
T12 201/203	2 Flute		91
T12 403/405	2 and 4 Flute		92
SB / MSB 201 **B / MB** 203	2 Flute Ball End		98
SB / MSB 301 **B / MB** 333	3 Flute Ball End		100
EX 204/206	2 Flute Extended Reach		105
TL / MTL 303	3 Flute Extra Long Cutting Length		88
ET	Engraving Tools		106
ACH / MAH Accuhold	Extension Holder		107

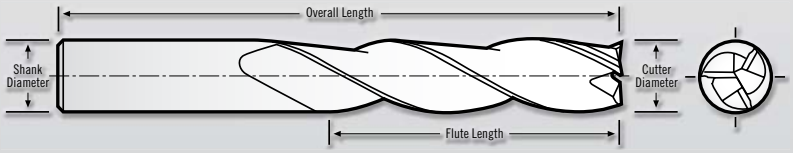
TL/MTL Tuffy Grade Carbide End Mills

Characteristics

Applications



Materials



TL Series Tolerances
Cutting Dia. = +.001/–.000"
LOC = +.060/–.000"
Shank Dia. = –.0001/–.0002"
L = ±.060"

MTL Tolerances
Cutting Dia. = +.025/–.000mm
Shank Dia. = –.002/–.005mm
OAL = ±1.000mm
LOC = +0.500/+1.500mm

+ Tolerances

TL-303 3 Flute Tuffy Grade Extra Length

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 Tuffy Grade Extra Length METRIC

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

NOTE: Metric tools do not have flats.

2 Flute Tuffy Grade Carbide End Mills T6

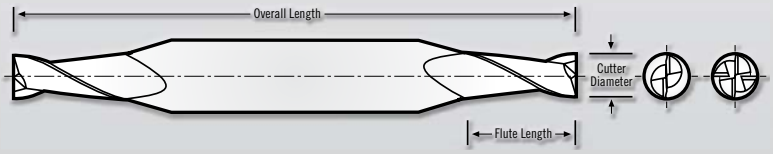
Characteristics

Applications

Materials

Coatings

+/- TIGHT Tolerances



T6 Series Tolerances

Cutting Dia. = ±.0005"
OAL = ±.060"
Shank Dia. = –.0001/–.0002"
LOC = +.030/–.000"

NEW Coatings Available!

T6-200 2 Flute Tuffy Grade Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number 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*

NEW Coatings Available!

T6-202 2 Flute Tuffy Grade Standard Length

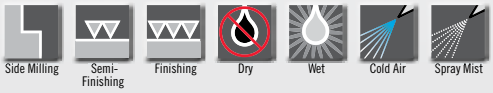
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC Coated
1/16"	3/16"	3/16"	2-1/2"	T6-202-02	T6-202-02 **T**	T6-202-02 **C**	T6-202-02 **A**	T6-202-02 **DLC**
5/64"	3/16"	5/16"	2-1/2"	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

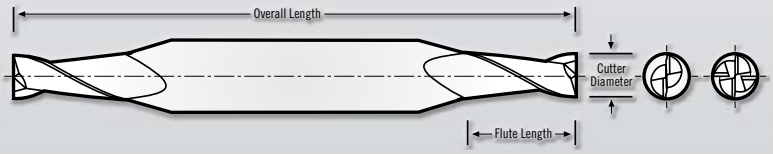
Characteristics

Applications



Materials

Coatings



T6 Series Tolerances

Cutting Dia. = ±.0005"
OAL = ±.060"
Shank Dia. = –.0001/–.0002"
LOC = +.030/–.000"

T6-400 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
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 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
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

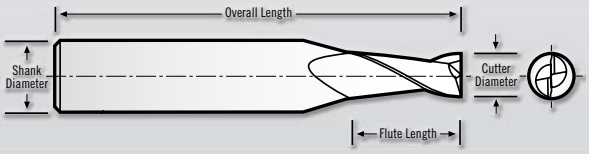
Characteristics

Applications

Materials

Coatings

T12 Series Comes in 64th Sizes



T12 Series Tolerances

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

T12-201 2 Flute Tuffy Grade Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number 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 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
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

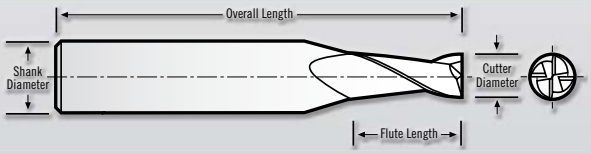
Applications: Side Milling, Semi-Finishing, Finishing, Dry, Wet, Cold Air, Spray Mist

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

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"
LOC (1/8" to 5/16") = +.030/–.000"
(21/64" to 3/4") = +.060/–.000"
Shank Dia. = –.0001/–.0002"
OAL = ±.060"

+ Tolerances

T12-403 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
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 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
1/8"	3/8"	1/2"	2-1/2"	T12-405-04	T12-405-04 **T**	T12-405-04 **C**	T12-405-04 **A**	T12-405-04 **DLC**
9/64"	3/8"	1/2"	2-1/2"	T12-405-04.5	T12-405-04.5 **T**	T12-405-04.5 **C**	T12-405-04.5 **A**	T12-405-04.5 **DLC**
5/32"	3/8"	9/16"	2-1/2"	T12-405-05	T12-405-05 **T**	T12-405-05 **C**	T12-405-05 **A**	T12-405-05 **DLC**
11/64"	3/8"	9/16"	2-1/2"	T12-405-05.5	T12-405-05.5 **T**	T12-405-05.5 **C**	T12-405-05.5 **A**	T12-405-05.5 **DLC**
3/16"	3/8"	5/8"	2-1/2"	T12-405-06	T12-405-06 **T**	T12-405-06 **C**	T12-405-06 **A**	T12-405-06 **DLC**
13/64"	3/8"	5/8"	2-1/2"	T12-405-06.5	T12-405-06.5 **T**	T12-405-06.5 **C**	T12-405-06.5 **A**	T12-405-06.5 **DLC**
7/32"	3/8"	5/8"	2-1/2"	T12-405-07	T12-405-07 **T**	T12-405-07 **C**	T12-405-07 **A**	T12-405-07 **DLC**
15/64"	3/8"	5/8"	2-1/2"	T12-405-07.5	T12-405-07.5 **T**	T12-405-07.5 **C**	T12-405-07.5 **A**	T12-405-07.5 **DLC**
1/4"	3/8"	3/4"	2-1/2"	T12-405-08	T12-405-08 **T**	T12-405-08 **C**	T12-405-08 **A**	T12-405-08 **DLC**
17/64"	3/8"	3/4"	2-1/2"	T12-405-08.5	T12-405-08.5 **T**	T12-405-08.5 **C**	T12-405-08.5 **A**	T12-405-08.5 **DLC**
9/32"	3/8"	3/4"	2-1/2"	T12-405-09	T12-405-09 **T**	T12-405-09 **C**	T12-405-09 **A**	T12-405-09 **DLC**
19/64"	3/8"	3/4"	2-1/2"	T12-405-09.5	T12-405-09.5 **T**	T12-405-09.5 **C**	T12-405-09.5 **A**	T12-405-09.5 **DLC**
5/16"	3/8"	13/16"	2-1/2"	T12-405-10	T12-405-10 **T**	T12-405-10 **C**	T12-405-10 **A**	T12-405-10 **DLC**
21/64"	3/8"	13/16"	2-1/2"	T12-405-10.5	T12-405-10.5 **T**	T12-405-10.5 **C**	T12-405-10.5 **A**	T12-405-10.5 **DLC**
11/32"	3/8"	13/16"	2-1/2"	T12-405-11	T12-405-11 **T**	T12-405-11 **C**	T12-405-11 **A**	T12-405-11 **DLC**
23/64"	3/8"	13/16"	2-1/2"	T12-405-11.5	T12-405-11.5 **T**	T12-405-11.5 **C**	T12-405-11.5 **A**	T12-405-11.5 **DLC**
3/8"	3/8"	7/8"	2-1/2"	T12-405-12	T12-405-12 **T**	T12-405-12 **C**	T12-405-12 **A**	T12-405-12 **DLC**
13/32"	1/2"	1"	3"	T12-405-13	T12-405-13 **T**	T12-405-13 **C**	T12-405-13 **A**	T12-405-13 **DLC**
7/16"	1/2"	1"	3"	T12-405-14	T12-405-14 **T**	T12-405-14 **C**	T12-405-14 **A**	T12-405-14 **DLC**
15/32"	1/2"	1"	3"	T12-405-15	T12-405-15 **T**	T12-405-15 **C**	T12-405-15 **A**	T12-405-15 **DLC**
1/2"	1/2"	1"	3"	T12-405-16	T12-405-16 **T**	T12-405-16 **C**	T12-405-16 **A**	T12-405-16 **DLC**

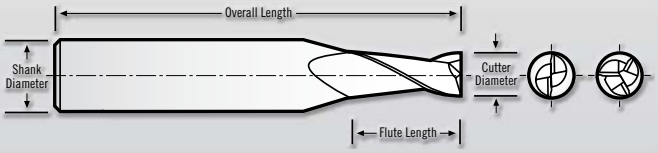
C-2 Grade Carbide End Mills C8

Characteristics

Applications

Materials

Coatings



C8 Series Tolerances

Cutting Dia. = +.000/–.002"
LOC = +.030/–.000"
Shank Dia. = –.0001/–.0002"
OAL = ±.060"

C8-201 2 Flute C-2 Grade Stub Length

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

C8-203 2 Flute C-2 Grade Standard Length

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

C8-301 3 Flute C-2 Grade Stub Length

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

C8-303 3 Flute C-2 Grade Standard Length

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**

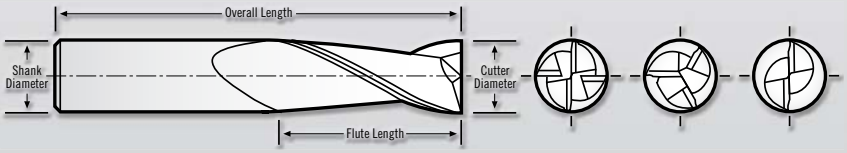
TS Tuffy Grade Carbide End Mills

Characteristics

Applications

Materials

Coatings



TS Tolerances

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

MTS Tolerances

Cutting Dia. = +.000/–.075mm
Shank Dia. = –.002/–.005mm
LOC = +0.500/+1.500mm
OAL = ±1.000mm

TS-201 2 Flute Tuffy Grade Stub Length

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated	Tool Number TiN Coated	Tool Number TiCN Coated	Tool Number AlTiN Coated	Tool Number DLC 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"	3-1/2"	TS-201-24	TS-201-24 **T**	TS-201-24 **C**	TS-201-24 **A**	TS-201-24 **DLC**

TS-301 3 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
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**

Tuffy Grade Carbide End Mills TS/MTS

Side Milling

TS-401 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
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"	3-1/2"	TS-401-24	TS-401-24 **T**	TS-401-24 **C**	TS-401-24 **A**	TS-401-24 **DLC**

MTS-401 Metric 4 Flute Tuffy Grade 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
2mm	3mm	5mm	38mm	MTS-401-02	MTS-401-02 **T**	MTS-401-02 **C**	MTS-401-02 **A**	MTS-401-02 **DLC**
3mm	3mm	6mm	38mm	MTS-401-03	MTS-401-03 **T**	MTS-401-03 **C**	MTS-401-03 **A**	MTS-401-03 **DLC**
4mm	4mm	8mm	50mm	MTS-401-04	MTS-401-04 **T**	MTS-401-04 **C**	MTS-401-04 **A**	MTS-401-04 **DLC**
5mm	5mm	8mm	50mm	MTS-401-05	MTS-401-05 **T**	MTS-401-05 **C**	MTS-401-05 **A**	MTS-401-05 **DLC**
6mm	6mm	8mm	50mm	MTS-401-06	MTS-401-06 **T**	MTS-401-06 **C**	MTS-401-06 **A**	MTS-401-06 **DLC**
8mm	8mm	12mm	58mm	MTS-401-08	MTS-401-08 **T**	MTS-401-08 **C**	MTS-401-08 **A**	MTS-401-08 **DLC**
10mm	10mm	14mm	66mm	MTS-401-10	MTS-401-10 **T**	MTS-401-10 **C**	MTS-401-10 **A**	MTS-401-10 **DLC**
12mm	12mm	16mm	73mm	MTS-401-12	MTS-401-12 **T**	MTS-401-12 **C**	MTS-401-12 **A**	MTS-401-12 **DLC**
16mm	16mm	20mm	82mm	MTS-401-16	MTS-401-16 **T**	MTS-401-16 **C**	MTS-401-16 **A**	MTS-401-16 **DLC**
20mm	20mm	25mm	92mm	MTS-401-20	MTS-401-20 **T**	MTS-401-20 **C**	MTS-401-20 **A**	MTS-401-20 **DLC**

TR 3 Flute Tuffy Grade Carbide End Mills

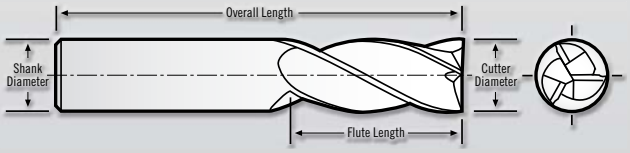
Characteristics

Applications

Materials

Coatings

TR Series Comes in + Tolerances



TR-303 Tolerances

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

NEW 3 Flute

TR-303 3 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
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.*

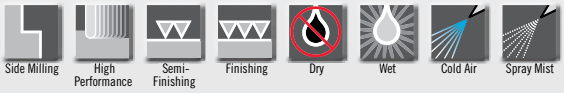
Need WITHOUT Flats?

