

DIAbide™

The Leader in CVD Diamond
Technology

PCD

Cartridges, Inserts &
Round Tools

SP3 DIAMOND CUTTING TOOLS

Ultra-Mill™

The "Ultimate" Milling Cutter

TFd™

Sheet Diamond that lasts
2x to 3x longer than PCD

THE DIAMOND SOLUTION SOURCE

cBN

Cartridges & Inserts



sp³ Cutting Tools Inc., located in Decatur, IN, manufactures and services a broad range of super-hard inserts, end mills, drills, cartridges, and cutter bodies for machining applications that demand the use of diamond. **sp³** tools are used to machine:

- Abrasive non-metallic materials such as graphite, green ceramics, ceramic matrix composites, filled plastics, and carbon fiber composites.
- Non-ferrous metals such as cast aluminums, metal matrix composites, copper, brass, and bronze.

sp³ Cutting Tools is the the only manufacturer of diamond cutting tools to offer the following three major types of diamond materials and cBN:

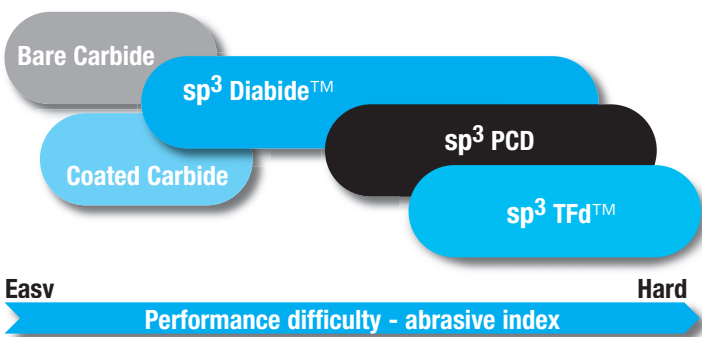
DIAbide™ Thin-film diamond,

or DIAbide – The Chemical Vapor Deposition or CVD coating of tungsten carbide enables **sp³** to provide diamond-coated carbide tools using our patented “DIAbide” process. The **sp³** DIAbide material has gained worldwide acceptance as the proven diamond tool solution for high-speed CNC machining applications using graphite and other non-ferrous materials. We offer a wide array of DIAbide tools, including end mills, profiling end mills, premium mold mills, drills, indexable inserts, profiling inserts, and grooving, cut-off and threading inserts.

Complete Diamond Tool Solutions

The world's leading supplier of diamond tooling

Soft, free-cutting non-ferrous metals. e.g. 6061 aluminum, brass, copper	Graphite, carbon, green ceramics, fiber-enforced plastics, fiberboard	Low-silicon aluminum. e.g. 380	High-silicon aluminum. e.g. 390	Metal Matrix Composites. e.g. Duraclan
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Ask your **sp³** representative how you can apply the best diamond alternative for your application.

TFd™

Thick-sheet diamond tools,

or TFd – **sp³** has extended CVD diamond technology to develop TFd, a free standing thick film pure diamond cutting tool. By manufacturing the thicker material and then segmenting the sheet, **sp³** has essentially created a pure diamond material that can be applied in much the same manner as PCD, offering a cutting surface of pure diamond with no binder. TFd indexable inserts provide a wear life 2 to 3 times that of PCD, and maintain edge sharpness longer. Absence of binder avoids chemical interaction with coolant or workpiece material and allows for a sharper edge.

PCD

Polycrystalline diamond tools,

or PCD tools are an alternative to tungsten carbide (uncoated and coated) tools and are designed to meet the needs of more demanding non-ferrous machining applications. PCD contains diamond particles and non-diamond metallic bonding materials. **sp³** offers PCD inserts, PCD brazed cartridges, screw-on inserted cartridges and round tools. We also design and manufacture custom tools and we have a comprehensive tool refurbishing service.

cBN

Cubic Boron Nitride tools

are used for machining a wide variety of ferrous materials. cBN provides increased productivity and cost savings over conventional carbide and ceramic tools. In many cases cBN tools make it possible to machine materials where conventional tools have failed.

cBN tools are typically most effective for alloy steels hardened to a minimum of 45 HRC. Although there are exceptions to this rule, it is important to note that if the material being machined does not meet the required hardness, the cBN tool life may be affected.

sp³ offers cBN inserts and indexable inserts that fit our Ultra-Mill line of milling cutters.

Material Application Codes (MAC)

sp³ offers diamond tools in several different Material Application Codes (MAC). For DIAbide product, these MACs are identified by a suffix on the part number, for example, 12085-7 or TPG-432-18. For DIAbide product higher numbered MACs represent thicker coatings and a more robust tool, however, the lower numbered MACs have a sharper edge.

DIAbide = MAC 3,5,7,8,18