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

4/6 Flute Tuffy Grade Carbide End Mills TR

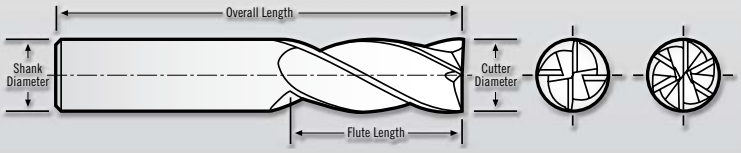
Characteristics

Applications



Materials

Coatings



TR-404 Tolerances

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

TR-606 Tolerances

Cutting Dia. = +.001/–.000"
LOC = +.060/–.000"
Shank Dia. = –.0001/–.0002"
OAL = ±.060"

Side Milling

TR-404 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
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**

Side Milling

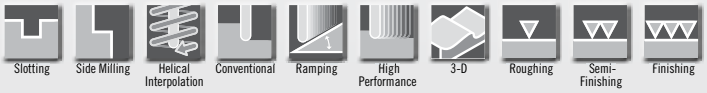
TR-606 6 Flute Tuffy Grade Standard Length

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
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

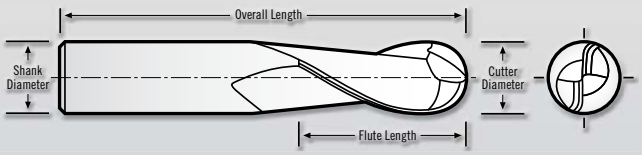
Characteristics

Applications



Materials

Coatings



SB Series Tolerances

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

MSB Tolerances

Cutting Dia. = +.000/–.075mm
Shank Dia. = –.002/–.005mm
OAL = ±1.000mm
LOC = +0.500/+1.500mm

NEW Coatings Available!

SB-201 2 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	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**

MSB-201 Metric 2 Flute Tuffy Ball End Mill Stub 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	MSB-201-02	MSB-201-02 **T**	MSB-201-02 **C**	MSB-201-02 **A**	MSB-201-02 **DLC**
3mm	3mm	6mm	38mm	MSB-201-03	MSB-201-03 **T**	MSB-201-03 **C**	MSB-201-03 **A**	MSB-201-03 **DLC**
4mm	4mm	8mm	50mm	MSB-201-04	MSB-201-04 **T**	MSB-201-04 **C**	MSB-201-04 **A**	MSB-201-04 **DLC**
5mm	5mm	8mm	50mm	MSB-201-05	MSB-201-05 **T**	MSB-201-05 **C**	MSB-201-05 **A**	MSB-201-05 **DLC**
6mm	6mm	8mm	50mm	MSB-201-06	MSB-201-06 **T**	MSB-201-06 **C**	MSB-201-06 **A**	MSB-201-06 **DLC**
8mm	8mm	12mm	58mm	MSB-201-08	MSB-201-08 **T**	MSB-201-08 **C**	MSB-201-08 **A**	MSB-201-08 **DLC**
10mm	10mm	14mm	66mm	MSB-201-10	MSB-201-10 **T**	MSB-201-10 **C**	MSB-201-10 **A**	MSB-201-10 **DLC**
12mm	12mm	16mm	73mm	MSB-201-12	MSB-201-12 **T**	MSB-201-12 **C**	MSB-201-12 **A**	MSB-201-12 **DLC**
16mm	16mm	20mm	82mm	MSB-201-16	MSB-201-16 **T**	MSB-201-16 **C**	MSB-201-16 **A**	MSB-201-16 **DLC**
20mm	20mm	25mm	92mm	MSB-201-20	MSB-201-20 **T**	MSB-201-20 **C**	MSB-201-20 **A**	MSB-201-20 **DLC**

2 Flute Tuffy Grade Carbide Ball End Mills B/MB

B-203 2 Flute 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	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**

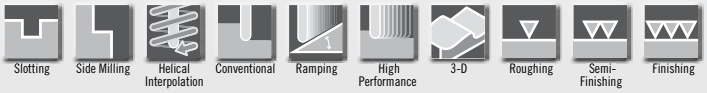
MB-203 Metric 2 Flute Tuffy Ball End Standard Length METRIC

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
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

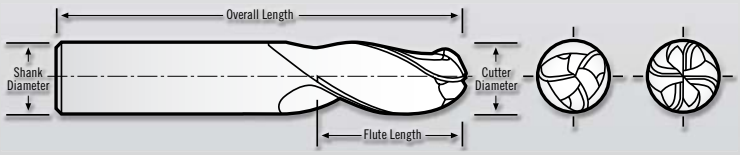
Characteristics

Applications



Materials

Coatings



SB/B Series Tolerances

Cutting Dia.(1/16" to 1/4") = +.000/–.002"
(9/32" to 3/4") = +.000/–.003"
LOC (1/16" to 5/16") = +.030/–.000"
(3/8" to1") = +.060/–.000"
Shank Dia. = –.0001/–.0002"
OAL = ±.060"

MB Tolerances

Cutting Dia. = +.000/–.075mm
Shank Dia. = –.002/–.005mm
OAL = ±1.000mm
LOC = +0.500/+1.500mm

SB-301 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	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**

MSB-301 Metric 3 Flute Tuffy 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
1.5mm	3mm	3mm	38mm	MSB-301-1.5	MSB-301-1.5 **T**	MSB-301-1.5 **C**	MSB-301-1.5 **A**	MSB-301-1.5 **DLC**
2mm	3mm	5mm	38mm	MSB-301-02	MSB-301-02 **T**	MSB-301-02 **C**	MSB-301-02 **A**	MSB-301-02 **DLC**
3mm	3mm	6mm	38mm	MSB-301-03	MSB-301-03 **T**	MSB-301-03 **C**	MSB-301-03 **A**	MSB-301-03 **DLC**
4mm	4mm	8mm	50mm	MSB-301-04	MSB-301-04 **T**	MSB-301-04 **C**	MSB-301-04 **A**	MSB-301-04 **DLC**
5mm	5mm	8mm	50mm	MSB-301-05	MSB-301-05 **T**	MSB-301-05 **C**	MSB-301-05 **A**	MSB-301-05 **DLC**
6mm	6mm	8mm	50mm	MSB-301-06	MSB-301-06 **T**	MSB-301-06 **C**	MSB-301-06 **A**	MSB-301-06 **DLC**
8mm	8mm	12mm	58mm	MSB-301-08	MSB-301-08 **T**	MSB-301-08 **C**	MSB-301-08 **A**	MSB-301-08 **DLC**
10mm	10mm	14mm	66mm	MSB-301-10	MSB-301-10 **T**	MSB-301-10 **C**	MSB-301-10 **A**	MSB-301-10 **DLC**
12mm	12mm	16mm	73mm	MSB-301-12	MSB-301-12 **T**	MSB-301-12 **C**	MSB-301-12 **A**	MSB-301-12 **DLC**
16mm	16mm	20mm	82mm	MSB-301-16	MSB-301-16 **T**	MSB-301-16 **C**	MSB-301-16 **A**	MSB-301-16 **DLC**
20mm	20mm	25mm	92mm	MSB-301-20	MSB-301-20 **T**	MSB-301-20 **C**	MSB-301-20 **A**	MSB-301-20 **DLC**

3 Flute Tuffy Grade Carbide Ball End Mills B/MB

B-333 3 Flute 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	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"	6-1/2"	BX-333-32	BX-333-32 **T**	BX-333-32 **C**	BX-333-32 **A**	BX-333-32 **DLC**

MB-333 Metric 3 Flute Tuffy Ball End 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
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

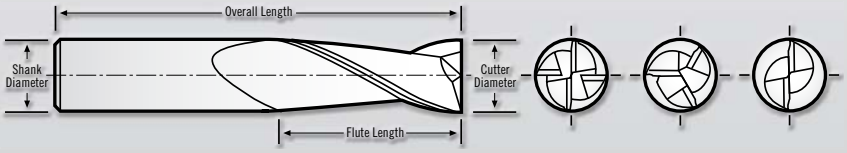
Characteristics: Square End · 2 Flute · 3 Flute · 4 Flute · 30° Helix · Flats

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

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

Coatings: Diamond-Like Carbon (DLC)

+ Tolerances 64th Sizes



NR Series Tolerances
Cutting Dia. = +.001/–.000"
Shank Dia. = –.0001/–.0002"
LOC (1/16" to 5/16") = +.030/–.000"
(21/64" to1") = +.060/–.000"
OAL = ±.060"

MNR Tolerances
Cutting Dia. = +.025/–.000mm
Shank Dia. = –.002/–.005mm
LOC = +0.500/+1.500mm
OAL = ±1.000mm

Slotting · Side Milling · Helical Interpolation

+ Tolerances

Flats!

NR-204 2 Flute C-2 Grade Standard Length

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

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 C-2 Grade Standard Length

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"		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 Metric 3 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-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 C-2 Grade Standard Length

Flats!

Flats!

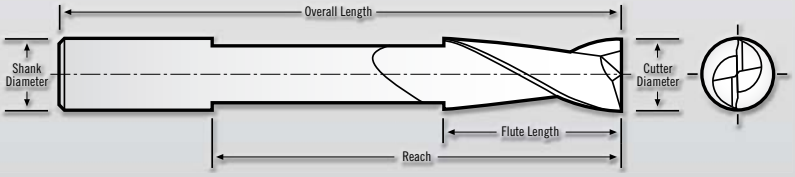
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Flats, Uncoated	Tool Number No Flats, Uncoated	Tool Number Flats, DLC Coated	Tool Number No Flats, DLC Coated
1/16"	1/8"	3/16"	1-1/2"	–	NR-404-02	–	NR-404-02 **DLC**
5/64"	1/8"	1/4"	1-1/2"	–	NR-404-02.5	–	NR-404-02.5 **DLC**
3/32"	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. = +.001/–.000"
LOC = +.060/–.000"
Shank Dia. = –.0001/–.0002"
OAL = ±.060"

+ Tolerances

EX-204 2 Flute Tuffy Grade Extra Length

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"	3-1/4"	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

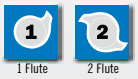
EX-206 2 Flute Tuffy Grade Extra Length Extended Reach

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

ET Engraving Tools

NEW!

Characteristics

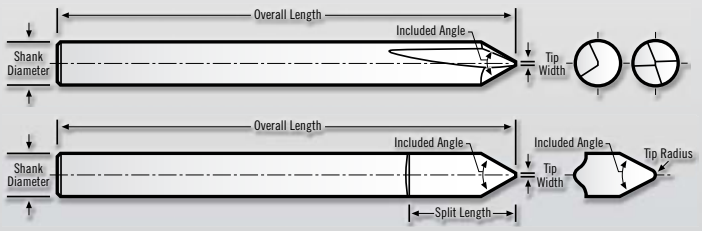


Applications

Materials

NEW Coatings Available!

TiN TiCN AlTiN



ET1 Double Lip Engraving Tool for Tougher Materials

Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Tool Number
.010"	1/4"	30°	—	2"	ET1-01030
.015"	1/4"	30°	—	2"	ET1-01530
.020"	1/4"	30°	—	2"	ET1-02030
.030"	1/4"	30°	—	2"	ET1-03030
.040"	1/4"	30°	—	2"	ET1-04030
.050"	1/4"	30°	—	2"	ET1-05030
.060"	1/4"	30°	—	2"	ET1-06030
.010"	1/4"	45°	—	2"	ET1-01045
.015"	1/4"	45°	—	2"	ET1-01545
.020"	1/4"	45°	—	2"	ET1-02045
.030"	1/4"	45°	—	2"	ET1-03045
.040"	1/4"	45°	—	2"	ET1-04045
.050"	1/4"	45°	—	2"	ET1-05045
.060"	1/4"	45°	—	2"	ET1-06045

NOTE: Specially designed to maximize the tip strength of the tool by removing the minimum amount of material from the end.

ET3 Ball Tip Engraving Tool

Tip Radius	Shank Diameter	Included Angle	Split Length	Overall Length	Tool Number
.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

ET2 Plunge Tip Engraving Tool for Drill & Engrave

Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Tool Number
.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

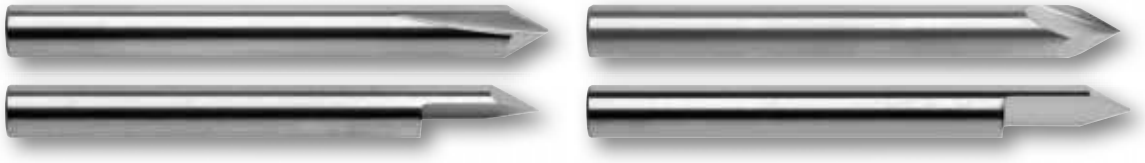
NOTE: Two flute tool serves as a multipurpose tool, which can be used for engraving, chamfering, spot-drilling and countersinking.

ET4 Standard Engraving Tool for Most Applications

Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Tool Number
.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"	ET4-01060
.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.

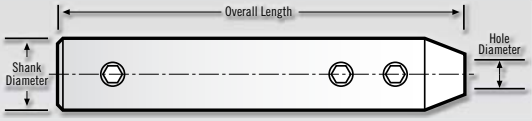
Engraving Tools ET



ET SPEED & FEED

Material	5000 RPM	7500 RPM	1000 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 Extension Holder

Hole Diameter	Shank Diameter	Overall Length	Tool Number
1/8"	3/8"	3-1/4"	ACH-04
3/16"	1/2"	3-1/2"	ACH-06
1/4"	5/8"	4-1/4"	ACH-08
3/8"	3/4"	4-1/2"	ACH-12
1/2"	3/4"	4-3/4"	ACH-16
1/2"	1"	4-3/4"	ACH-16L

MAH Accuhold – Metric End Mill Extension Holder METRIC

Hole Diameter	Shank Diameter	Overall Length	Tool Number
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

TOOLS FOR Saws Applications

Quantity Discount

1–2 of a size . . . . . .Net

3–6 . . . . . Less 5%

7–24 . . . . . Less 10%

25 or more . . . . . Less 15%

Pricing Special Decimal Thicknesses

Find the price of the closest thicker standard saw.

To this add $5.00 for one of a size.

Add $3.50 for two to six of a size.

For 7 or more, there is no additional charge above the base price.

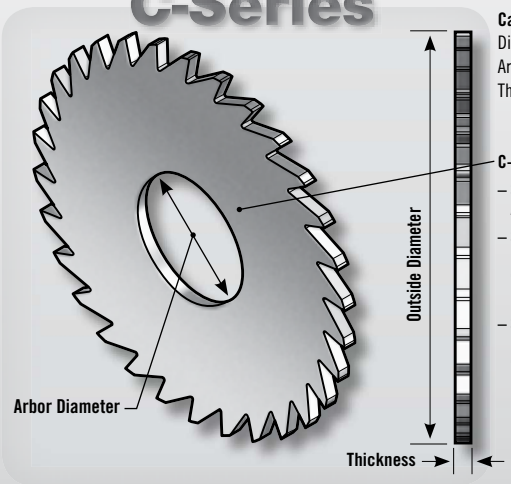
Quantity discounts apply to special thicknesses.

Saws made for gangs with special tolerances are priced on application.

Special Note: Saws under .008" or .19 mm thickness are non-returnable.

SAWS

C-Series



Carbide Saw Tolerances

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

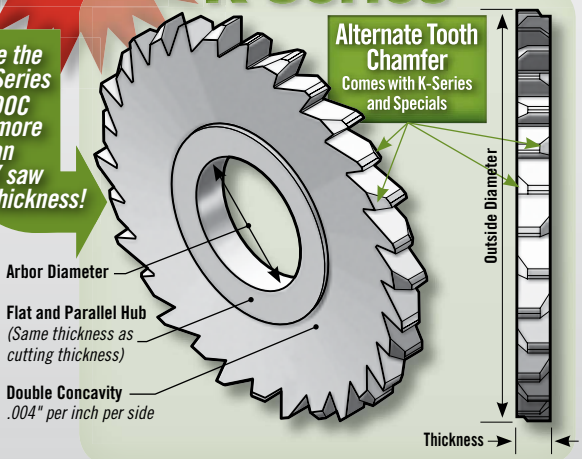
C-Series Concavity

- **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

NEW! 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

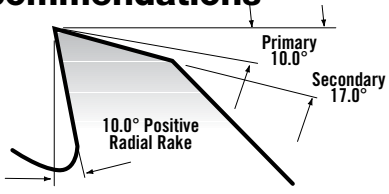
Application Guidelines

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

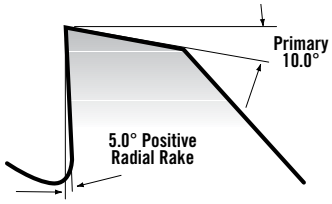
Coarse Pitch

Coarse Tooth recommended for use in non-ferrous materials.



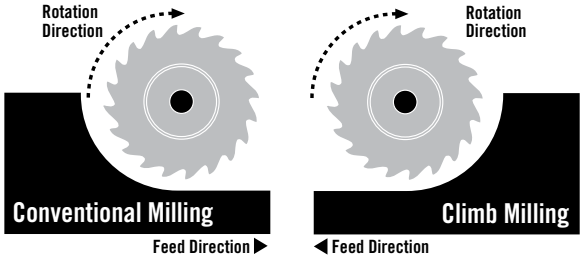
Fine Pitch

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.



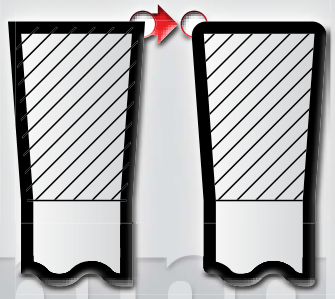
Speed & Feeds

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	.0059/.0069	.0069/.013	0.013
6061 (T1–T3)	4	Coarse	3600	.000234/.000273	.000273/.00052	0.00052	1100	.0059/.0069	.0069/.013	0.013
6061 (T4–T6)	4	Coarse	3600	.000234/.000273	.000273/.00052	0.00052	1100	.0059/.0069	.0069/.013	0.013
7075	4	Coarse	3600	.000234/.000273	.000273/.00052	0.00052	1100	.0059/.0069	.0069/.013	0.013
Non-Ferrous										
Brass	4	Coarse	750	.000234/.000273	.000273/.00052	0.00052	230	.0059/.0069	.0069/.013	0.013
Copper	4	Coarse	600	.000234/.000273	.000273/.00052	0.00052	190	.0059/.0069	.0069/.013	0.013
Magnesium	4	Coarse	3600	.000234/.000273	.000273/.00052	0.00052	1100	.0059/.0069	.0069/.013	0.013
Titanium, Steel and High-Temp Alloys										
Titanium										
Commercially Pure	2	Fine	700	.00018/.00021	.00021/.0004	0.0004	210	.0046/.0053	.0053/.010	0.010
6AL-4V	2	Fine	350	.00018/.00021	.00021/.0004	0.0004	105	.0046/.0053	.0053/.010	0.010
6AL-6V	2	Fine	230	.00018/.00021	.00021/.0004	0.0004	70	.0046/.0053	.0053/.010	0.010
Steel										
1018–1020	4	Fine	350	.00018/.00021	.00021/.0004	0.0004	110	.0046/.0053	.0053/.010	0.010
4130	2	Fine	260	.00018/.00021	.00021/.0004	0.0004	80	.0046/.0053	.0053/.010	0.010
4140	2	Fine	220	.00018/.00021	.00021/.0004	0.0004	70	.0046/.0053	.0053/.010	0.010
4340	2	Fine	280	.00018/.00021	.00021/.0004	0.0004	90	.0046/.0053	.0053/.010	0.010
Tool Steel Annealed										
A2	2	Fine	350	.00018/.00021	.00021/.0004	0.0004	110	.0046/.0053	.0053/.010	0.010
D2	2	Fine	260	.00018/.00021	.00021/.0004	0.0004	80	.0046/.0053	.0053/.010	0.010
H13	2	Fine	230	.00018/.00021	.00021/.0004	0.0004	70	.0046/.0053	.0053/.010	0.010
P20	2	Fine	350	.00018/.00021	.00021/.0004	0.0004	110	.0046/.0053	.0053/.010	0.010
Stainless Steel										
303	2	Fine	500	.00018/.00021	.00021/.0004	0.0004	150	.0046/.0053	.0053/.010	0.010
304	2	Fine	200	.00018/.00021	.00021/.0004	0.0004	70	.0046/.0053	.0053/.010	0.010
316	2	Fine	240	.00018/.00021	.00021/.0004	0.0004	75	.0046/.0053	.0053/.010	0.010
15-5/17-4 PH	2	Fine	200	.00018/.00021	.00021/.0004	0.0004	60	.0046/.0053	.0053/.010	0.010
440C	2	Fine	200	.00018/.00021	.00021/.0004	0.0004	60	.0046/.0053	.0053/.010	0.010
Inconel										
625 / 718	2	Fine	100	.00018/.00021	.00021/.0004	0.0004	30	.0046/.0053	.0053/.010	0.010
Composites & Plastics										
G10 Fiberglass / Polyester	4	Coarse	1000	.000234/.000273	.000273/.00052	0.00052	300	.0059/.0069	.0069/.013	0.013
Graphite	4	Coarse	1000	.000234/.000273	.000273/.00052	0.00052	300	.0059/.0069	.0069/.013	0.013
Graphite Fiber / Epoxy	4	Coarse	800	.000234/.000273	.000273/.00052	0.00052	250	.0059/.0069	.0069/.013	0.013
Plastics	4	Coarse	1600	.000234/.000273	.000273/.00052	0.00052	400	.0059/.0069	.0069/.013	0.013
Other Material Applications										
Cast Iron										
Ductile Iron	2	Fine	350	.00018/.00021	.00021/.0004	0.0004	110	.0046/.0053	.0053/.010	0.010
Gray Cast Iron	2	Fine	500	.00018/.00021	.00021/.0004	0.0004	150	.0046/.0053	.0053/.010	0.010

Saw Modifications

T-Process

T-Process is a honed edge we put on a saw to help eliminate chipping.



Chipping?

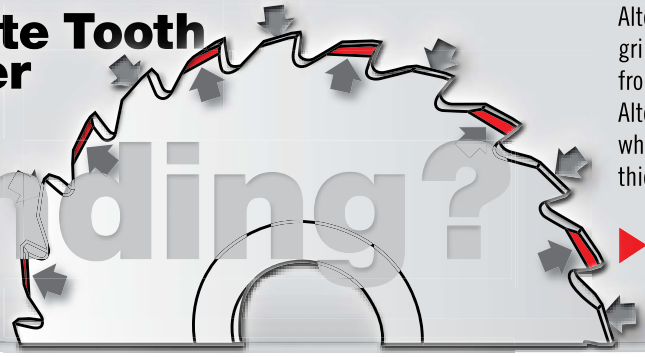
Pros: T-Process strengthens the edge, helps eliminate chipping and gives a smooth edge.
Cons: T-Process will bring up a burr in certain materials, it is not for materials that like a sharp edge, such as aluminum and plastics.

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

Example:
An 4" saw with a T-Process is Part Number:

C40-032-32-36-TP
See price sheet for pricing

Alternate Tooth Chamfer

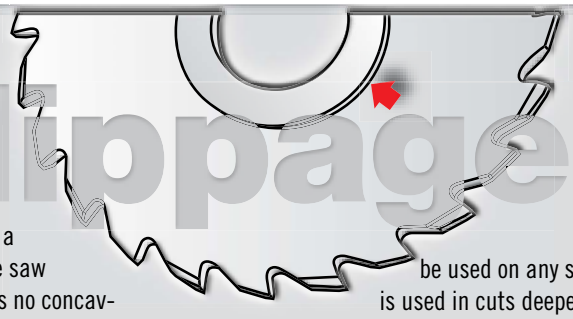


Binding?

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)

Hub



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.

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 *Part Number*, and add *-H,* followed by *Hub Diameter.*

Example:
4" saw with a 2.000" diameter hub

C40-032-32-36-H 2.000"
See price sheet for pricing

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 *Part Number*, and add *-K.*

Example:
4" saw with a 1/4" keyway

C40-125-32-36-K
See price sheet for pricing

SAWS Solid Carbide

3/4" Diameter 1/4" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .075"
Using NAB Arbor = .040"

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

Use if DOC is more than 5X saw thickness

10 TEETH		Double Concavity Alternative Tooth Chamfer ½" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C07-002-08-10	–
.0040"	C07-004-08-10	–
.0060"	C07-006-08-10	–
.0080"	C07-008-08-10	–
.0100"	C07-010-08-10	–
.0120"	C07-012-08-10	–
.0140"	C07-014-08-10	–
.0156"	C07-016-08-10	–
.0180"	C07-018-08-10	–
.0200"	C07-020-08-10	K07-020-08-10
.0230"	C07-023-08-10	K07-023-08-10
.0250"	C07-025-08-10	K07-025-08-10
.0280"	C07-028-08-10	K07-028-08-10
.0312"	C07-032-08-10	K07-032-08-10
.0350"	C07-035-08-10	K07-035-08-10
.0400"	C07-040-08-10	K07-040-08-10
.0468"	C07-045-08-10	K07-045-08-10
.0510"	C07-051-08-10	K07-051-08-10
.0625"	C07-062-08-10	K07-062-08-10
.0781"	C07-078-08-10	K07-078-08-10
.0937"	C07-092-08-10	K07-092-08-10
.1250"	C07-125-08-10	K07-125-08-10
.1562"	C07-156-08-10	K07-156-08-10
.1875"	C07-187-08-10	K07-187-08-10
.2500"	C07-250-08-10	K07-250-08-10

Any Saw Thickness Available

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

Use if DOC is more than 5X saw thickness

20 TEETH		Double Concavity Alternative Tooth Chamfer ½" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C07-002-08-20	–
.0040"	C07-004-08-20	–
.0060"	C07-006-08-20	–
.0080"	C07-008-08-20	–
.0100"	C07-010-08-20	–
.0120"	C07-012-08-20	–
.0140"	C07-014-08-20	–
.0156"	C07-016-08-20	–
.0180"	C07-018-08-20	–
.0200"	C07-020-08-20	K07-020-08-20
.0230"	C07-023-08-20	K07-023-08-20
.0250"	C07-025-08-20	K07-025-08-20
.0280"	C07-028-08-20	K07-028-08-20
.0312"	C07-032-08-20	K07-032-08-20
.0350"	C07-035-08-20	K07-035-08-20
.0400"	C07-040-08-20	K07-040-08-20
.0468"	C07-045-08-20	K07-045-08-20
.0510"	C07-051-08-20	K07-051-08-20
.0625"	C07-062-08-20	K07-062-08-20
.0781"	C07-078-08-20	K07-078-08-20
.0937"	C07-092-08-20	K07-092-08-20
.1250"	C07-125-08-20	K07-125-08-20
.1562"	C07-156-08-20	K07-156-08-20
.1875"	C07-187-08-20	K07-187-08-20
.2500"	C07-250-08-20	K07-250-08-20

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"

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

Use if DOC is more than 5X saw thickness

12 TEETH		Double Concavity Alternative Tooth Chamfer 5/8" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C10-002-12-12	–
.0040"	C10-004-12-12	–
.0060"	C10-006-12-12	–
.0080"	C10-008-12-12	–
.0100"	C10-010-12-12	–
.0120"	C10-012-12-12	–
.0140"	C10-014-12-12	–
.0156"	C10-016-12-12	–
.0180"	C10-018-12-12	–
.0200"	C10-020-12-12	K10-020-12-12
.0230"	C10-023-12-12	K10-023-12-12
.0250"	C10-025-12-12	K10-025-12-12
.0280"	C10-028-12-12	K10-028-12-12
.0312"	C10-032-12-12	K10-032-12-12
.0350"	C10-035-12-12	K10-035-12-12
.0400"	C10-040-12-12	K10-040-12-12
.0468"	C10-045-12-12	K10-045-12-12
.0510"	C10-051-12-12	K10-051-12-12
.0625"	C10-062-12-12	K10-062-12-12
.0781"	C10-078-12-12	K10-078-12-12
.0937"	C10-092-12-12	K10-092-12-12
.1250"	C10-125-12-12	K10-125-12-12
.1562"	C10-156-12-12	K10-156-12-12
.1875"	C10-187-12-12	K10-187-12-12
.2500"	C10-250-12-12	K10-250-12-12

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

Use if DOC is more than 5X saw thickness

24 TEETH		Double Concavity Alternative Tooth Chamfer 5/8" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C10-002-12-24	–
.0040"	C10-004-12-24	–
.0060"	C10-006-12-24	–
.0080"	C10-008-12-24	–
.0100"	C10-010-12-24	–
.0120"	C10-012-12-24	–
.0140"	C10-014-12-24	–
.0156"	C10-016-12-24	–
.0180"	C10-018-12-24	–
.0200"	C10-020-12-24	K10-020-12-24
.0230"	C10-023-12-24	K10-023-12-24
.0250"	C10-025-12-24	K10-025-12-24
.0280"	C10-028-12-24	K10-028-12-24
.0312"	C10-032-12-24	K10-032-12-24
.0350"	C10-035-12-24	K10-035-12-24
.0400"	C10-040-12-24	K10-040-12-24
.0468"	C10-045-12-24	K10-045-12-24
.0510"	C10-051-12-24	K10-051-12-24
.0625"	C10-062-12-24	K10-062-12-24
.0781"	C10-078-12-24	K10-078-12-24
.0937"	C10-092-12-24	K10-092-12-24
.1250"	C10-125-12-24	K10-125-12-24
.1562"	C10-156-12-24	K10-156-12-24
.1875"	C10-187-12-24	K10-187-12-24
.2500"	C10-250-12-24	K10-250-12-24

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.

Solid Carbide SAWS

1¼" Diameter ½" Arbor

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

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

Use if DOC is more than 5X saw thickness

16 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 3/4" HUB Diameter
.0020"	C12-002-16-16	–
.0040"	C12-004-16-16	–
.0060"	C12-006-16-16	–
.0080"	C12-008-16-16	–
.0100"	C12-010-16-16	–
.0120"	C12-012-16-16	–
.0140"	C12-014-16-16	–
.0156"	C12-016-16-16	–
.0180"	C12-018-16-16	–
.0200"	C12-020-16-16	K12-020-16-16
.0230"	C12-023-16-16	K12-023-16-16
.0250"	C12-025-16-16	K12-025-16-16
.0280"	C12-028-16-16	K12-028-16-16
.0312"	C12-032-16-16	K12-032-16-16
.0350"	C12-035-16-16	K12-035-16-16
.0400"	C12-040-16-16	K12-040-16-16
.0468"	C12-045-16-16	K12-045-16-16
.0510"	C12-051-16-16	K12-051-16-16
.0625"	C12-062-16-16	K12-062-16-16
.0781"	C12-078-16-16	K12-078-16-16
.0937"	C12-092-16-16	K12-092-16-16
.1250"	C12-125-16-16	K12-125-16-16
.1562"	C12-156-16-16	K12-156-16-16
.1875"	C12-187-16-16	K12-187-16-16
.2500"	C12-250-16-16	K12-250-16-16

Any Saw Thickness Available

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

Use if DOC is more than 5X saw thickness

36 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 3/4" HUB Diameter
.0020"	C12-002-16-36	–
.0040"	C12-004-16-36	–
.0060"	C12-006-16-36	–
.0080"	C12-008-16-36	–
.0100"	C12-010-16-36	–
.0120"	C12-012-16-36	–
.0140"	C12-014-16-36	–
.0156"	C12-016-16-36	–
.0180"	C12-018-16-36	–
.0200"	C12-020-16-36	K12-020-16-36
.0230"	C12-023-16-36	K12-023-16-36
.0250"	C12-025-16-36	K12-025-16-36
.0280"	C12-028-16-36	K12-028-16-36
.0312"	C12-032-16-36	K12-032-16-36
.0350"	C12-035-16-36	K12-035-16-36
.0400"	C12-040-16-36	K12-040-16-36
.0468"	C12-045-16-36	K12-045-16-36
.0510"	C12-051-16-36	K12-051-16-36
.0625"	C12-062-16-36	K12-062-16-36
.0781"	C12-078-16-36	K12-078-16-36
.0937"	C12-092-16-36	K12-092-16-36
.1250"	C12-125-16-36	K12-125-16-36
.1562"	C12-156-16-36	K12-156-16-36
.1875"	C12-187-16-36	K12-187-16-36
.2500"	C12-250-16-36	K12-250-16-36

Any Saw Thickness Available

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 | Composites | Brass

Use if DOC is more than 5X saw thickness

16 TEETH

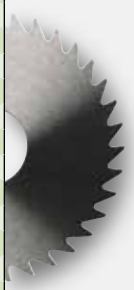
Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 3/4" HUB Diameter
.0020"	C15-002-16-16	–
.0040"	C15-004-16-16	–
.0060"	C15-006-16-16	–
.0080"	C15-008-16-16	–
.0100"	C15-010-16-16	–
.0120"	C15-012-16-16	–
.0140"	C15-014-16-16	–
.0156"	C15-016-16-16	–
.0180"	C15-018-16-16	–
.0200"	C15-020-16-16	K15-020-16-16
.0230"	C15-023-16-16	K15-023-16-16
.0250"	C15-025-16-16	K15-025-16-16
.0280"	C15-028-16-16	K15-028-16-16
.0312"	C15-032-16-16	K15-032-16-16
.0350"	C15-035-16-16	K15-035-16-16
.0400"	C15-040-16-16	K15-040-16-16
.0468"	C15-045-16-16	K15-045-16-16
.0510"	C15-051-16-16	K15-051-16-16
.0625"	C15-062-16-16	K15-062-16-16
.0781"	C15-078-16-16	K15-078-16-16
.0937"	C15-092-16-16	K15-092-16-16
.1250"	C15-125-16-16	K15-125-16-16
.1562"	C15-156-16-16	K15-156-16-16
.1875"	C15-187-16-16	K15-187-16-16
.2500"	C15-250-16-16	K15-250-16-16

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

Use if DOC is more than 5X saw thickness

36 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 3/4" HUB Diameter
.0020"	C15-002-16-36	–
.0040"	C15-004-16-36	–
.0060"	C15-006-16-36	–
.0080"	C15-008-16-36	–
.0100"	C15-010-16-36	–
.0120"	C15-012-16-36	–
.0140"	C15-014-16-36	–
.0156"	C15-016-16-36	–
.0180"	C15-018-16-36	–
.0200"	C15-020-16-36	K15-020-16-36
.0230"	C15-023-16-36	K15-023-16-36
.0250"	C15-025-16-36	K15-025-16-36
.0280"	C15-028-16-36	K15-028-16-36
.0312"	C15-032-16-36	K15-032-16-36
.0350"	C15-035-16-36	K15-035-16-36
.0400"	C15-040-16-36	K15-040-16-36
.0468"	C15-045-16-36	K15-045-16-36
.0510"	C15-051-16-36	K15-051-16-36
.0625"	C15-062-16-36	K15-062-16-36
.0781"	C15-078-16-36	K15-078-16-36
.0937"	C15-092-16-36	K15-092-16-36
.1250"	C15-125-16-36	K15-125-16-36
.1562"	C15-156-16-36	K15-156-16-36
.1875"	C15-187-16-36	K15-187-16-36
.2500"	C15-250-16-36	K15-250-16-36



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.

SAWS Solid Carbide

1¾" Diameter ½" 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		Double Concavity Alternative Tooth Chamfer 3/4" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C17-002-16-24	–
.0040"	C17-004-16-24	–
.0060"	C17-006-16-24	–
.0080"	C17-008-16-24	–
.0100"	C17-010-16-24	–
.0120"	C17-012-16-24	–
.0140"	C17-014-16-24	–
.0156"	C17-016-16-24	–
.0180"	C17-018-16-24	–
.0200"	C17-020-16-24	K17-020-16-24
.0230"	C17-023-16-24	K17-023-16-24
.0250"	C17-025-16-24	K17-025-16-24
.0280"	C17-028-16-24	K17-028-16-24
.0312"	C17-032-16-24	K17-032-16-24
.0350"	C17-035-16-24	K17-035-16-24
.0400"	C17-040-16-24	K17-040-16-24
.0468"	C17-045-16-24	K17-045-16-24
.0510"	C17-051-16-24	K17-051-16-24
.0625"	C17-062-16-24	K17-062-16-24
.0781"	C17-078-16-24	K17-078-16-24
.0937"	C17-092-16-24	K17-092-16-24
.1250"	C17-125-16-24	K17-125-16-24
.1562"	C17-156-16-24	K17-156-16-24
.1875"	C17-187-16-24	K17-187-16-24
.2500"	C17-250-16-24	K17-250-16-24

Any Saw Thickness Available

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

Use if DOC is more than 5X saw thickness

36 TEETH		Double Concavity Alternative Tooth Chamfer 3/4" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C17-002-16-36	–
.0040"	C17-004-16-36	–
.0060"	C17-006-16-36	–
.0080"	C17-008-16-36	–
.0100"	C17-010-16-36	–
.0120"	C17-012-16-36	–
.0140"	C17-014-16-36	–
.0156"	C17-016-16-36	–
.0180"	C17-018-16-36	–
.0200"	C17-020-16-36	K17-020-16-36
.0230"	C17-023-16-36	K17-023-16-36
.0250"	C17-025-16-36	K17-025-16-36
.0280"	C17-028-16-36	K17-028-16-36
.0312"	C17-032-16-36	K17-032-16-36
.0350"	C17-035-16-36	K17-035-16-36
.0400"	C17-040-16-36	K17-040-16-36
.0468"	C17-045-16-36	K17-045-16-36
.0510"	C17-051-16-36	K17-051-16-36
.0625"	C17-062-16-36	K17-062-16-36
.0781"	C17-078-16-36	K17-078-16-36
.0937"	C17-092-16-36	K17-092-16-36
.1250"	C17-125-16-36	K17-125-16-36
.1562"	C17-156-16-36	K17-156-16-36
.1875"	C17-187-16-36	K17-187-16-36
.2500"	C17-250-16-36	K17-250-16-36

Any Saw Thickness Available

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:
Using AB Arbor = .325"
Using NAB Arbor = .2875"

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

Use if DOC is more than 5X saw thickness

24 TEETH		Double Concavity Alternative Tooth Chamfer 1" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C17-002-20-24	–
.0040"	C17-004-20-24	–
.0060"	C17-006-20-24	–
.0080"	C17-008-20-24	–
.0100"	C17-010-20-24	–
.0120"	C17-012-20-24	–
.0140"	C17-014-20-24	–
.0156"	C17-016-20-24	–
.0180"	C17-018-20-24	–
.0200"	C17-020-20-24	K17-020-20-24
.0230"	C17-023-20-24	K17-023-20-24
.0250"	C17-025-20-24	K17-025-20-24
.0280"	C17-028-20-24	K17-028-20-24
.0312"	C17-032-20-24	K17-032-20-24
.0350"	C17-035-20-24	K17-035-20-24
.0400"	C17-040-20-24	K17-040-20-24
.0468"	C17-045-20-24	K17-045-20-24
.0510"	C17-051-20-24	K17-051-20-24
.0625"	C17-062-20-24	K17-062-20-24
.0781"	C17-078-20-24	K17-078-20-24
.0937"	C17-092-20-24	K17-092-20-24
.1250"	C17-125-20-24	K17-125-20-24
.1562"	C17-156-20-24	K17-156-20-24
.1875"	C17-187-20-24	K17-187-20-24
.2500"	C17-250-20-24	K17-250-20-24

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

Use if DOC is more than 5X saw thickness

36 TEETH		Double Concavity Alternative Tooth Chamfer 1" HUB Diameter
Saw Thickness	Standard Concavity	
.0020"	C17-002-20-36	–
.0040"	C17-004-20-36	–
.0060"	C17-006-20-36	–
.0080"	C17-008-20-36	–
.0100"	C17-010-20-36	–
.0120"	C17-012-20-36	–
.0140"	C17-014-20-36	–
.0156"	C17-016-20-36	–
.0180"	C17-018-20-36	–
.0200"	C17-020-20-36	K17-020-20-36
.0230"	C17-023-20-36	K17-023-20-36
.0250"	C17-025-20-36	K17-025-20-36
.0280"	C17-028-20-36	K17-028-20-36
.0312"	C17-032-20-36	K17-032-20-36
.0350"	C17-035-20-36	K17-035-20-36
.0400"	C17-040-20-36	K17-040-20-36
.0468"	C17-045-20-36	K17-045-20-36
.0510"	C17-051-20-36	K17-051-20-36
.0625"	C17-062-20-36	K17-062-20-36
.0781"	C17-078-20-36	K17-078-20-36
.0937"	C17-092-20-36	K17-092-20-36
.1250"	C17-125-20-36	K17-125-20-36
.1562"	C17-156-20-36	K17-156-20-36
.1875"	C17-187-20-36	K17-187-20-36
.2500"	C17-250-20-36	K17-250-20-36

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.

1 3/4" Diameter 7/8" Arbor

Proper Max Depth of Cut:
Using AB Arbor = .200"
Using NAB Arbor = .108"

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

Use if DOC is more than 5X saw thickness

24 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/4" HUB Diameter
.0020"	C17-002-28-24	–
.0040"	C17-004-28-24	–
.0060"	C17-006-28-24	–
.0080"	C17-008-28-24	–
.0100"	C17-010-28-24	–
.0120"	C17-012-28-24	–
.0140"	C17-014-28-24	–
.0156"	C17-016-28-24	–
.0180"	C17-018-28-24	–
.0200"	C17-020-28-24	K17-020-28-24
.0230"	C17-023-28-24	K17-023-28-24
.0250"	C17-025-28-24	K17-025-28-24
.0280"	C17-028-28-24	K17-028-28-24
.0312"	C17-032-28-24	K17-032-28-24
.0350"	C17-035-28-24	K17-035-28-24
.0400"	C17-040-28-24	K17-040-28-24
.0468"	C17-045-28-24	K17-045-28-24
.0510"	C17-051-28-24	K17-051-28-24
.0625"	C17-062-28-24	K17-062-28-24
.0781"	C17-078-28-24	K17-078-28-24
.0937"	C17-092-28-24	K17-092-28-24
.1250"	C17-125-28-24	K17-125-28-24
.1562"	C17-156-28-24	K17-156-28-24
.1875"	C17-187-28-24	K17-187-28-24
.2500"	C17-250-28-24	K17-250-28-24

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

Use if DOC is more than 5X saw thickness

36 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/4" HUB Diameter
.0020"	C17-002-28-36	–
.0040"	C17-004-28-36	–
.0060"	C17-006-28-36	–
.0080"	C17-008-28-36	–
.0100"	C17-010-28-36	–
.0120"	C17-012-28-36	–
.0140"	C17-014-28-36	–
.0156"	C17-016-28-36	–
.0180"	C17-018-28-36	–
.0200"	C17-020-28-36	K17-020-28-36
.0230"	C17-023-28-36	K17-023-28-36
.0250"	C17-025-28-36	K17-025-28-36
.0280"	C17-028-28-36	K17-028-28-36
.0312"	C17-032-28-36	K17-032-28-36
.0350"	C17-035-28-36	K17-035-28-36
.0400"	C17-040-28-36	K17-040-28-36
.0468"	C17-045-28-36	K17-045-28-36
.0510"	C17-051-28-36	K17-051-28-36
.0625"	C17-062-28-36	K17-062-28-36
.0781"	C17-078-28-36	K17-078-28-36
.0937"	C17-092-28-36	K17-092-28-36
.1250"	C17-125-28-36	K17-125-28-36
.1562"	C17-156-28-36	K17-156-28-36
.1875"	C17-187-28-36	K17-187-28-36
.2500"	C17-250-28-36	K17-250-28-36

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"

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

Use if DOC is more than 5X saw thickness

24 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 3/4" HUB Diameter
.0020"	C20-002-16-24	–
.0040"	C20-004-16-24	–
.0060"	C20-006-16-24	–
.0080"	C20-008-16-24	–
.0100"	C20-010-16-24	–
.0120"	C20-012-16-24	–
.0140"	C20-014-16-24	–
.0156"	C20-016-16-24	–
.0180"	C20-018-16-24	–
.0200"	C20-020-16-24	K20-020-16-24
.0230"	C20-023-16-24	K20-023-16-24
.0250"	C20-025-16-24	K20-025-16-24
.0280"	C20-028-16-24	K20-028-16-24
.0312"	C20-032-16-24	K20-032-16-24
.0350"	C20-035-16-24	K20-035-16-24
.0400"	C20-040-16-24	K20-040-16-24
.0468"	C20-045-16-24	K20-045-16-24
.0510"	C20-051-16-24	K20-051-16-24
.0625"	C20-062-16-24	K20-062-16-24
.0781"	C20-078-16-24	K20-078-16-24
.0937"	C20-092-16-24	K20-092-16-24
.1250"	C20-125-16-24	K20-125-16-24
.1562"	C20-156-16-24	K20-156-16-24
.1875"	C20-187-16-24	K20-187-16-24
.2500"	C20-250-16-24	K20-250-16-24

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

Use if DOC is more than 5X saw thickness

48 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 3/4" HUB Diameter
.0020"	C20-002-16-48	–
.0040"	C20-004-16-48	–
.0060"	C20-006-16-48	–
.0080"	C20-008-16-48	–
.0100"	C20-010-16-48	–
.0120"	C20-012-16-48	–
.0140"	C20-014-16-48	–
.0156"	C20-016-16-48	–
.0180"	C20-018-16-48	–
.0200"	C20-020-16-48	K20-020-16-48
.0230"	C20-023-16-48	K20-023-16-48
.0250"	C20-025-16-48	K20-025-16-48
.0280"	C20-028-16-48	K20-028-16-48
.0312"	C20-032-16-48	K20-032-16-48
.0350"	C20-035-16-48	K20-035-16-48
.0400"	C20-040-16-48	K20-040-16-48
.0468"	C20-045-16-48	K20-045-16-48
.0510"	C20-051-16-48	K20-051-16-48
.0625"	C20-062-16-48	K20-062-16-48
.0781"	C20-078-16-48	K20-078-16-48
.0937"	C20-092-16-48	K20-092-16-48
.1250"	C20-125-16-48	K20-125-16-48
.1562"	C20-156-16-48	K20-156-16-48
.1875"	C20-187-16-48	K20-187-16-48
.2500"	C20-250-16-48	K20-250-16-48

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.

SAWS Solid Carbide

2" Diameter 1" Arbor

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

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

24 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C20-002-32-24	–
.0040"	C20-004-32-24	–
.0060"	C20-006-32-24	–
.0080"	C20-008-32-24	–
.0100"	C20-010-32-24	–
.0120"	C20-012-32-24	–
.0140"	C20-014-32-24	–
.0156"	C20-016-32-24	–
.0180"	C20-018-32-24	–
.0200"	C20-020-32-24	K20-020-32-24
.0230"	C20-023-32-24	K20-023-32-24
.0250"	C20-025-32-24	K20-025-32-24
.0280"	C20-028-32-24	K20-028-32-24
.0312"	C20-032-32-24	K20-032-32-24
.0350"	C20-035-32-24	K20-035-32-24
.0400"	C20-040-32-24	K20-040-32-24
.0468"	C20-045-32-24	K20-045-32-24
.0510"	C20-051-32-24	K20-051-32-24
.0625"	C20-062-32-24	K20-062-32-24
.0781"	C20-078-32-24	K20-078-32-24
.0937"	C20-092-32-24	K20-092-32-24
.1250"	C20-125-32-24	K20-125-32-24
.1562"	C20-156-32-24	K20-156-32-24
.1875"	C20-187-32-24	K20-187-32-24
.2500"	C20-250-32-24	K20-250-32-24

Use if DOC is more than 5X saw thickness

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

48 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C20-002-32-48	–
.0040"	C20-004-32-48	–
.0060"	C20-006-32-48	–
.0080"	C20-008-32-48	–
.0100"	C20-010-32-48	–
.0120"	C20-012-32-48	–
.0140"	C20-014-32-48	–
.0156"	C20-016-32-48	–
.0180"	C20-018-32-48	–
.0200"	C20-020-32-48	K20-020-32-48
.0230"	C20-023-32-48	K20-023-32-48
.0250"	C20-025-32-48	K20-025-32-48
.0280"	C20-028-32-48	K20-028-32-48
.0312"	C20-032-32-48	K20-032-32-48
.0350"	C20-035-32-48	K20-035-32-48
.0400"	C20-040-32-48	K20-040-32-48
.0468"	C20-045-32-48	K20-045-32-48
.0510"	C20-051-32-48	K20-051-32-48
.0625"	C20-062-32-48	K20-062-32-48
.0781"	C20-078-32-48	K20-078-32-48
.0937"	C20-092-32-48	K20-092-32-48
.1250"	C20-125-32-48	K20-125-32-48
.1562"	C20-156-32-48	K20-156-32-48
.1875"	C20-187-32-48	K20-187-32-48
.2500"	C20-250-32-48	K20-250-32-48

Use if DOC is more than 5X saw thickness

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:
Using AB Arbor = .575"
Using NAB Arbor = .5375"

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

28 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1" HUB Diameter
.0020"	C22-002-20-28	–
.0040"	C22-004-20-28	–
.0060"	C22-006-20-28	–
.0080"	C22-008-20-28	–
.0100"	C22-010-20-28	–
.0120"	C22-012-20-28	–
.0140"	C22-014-20-28	–
.0156"	C22-016-20-28	–
.0180"	C22-018-20-28	–
.0200"	C22-020-20-28	K22-020-20-28
.0230"	C22-023-20-28	K22-023-20-28
.0250"	C22-025-20-28	K22-025-20-28
.0280"	C22-028-20-28	K22-028-20-28
.0312"	C22-032-20-28	K22-032-20-28
.0350"	C22-035-20-28	K22-035-20-28
.0400"	C22-040-20-28	K22-040-20-28
.0468"	C22-045-20-28	K22-045-20-28
.0510"	C22-051-20-28	K22-051-20-28
.0625"	C22-062-20-28	K22-062-20-28
.0781"	C22-078-20-28	K22-078-20-28
.0937"	C22-092-20-28	K22-092-20-28
.1250"	C22-125-20-28	K22-125-20-28
.1562"	C22-156-20-28	K22-156-20-28
.1875"	C22-187-20-28	K22-187-20-28
.2500"	C22-250-20-28	K22-250-20-28

Use if DOC is more than 5X saw thickness

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56 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1" HUB Diameter
.0020"	C22-002-20-56	–
.0040"	C22-004-20-56	–
.0060"	C22-006-20-56	–
.0080"	C22-008-20-56	–
.0100"	C22-010-20-56	–
.0120"	C22-012-20-56	–
.0140"	C22-014-20-56	–
.0156"	C22-016-20-56	–
.0180"	C22-018-20-56	–
.0200"	C22-020-20-56	K22-020-20-56
.0230"	C22-023-20-56	K22-023-20-56
.0250"	C22-025-20-56	K22-025-20-56
.0280"	C22-028-20-56	K22-028-20-56
.0312"	C22-032-20-56	K22-032-20-56
.0350"	C22-035-20-56	K22-035-20-56
.0400"	C22-040-20-56	K22-040-20-56
.0468"	C22-045-20-56	K22-045-20-56
.0510"	C22-051-20-56	K22-051-20-56
.0625"	C22-062-20-56	K22-062-20-56
.0781"	C22-078-20-56	K22-078-20-56
.0937"	C22-092-20-56	K22-092-20-56
.1250"	C22-125-20-56	K22-125-20-56
.1562"	C22-156-20-56	K22-156-20-56
.1875"	C22-187-20-56	K22-187-20-56
.2500"	C22-250-20-56	K22-250-20-56

Use if DOC is more than 5X saw thickness

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.

Solid Carbide SAWS

2½" Diameter 1" Arbor

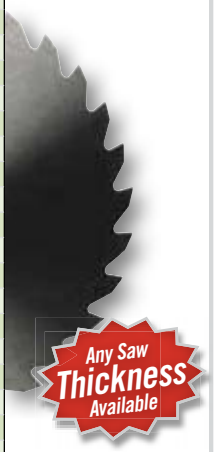
Proper Max Depth of Cut:
Using AB Arbor = .450"
Using NAB Arbor = .460"

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

Use if DOC is more than 5X saw thickness

28 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C25-002-32-28	–
.0040"	C25-004-32-28	–
.0060"	C25-006-32-28	–
.0080"	C25-008-32-28	–
.0100"	C25-010-32-28	–
.0120"	C25-012-32-28	–
.0140"	C25-014-32-28	–
.0156"	C25-016-32-28	–
.0180"	C25-018-32-28	–
.0200"	C25-020-32-28	K25-020-32-28
.0230"	C25-023-32-28	K25-023-32-28
.0250"	C25-025-32-28	K25-025-32-28
.0280"	C25-028-32-28	K25-028-32-28
.0312"	C25-032-32-28	K25-032-32-28
.0350"	C25-035-32-28	K25-035-32-28
.0400"	C25-040-32-28	K25-040-32-28
.0468"	C25-045-32-28	K25-045-32-28
.0510"	C25-051-32-28	K25-051-32-28
.0625"	C25-062-32-28	K25-062-32-28
.0781"	C25-078-32-28	K25-078-32-28
.0937"	C25-092-32-28	K25-092-32-28
.1250"	C25-125-32-28	K25-125-32-28
.1562"	C25-156-32-28	K25-156-32-28
.1875"	C25-187-32-28	K25-187-32-28
.2500"	C25-250-32-28	K25-250-32-28



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Use if DOC is more than 5X saw thickness

56 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C25-002-32-56	–
.0040"	C25-004-32-56	–
.0060"	C25-006-32-56	–
.0080"	C25-008-32-56	–
.0100"	C25-010-32-56	–
.0120"	C25-012-32-56	–
.0140"	C25-014-32-56	–
.0156"	C25-016-32-56	–
.0180"	C25-018-32-56	–
.0200"	C25-020-32-56	K25-020-32-56
.0230"	C25-023-32-56	K25-023-32-56
.0250"	C25-025-32-56	K25-025-32-56
.0280"	C25-028-32-56	K25-028-32-56
.0312"	C25-032-32-56	K25-032-32-56
.0350"	C25-035-32-56	K25-035-32-56
.0400"	C25-040-32-56	K25-040-32-56
.0468"	C25-045-32-56	K25-045-32-56
.0510"	C25-051-32-56	K25-051-32-56
.0625"	C25-062-32-56	K25-062-32-56
.0781"	C25-078-32-56	K25-078-32-56
.0937"	C25-092-32-56	K25-092-32-56
.1250"	C25-125-32-56	K25-125-32-56
.1562"	C25-156-32-56	K25-156-32-56
.1875"	C25-187-32-56	K25-187-32-56
.2500"	C25-250-32-56	K25-250-32-56

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.

2¾" Diameter 1" Arbor

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

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

Use if DOC is more than 5X saw thickness

30 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C27-002-32-30	–
.0040"	C27-004-32-30	–
.0060"	C27-006-32-30	–
.0080"	C27-008-32-30	–
.0100"	C27-010-32-30	–
.0120"	C27-012-32-30	–
.0140"	C27-014-32-30	–
.0156"	C27-016-32-30	–
.0180"	C27-018-32-30	–
.0200"	C27-020-32-30	K27-020-32-30
.0230"	C27-023-32-30	K27-023-32-30
.0250"	C27-025-32-30	K27-025-32-30
.0280"	C27-028-32-30	K27-028-32-30
.0312"	C27-032-32-30	K27-032-32-30
.0350"	C27-035-32-30	K27-035-32-30
.0400"	C27-040-32-30	K27-040-32-30
.0468"	C27-045-32-30	K27-045-32-30
.0510"	C27-051-32-30	K27-051-32-30
.0625"	C27-062-32-30	K27-062-32-30
.0781"	C27-078-32-30	K27-078-32-30
.0937"	C27-092-32-30	K27-092-32-30
.1250"	C27-125-32-30	K27-125-32-30
.1562"	C27-156-32-30	K27-156-32-30
.1875"	C27-187-32-30	K27-187-32-30
.2500"	C27-250-32-30	K27-250-32-30

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Use if DOC is more than 5X saw thickness

60 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C27-002-32-60	–
.0040"	C27-004-32-60	–
.0060"	C27-006-32-60	–
.0080"	C27-008-32-60	–
.0100"	C27-010-32-60	–
.0120"	C27-012-32-60	–
.0140"	C27-014-32-60	–
.0156"	C27-016-32-60	–
.0180"	C27-018-32-60	–
.0200"	C27-020-32-60	K27-020-32-60
.0230"	C27-023-32-60	K27-023-32-60
.0250"	C27-025-32-60	K27-025-32-60
.0280"	C27-028-32-60	K27-028-32-60
.0312"	C27-032-32-60	K27-032-32-60
.0350"	C27-035-32-60	K27-035-32-60
.0400"	C27-040-32-60	K27-040-32-60
.0468"	C27-045-32-60	K27-045-32-60
.0510"	C27-051-32-60	K27-051-32-60
.0625"	C27-062-32-60	K27-062-32-60
.0781"	C27-078-32-60	K27-078-32-60
.0937"	C27-092-32-60	K27-092-32-60
.1250"	C27-125-32-60	K27-125-32-60
.1562"	C27-156-32-60	K27-156-32-60
.1875"	C27-187-32-60	K27-187-32-60
.2500"	C27-250-32-60	K27-250-32-60

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.

SAWS Solid Carbide

3" Diameter 1" Arbor

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

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

30 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C30-002-32-30	–
.0040"	C30-004-32-30	–
.0060"	C30-006-32-30	–
.0080"	C30-008-32-30	–
.0100"	C30-010-32-30	–
.0120"	C30-012-32-30	–
.0140"	C30-014-32-30	–
.0156"	C30-016-32-30	–
.0180"	C30-018-32-30	–
.0200"	C30-020-32-30	K30-020-32-30
.0230"	C30-023-32-30	K30-023-32-30
.0250"	C30-025-32-30	K30-025-32-30
.0280"	C30-028-32-30	K30-028-32-30
.0312"	C30-032-32-30	K30-032-32-30
.0350"	C30-035-32-30	K30-035-32-30
.0400"	C30-040-32-30	K30-040-32-30
.0468"	C30-045-32-30	K30-045-32-30
.0510"	C30-051-32-30	K30-051-32-30
.0625"	C30-062-32-30	K30-062-32-30
.0781"	C30-078-32-30	K30-078-32-30
.0937"	C30-092-32-30	K30-092-32-30
.1250"	C30-125-32-30	K30-125-32-30
.1562"	C30-156-32-30	K30-156-32-30
.1875"	C30-187-32-30	K30-187-32-30
.2500"	C30-250-32-30	K30-250-32-30

Use if DOC is more than 5X saw thickness

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60 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C30-002-32-60	–
.0040"	C30-004-32-60	–
.0060"	C30-006-32-60	–
.0080"	C30-008-32-60	–
.0100"	C30-010-32-60	–
.0120"	C30-012-32-60	–
.0140"	C30-014-32-60	–
.0156"	C30-016-32-60	–
.0180"	C30-018-32-60	–
.0200"	C30-020-32-60	K30-020-32-60
.0230"	C30-023-32-60	K30-023-32-60
.0250"	C30-025-32-60	K30-025-32-60
.0280"	C30-028-32-60	K30-028-32-60
.0312"	C30-032-32-60	K30-032-32-60
.0350"	C30-035-32-60	K30-035-32-60
.0400"	C30-040-32-60	K30-040-32-60
.0468"	C30-045-32-60	K30-045-32-60
.0510"	C30-051-32-60	K30-051-32-60
.0625"	C30-062-32-60	K30-062-32-60
.0781"	C30-078-32-60	K30-078-32-60
.0937"	C30-092-32-60	K30-092-32-60
.1250"	C30-125-32-60	K30-125-32-60
.1562"	C30-156-32-60	K30-156-32-60
.1875"	C30-187-32-60	K30-187-32-60
.2500"	C30-250-32-60	K30-250-32-60

Use if DOC is more than 5X saw thickness

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 | Composites | Brass

36 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C40-002-32-36	–
.0040"	C40-004-32-36	–
.0060"	C40-006-32-36	–
.0080"	C40-008-32-36	–
.0100"	C40-010-32-36	–
.0120"	C40-012-32-36	–
.0140"	C40-014-32-36	–
.0156"	C40-016-32-36	–
.0180"	C40-018-32-36	–
.0200"	C40-020-32-36	K40-020-32-36
.0230"	C40-023-32-36	K40-023-32-36
.0250"	C40-025-32-36	K40-025-32-36
.0280"	C40-028-32-36	K40-028-32-36
.0312"	C40-032-32-36	K40-032-32-36
.0350"	C40-035-32-36	K40-035-32-36
.0400"	C40-040-32-36	K40-040-32-36
.0468"	C40-045-32-36	K40-045-32-36
.0510"	C40-051-32-36	K40-051-32-36
.0625"	C40-062-32-36	K40-062-32-36
.0781"	C40-078-32-36	K40-078-32-36
.0937"	C40-092-32-36	K40-092-32-36
.1250"	C40-125-32-36	K40-125-32-36
.1562"	C40-156-32-36	K40-156-32-36
.1875"	C40-187-32-36	K40-187-32-36
.2500"	C40-250-32-36	K40-250-32-36

Use if DOC is more than 5X saw thickness

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72 TEETH

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 1-1/2" HUB Diameter
.0020"	C40-002-32-72	–
.0040"	C40-004-32-72	–
.0060"	C40-006-32-72	–
.0080"	C40-008-32-72	–
.0100"	C40-010-32-72	–
.0120"	C40-012-32-72	–
.0140"	C40-014-32-72	–
.0156"	C40-016-32-72	–
.0180"	C40-018-32-72	–
.0200"	C40-020-32-72	K40-020-32-72
.0230"	C40-023-32-72	K40-023-32-72
.0250"	C40-025-32-72	K40-025-32-72
.0280"	C40-028-32-72	K40-028-32-72
.0312"	C40-032-32-72	K40-032-32-72
.0350"	C40-035-32-72	K40-035-32-72
.0400"	C40-040-32-72	K40-040-32-72
.0468"	C40-045-32-72	K40-045-32-72
.0510"	C40-051-32-72	K40-051-32-72
.0625"	C40-062-32-72	K40-062-32-72
.0781"	C40-078-32-72	K40-078-32-72
.0937"	C40-092-32-72	K40-092-32-72
.1250"	C40-125-32-72	K40-125-32-72
.1562"	C40-156-32-72	K40-156-32-72
.1875"	C40-187-32-72	K40-187-32-72
.2500"	C40-250-32-72	K40-250-32-72

Use if DOC is more than 5X saw thickness

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.

Solid Carbide SAWS

20 mm Diameter 5 mm Arbor

Proper Max Depth of Cut: Using MSA Arbor = 3.5 mm

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Use if DOC is more than 5X saw thickness

10 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 12mm HUB Diameter
Saw Thickness	Standard Concavity	
.05 mm	M20-005-05-10	–
.10 mm	M20-010-05-10	–
.15 mm	M20-015-05-10	–
.20 mm	M20-020-05-10	–
.40 mm	M20-040-05-10	–
.60 mm	M20-060-05-10	MK20-060-05-10
1.00 mm	M20-100-05-10	MK20-100-05-10
1.20 mm	M20-120-05-10	MK20-120-05-10
1.60 mm	M20-160-05-10	MK20-160-05-10
2.00 mm	M20-200-05-10	MK20-200-05-10
2.50 mm	M20-250-05-10	MK20-250-05-10
3.00 mm	M20-300-05-10	MK20-300-05-10
4.00 mm	M20-400-05-10	MK20-400-05-10
5.00 mm	M20-500-05-10	MK20-500-05-10
6.00 mm	M20-600-05-10	MK20-600-05-10

Any Saw Thickness Available

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Use if DOC is more than 5X saw thickness

20 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 12mm HUB Diameter
Saw Thickness	Standard Concavity	
.05 mm	M20-005-05-20	–
.10 mm	M20-010-05-20	–
.15 mm	M20-015-05-20	–
.20 mm	M20-020-05-20	–
.40 mm	M20-040-05-20	–
.60 mm	M20-060-05-20	MK20-060-05-20
1.00 mm	M20-100-05-20	MK20-100-05-20
1.20 mm	M20-120-05-20	MK20-120-05-20
1.60 mm	M20-160-05-20	MK20-160-05-20
2.00 mm	M20-200-05-20	MK20-200-05-20
2.50 mm	M20-250-05-20	MK20-250-05-20
3.00 mm	M20-300-05-20	MK20-300-05-20
4.00 mm	M20-400-05-20	MK20-400-05-20
5.00 mm	M20-500-05-20	MK20-500-05-20
6.00 mm	M20-600-05-20	MK20-600-05-20

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

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Use if DOC is more than 5X saw thickness

12 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 16mm HUB Diameter
Saw Thickness	Standard Concavity	
.05 mm	M25-005-08-12	–
.10 mm	M25-010-08-12	–
.15 mm	M25-015-08-12	–
.20 mm	M25-020-08-12	–
.40 mm	M25-040-08-12	–
.60 mm	M25-060-08-12	MK25-060-08-12
1.00 mm	M25-100-08-12	MK25-100-08-12
1.20 mm	M25-120-08-12	MK25-120-08-12
1.60 mm	M25-160-08-12	MK25-160-08-12
2.00 mm	M25-200-08-12	MK25-200-08-12
2.50 mm	M25-250-08-12	MK25-250-08-12
3.00 mm	M25-300-08-12	MK25-300-08-12
4.00 mm	M25-400-08-12	MK25-400-08-12
5.00 mm	M25-500-08-12	MK25-500-08-12
6.00 mm	M25-600-08-12	MK25-600-08-12

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Use if DOC is more than 5X saw thickness

24 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 16mm HUB Diameter
Saw Thickness	Standard Concavity	
.05 mm	M25-005-08-24	–
.10 mm	M25-010-08-24	–
.15 mm	M25-015-08-24	–
.20 mm	M25-020-08-24	–
.40 mm	M25-040-08-24	–
.60 mm	M25-060-08-24	MK25-060-08-24
1.00 mm	M25-100-08-24	MK25-100-08-24
1.20 mm	M25-120-08-24	MK25-120-08-24
1.60 mm	M25-160-08-24	MK25-160-08-24
2.00 mm	M25-200-08-24	MK25-200-08-24
2.50 mm	M25-250-08-24	MK25-250-08-24
3.00 mm	M25-300-08-24	MK25-300-08-24
4.00 mm	M25-400-08-24	MK25-400-08-24
5.00 mm	M25-500-08-24	MK25-500-08-24
6.00 mm	M25-600-08-24	MK25-600-08-24

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

See Price Sheet for Quantity Discount

Info on Page 108

SAWS Solid Carbide

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		Double Concavity Alternative Tooth Chamfer 16mm HUB Diameter
Saw Thickness	Standard Concavity	
.10 mm	M32-010-08-16	–
.15 mm	M32-015-08-16	–
.20 mm	M32-020-08-16	–
.40 mm	M32-040-08-16	–
.60 mm	M32-060-08-16	MK32-060-08-16
1.00 mm	M32-100-08-16	MK32-100-08-16
1.20 mm	M32-120-08-16	MK32-120-08-16
1.60 mm	M32-160-08-16	MK32-160-08-16
2.00 mm	M32-200-08-16	MK32-200-08-16
2.50 mm	M32-250-08-16	MK32-250-08-16
3.00 mm	M32-300-08-16	MK32-300-08-16
4.00 mm	M32-400-08-16	MK32-400-08-16
5.00 mm	M32-500-08-16	MK32-500-08-16
6.00 mm	M32-600-08-16	MK32-600-08-16

Any Saw Thickness Available

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

Use if DOC is more than 5X saw thickness

36 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 16mm HUB Diameter
Saw Thickness	Standard Concavity	
.10 mm	M32-010-08-36	–
.15 mm	M32-015-08-36	–
.20 mm	M32-020-08-36	–
.40 mm	M32-040-08-36	–
.60 mm	M32-060-08-36	MK32-060-08-36
1.00 mm	M32-100-08-36	MK32-100-08-36
1.20 mm	M32-120-08-36	MK32-120-08-36
1.60 mm	M32-160-08-36	MK32-160-08-36
2.00 mm	M32-200-08-36	MK32-200-08-36
2.50 mm	M32-250-08-36	MK32-250-08-36
3.00 mm	M32-300-08-36	MK32-300-08-36
4.00 mm	M32-400-08-36	MK32-400-08-36
5.00 mm	M32-500-08-36	MK32-500-08-36
6.00 mm	M32-600-08-36	MK32-600-08-36

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

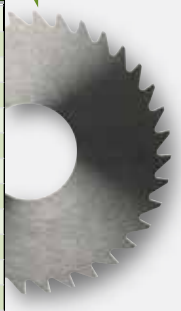
Use if DOC is more than 5X saw thickness

16 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 18mm HUB Diameter
Saw Thickness	Standard Concavity	
.10 mm	M40-010-10-16	–
.15 mm	M40-015-10-16	–
.20 mm	M40-020-10-16	–
.40 mm	M40-040-10-16	–
.60 mm	M40-060-10-16	MK40-060-10-16
1.00 mm	M40-100-10-16	MK40-100-10-16
1.20 mm	M40-120-10-16	MK40-120-10-16
1.60 mm	M40-160-10-16	MK40-160-10-16
2.00 mm	M40-200-10-16	MK40-200-10-16
2.50 mm	M40-250-10-16	MK40-250-10-16
3.00 mm	M40-300-10-16	MK40-300-10-16
4.00 mm	M40-400-10-16	MK40-400-10-16
5.00 mm	M40-500-10-16	MK40-500-10-16
6.00 mm	M40-600-10-16	MK40-600-10-16

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

Use if DOC is more than 5X saw thickness

36 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 18mm HUB Diameter
Saw Thickness	Standard Concavity	
.10 mm	M40-010-10-36	–
.15 mm	M40-015-10-36	–
.20 mm	M40-020-10-36	–
.40 mm	M40-040-10-36	–
.60 mm	M40-060-10-36	MK40-060-10-36
1.00 mm	M40-100-10-36	MK40-100-10-36
1.20 mm	M40-120-10-36	MK40-120-10-36
1.60 mm	M40-160-10-36	MK40-160-10-36
2.00 mm	M40-200-10-36	MK40-200-10-36
2.50 mm	M40-250-10-36	MK40-250-10-36
3.00 mm	M40-300-10-36	MK40-300-10-36
4.00 mm	M40-400-10-36	MK40-400-10-36
5.00 mm	M40-500-10-36	MK40-500-10-36
6.00 mm	M40-600-10-36	MK40-600-10-36



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

NEW Coatings Available! TiN TiCN AlTiN

JUST ASK! Any Thickness Available!

Solid Carbide SAWS

50 mm Diameter 13 mm Arbor

Proper Max Depth of Cut: MSA Arbor = 14.5 mm

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

Use if DOC is more than 5X saw thickness

24 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 20mm HUB Diameter
Saw Thickness	Standard Concavity	
.15 mm	M50-015-13-24	–
.20 mm	M50-020-13-24	–
.40 mm	M50-040-13-24	–
.60 mm	M50-060-13-24	MK50-060-13-24
1.00 mm	M50-100-13-24	MK50-100-13-24
1.20 mm	M50-120-13-24	MK50-120-13-24
1.60 mm	M50-160-13-24	MK50-160-13-24
2.00 mm	M50-200-13-24	MK50-200-13-24
2.50 mm	M50-250-13-24	MK50-250-13-24
3.00 mm	M50-300-13-24	MK50-300-13-24
4.00 mm	M50-400-13-24	MK50-400-13-24
5.00 mm	M50-500-13-24	MK50-500-13-24
6.00 mm	M50-600-13-24	MK50-600-13-24

Any Saw Thickness Available

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

Use if DOC is more than 5X saw thickness

48 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 20mm HUB Diameter
Saw Thickness	Standard Concavity	
.15 mm	M50-015-13-48	–
.20 mm	M50-020-13-48	–
.40 mm	M50-040-13-48	–
.60 mm	M50-060-13-48	MK50-060-13-48
1.00 mm	M50-100-13-48	MK50-100-13-48
1.20 mm	M50-120-13-48	MK50-120-13-48
1.60 mm	M50-160-13-48	MK50-160-13-48
2.00 mm	M50-200-13-48	MK50-200-13-48
2.50 mm	M50-250-13-48	MK50-250-13-48
3.00 mm	M50-300-13-48	MK50-300-13-48
4.00 mm	M50-400-13-48	MK50-400-13-48
5.00 mm	M50-500-13-48	MK50-500-13-48
6.00 mm	M50-600-13-48	MK50-600-13-48

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

63 mm Diameter 16 mm Arbor

Proper Max Depth of Cut: MSA Arbor = 18.5 mm

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

Use if DOC is more than 5X saw thickness

28 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 25mm HUB Diameter
Saw Thickness	Standard Concavity	
.15 mm	M63-015-16-28	–
.20 mm	M63-020-16-28	–
.40 mm	M63-040-16-28	–
.60 mm	M63-060-16-28	MK63-060-16-28
1.00 mm	M63-100-16-28	MK63-100-16-28
1.20 mm	M63-120-16-28	MK63-120-16-28
1.60 mm	M63-160-16-28	MK63-160-16-28
2.00 mm	M63-200-16-28	MK63-200-16-28
2.50 mm	M63-250-16-28	MK63-250-16-28
3.00 mm	M63-300-16-28	MK63-300-16-28
4.00 mm	M63-400-16-28	MK63-400-16-28
5.00 mm	M63-500-16-28	MK63-500-16-28
6.00 mm	M63-600-16-28	MK63-600-16-28

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

Use if DOC is more than 5X saw thickness

56 TEETH METRIC		Double Concavity Alternative Tooth Chamfer 25mm HUB Diameter
Saw Thickness	Standard Concavity	
.15 mm	M63-015-16-56	–
.20 mm	M63-020-16-56	–
.40 mm	M63-040-16-56	–
.60 mm	M63-060-16-56	MK63-060-16-56
1.00 mm	M63-100-16-56	MK63-100-16-56
1.20 mm	M63-120-16-56	MK63-120-16-56
1.60 mm	M63-160-16-56	MK63-160-16-56
2.00 mm	M63-200-16-56	MK63-200-16-56
2.50 mm	M63-250-16-56	MK63-250-16-56
3.00 mm	M63-300-16-56	MK63-300-16-56
4.00 mm	M63-400-16-56	MK63-400-16-56
5.00 mm	M63-500-16-56	MK63-500-16-56
6.00 mm	M63-600-16-56	MK63-600-16-56

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

Any Thickness Available! Just Ask!

SAWS Metric

80 mm Diameter 22 mm Arbor

Proper Max Depth of Cut:
MSA Arbor = 24.5 mm

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

30 TEETH METRIC

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 35mm HUB Diameter
.20 mm	M80-020-22-30	–
.40 mm	M80-040-22-30	–
.60 mm	M80-060-22-30	MK80-060-22-30
1.00 mm	M80-100-22-30	MK80-100-22-30
1.20 mm	M80-120-22-30	MK80-120-22-30
1.60 mm	M80-160-22-30	MK80-160-22-30
2.00 mm	M80-200-22-30	MK80-200-22-30
2.50 mm	M80-250-22-30	MK80-250-22-30
3.00 mm	M80-300-22-30	MK80-300-22-30
4.00 mm	M80-400-22-30	MK80-400-22-30
5.00 mm	M80-500-22-30	MK80-500-22-30
6.00 mm	M80-600-22-30	MK80-600-22-30

Use if DOC is more than 5X saw thickness

Any Saw Thickness Available

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

60 TEETH METRIC

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 35mm HUB Diameter
.20 mm	M80-020-22-60	–
.40 mm	M80-040-22-60	–
.60 mm	M80-060-22-60	MK80-060-22-60
1.00 mm	M80-100-22-60	MK80-100-22-60
1.20 mm	M80-120-22-60	MK80-120-22-60
1.60 mm	M80-160-22-60	MK80-160-22-60
2.00 mm	M80-200-22-60	MK80-200-22-60
2.50 mm	M80-250-22-60	MK80-250-22-60
3.00 mm	M80-300-22-60	MK80-300-22-60
4.00 mm	M80-400-22-60	MK80-400-22-60
5.00 mm	M80-500-22-60	MK80-500-22-60
6.00 mm	M80-600-22-60	MK80-600-22-60

Use if DOC is more than 5X saw thickness

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

100 mm Diameter 22 mm Arbor

Proper Max Depth of Cut:
MSA Arbor = 34.5 mm

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

36 TEETH METRIC

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 35mm HUB Diameter
.20 mm	M100-020-22-36	–
.40 mm	M100-040-22-36	–
.60 mm	M100-060-22-36	MK100-060-22-36
1.00 mm	M100-100-22-36	MK100-100-22-36
1.20 mm	M100-120-22-36	MK100-120-22-36
1.60 mm	M100-160-22-36	MK100-160-22-36
2.00 mm	M100-200-22-36	MK100-200-22-36
2.50 mm	M100-250-22-36	MK100-250-22-36
3.00 mm	M100-300-22-36	MK100-300-22-36
4.00 mm	M100-400-22-36	MK100-400-22-36
5.00 mm	M100-500-22-36	MK100-500-22-36
6.00 mm	M100-600-22-36	MK100-600-22-36

Use if DOC is more than 5X saw thickness

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

72 TEETH METRIC

Saw Thickness	Standard Concavity	Double Concavity Alternative Tooth Chamfer 35mm HUB Diameter
.20 mm	M100-020-22-72	–
.40 mm	M100-040-22-72	–
.60 mm	M100-060-22-72	MK100-060-22-72
1.00 mm	M100-100-22-72	MK100-100-22-72
1.20 mm	M100-120-22-72	MK100-120-22-72
1.60 mm	M100-160-22-72	MK100-160-22-72
2.00 mm	M100-200-22-72	MK100-200-22-72
2.50 mm	M100-250-22-72	MK100-250-22-72
3.00 mm	M100-300-22-72	MK100-300-22-72
4.00 mm	M100-400-22-72	MK100-400-22-72
5.00 mm	M100-500-22-72	MK100-500-22-72
6.00 mm	M100-600-22-72	MK100-600-22-72

Use if DOC is more than 5X saw thickness

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

NEW Coatings Available!

TiN TiCN AlTiN

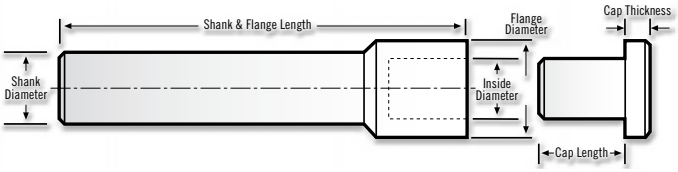
Any Saw Thickness Available!

AB Arbors

Arbor Size	Shank Diameter	Flange Diameter	Cap Length	Shank & Flange Length	Cap Thickness	Screw Size (Included)	Hex Key Size (Included)	Part Number
1/4"	1/2"	1/2"	3/8"	2-7/8"	3/16"	8-32×1" Flat head Socket head cap screw	3/32"	AB-250
3/8"	1/2"	5/8"	3/8"	2-7/8"	1/4"	10-32×1.5" Flat head Socket head cap screw	1/8"	AB-375
1/2"	1/2"	3/4"	1/2"	2-7/8"	1/4"	1/4-20×1.5" Socket head cap screw	5/32"	AB-500
5/8"	3/4"	1"	7/8"	4"	1/4"	1/4-20×2" Socket head cap screw	3/16"	AB-625
7/8"	3/4"	1-1/4"	1"	4"	1/4"	5/16-18×2.5" Socket head cap screw	1/4"	AB-875
1"	3/4"	1-1/2"	1"	4"	1/4"	5/16-18×2.5" Socket head cap screw	1/4"	AB-1000
1"	1"	1-1/2"	1"	5"	1/4"	5/16-18×2.5" Socket head cap screw	1/4"	AB-1000-1
1-1/4"	1"	1-3/4"	1-3/8"	5"	1/4"	1/2-13×3" Socket head cap screw	3/8"	AB-1250

MSA Arbors METRIC

Arbor Size	Shank Diameter	Flange Diameter	Cap Length	Shank & Flange Length	Cap Thickness	Screw Size (Included)	Hex Key Size (Included)	Part Number
5mm	12mm	12mm	10mm	75mm	4.5mm	M3×25 Flat head Socket head cap screw	2mm	MSA-05
8mm	12mm	16mm	10mm	75mm	6mm	M3×25 Flat head Socket head cap screw	2mm	MSA-08
10mm	12mm	18mm	10mm	75mm	6mm	M5×30 Flat head Socket head cap screw	3mm	MSA-10
13mm	12mm	20mm	10mm	75mm	6mm	M5×30 Flat head Socket head cap screw	3mm	MSA-13
16mm	16mm	25mm	22mm	100mm	6mm	M5×45 Flat head Socket head cap screw	4mm	MSA-16
22mm	20mm	35mm	22mm	100mm	6mm	M6×45 Flat head Socket head cap screw	5mm	MSA-22



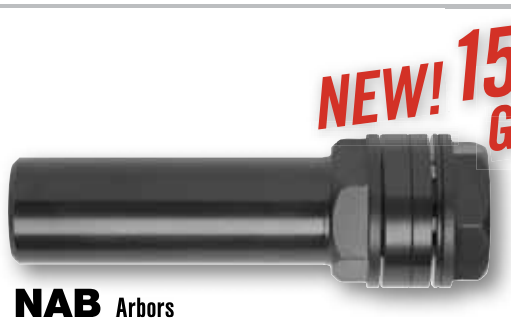
AB Arbor Tolerances
Inside Dia. = +.0001/+.0003"
Flange Dia. = ±.003"
Shank Dia. = –.0001/–.0003"
OAL = ±.060"
Cap Dia. = +.0000/–.0002"
Cap Length = +.060/–.000"
Cap Thickness = +.060/–.000"

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

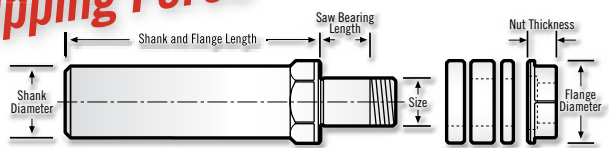
Inside Diameter concentric to Shank Diameter within .005mm

Notes:
Total thickness of saws/spacers should not exceed 50% of LOC dimension.

Arbor caps with longer Cap Length dimension available.



NEW! 15X Gripping Force



NAB Arbors

Arbor Size	Shank Diameter	Flange Diameter	Saw Bearing Length	Shank & Flange Length	Nut Thickness	Spacers Included	Part Number Without Keyway	Part Number With Keyway
.25"	.5"	0.57"	0.26"	2.2"	.250"	.0625" .125" .1875"	NAB-250	–
0.375"	.625"	0.71"	.375"	2.4"	.280"	.0625" .125" .1875"	NAB-375	–
.5"	.75"	0.855"	.5"	3.0"	.325"	.0625" .1875" .25"	NAB-500	–
.625"	.875"	1.075"	.5"	3.15"	.390"	.0625" .1875" .25"	–	NAB-625
.75"	1.0"	1.215"	.5"	3.4"	.440"	.0625" .1875" .25"	–	NAB-750
.875"	1.0"	1.434"	.5"	3.4"	.440"	.0625" .1875" .25"	–	NAB-875
1.0"	1.0"	1.48"	.5"	3.5"	.440"	.0625" .1875" .25"	–	NAB-1000
1.25"	1-1/4"	2"	.5"	3.5"	.440"	.0625" .1875" .25"	–	NAB-1250

SAWS Arbors & Flanges for Saws

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 heat treated and ground flat and parallel within plus or minus .00005".
All steel flanges have 1" arbor hole.
Steel flanges are custom ground as to diameter. Please specify exact diameter (see range).

Carbide spacers available.

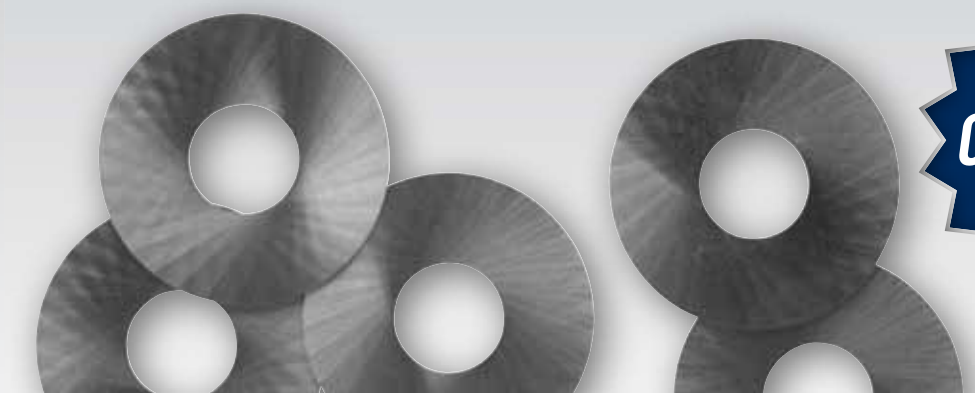
CAPS Standard Length Replacements

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	3/32"	CP-AB-250
AB-375	3/8"	10-32×1.5" Flat head Socket head cap screw	1/8"	CP-AB-375
AB-500	1/2"	1/4-20×1.5" Socket head cap screw	5/32"	CP-AB-500
AB-625	7/8"	1/4-20×2" Socket head cap screw	3/16"	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

NEW!

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	3/32"	XCP-AB-250
AB-375	7/8"	10-32×2" Flat head Socket head cap screw	1/8"	XCP-AB-375
AB-500	3/4"	1/4-20×1.75" Socket head cap screw	5/32"	XCP-AB-500
AB-625	1-3/4"	1/4-20×2.5" Socket head cap screw	3/16"	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!

Custom End Mills

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

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

Questions?

Delivery is NOW Faster Than Ever

Call us: at (916) 645-6045 or (800) 527-8883

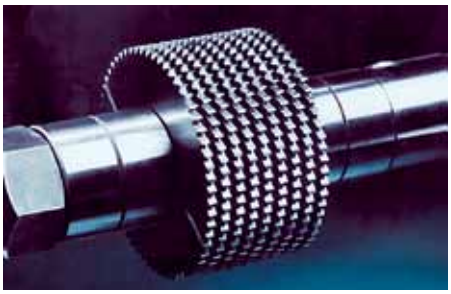
Fax us: at (916) 645-0146 or (916) 645-1668

Visit us: at www.robbjack.com

Email us: quotes@robbjack.com

SPECIAL SAWS TO MEET YOUR SPECIFIC NEEDS

In addition to the broad line of standard saws listed in this catalog, RobbJack is capable of manufacturing a wide variety of special saws. If our standard offerings do not meet your needs, call or fax your specifications to us for quotation. Contact us if you need:



- **Special Cutting Diameters**
- **Special Thicknesses**
- **Special Arbor Hole Sizes and Keyways**
- **Special Chamfers, Angles or Radii**
- **Special Tooth Configurations and Pitches**
- **Special Coatings Available.**
- **Gang Saws** – If your requirements call for the use of more than one saw at a time, contact us for a complete, ready-to-use package, including saws, arbors and spacers. We are experts in ganging saws, which generally requires flat and parallel hubs, made to our 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: _____

ROBBJACK CORPORATION

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Fax us: at (916) 645-0146 or (916) 645-1668

Visit us: at www.robbjack.com

Email us: quotes@robbjack.com

Terms & Conditions

Terms

1% Ten Days, Net 30 Days. Minimum Invoice, $25.00.

Shipping

F.O.B. Lincoln, California. All shipments via **2nd Day Air**, unless otherwise specified.

Claims

Goods are considered sold and our responsibility ceases when delivery is made to the transportation company. In the event of goods being lost in transit, we will make every effort on behalf of customers to have lost goods found or to have the transportation company make proper restitution for loss.

Damage claims must be made against carrier.

Specials

Orders for special tools, non-catalog or modified tools are accepted on a no-cancellation basis and tools are not returnable. A confirming purchase order is required before any work begins on special tools.

A 10% over or under shipment on a special is acceptable based on industry practices unless no overshipment is stated at time of quoting.

Return Policy

No merchandise may be returned without prior authorization from the factory. Credit will not be issued for merchandise returned without a return authorization number.

All merchandise returned for credit will be subject to a 15% restocking charge.

Errors

RobbJack Corporation can not be held responsible for incorrect parts made with our products due to mislabeling or defect. We assume all tools used by our customers are inspected before use and that first part inspections in customer's plant is the rule. We will replace or credit tools in those situations.

Prices

Prices subject to change without notice.

3300 Nicolaus Road
Lincoln, CA 95648
Toll Free: (800) 527-8883
Phone: (916) 645-6045
Fax: (916) 645-0146 *or* (916) 645-1668
www.robbjack.com

Canada Toll Free: (877) 527-8883
International Fax: (916) 645-1668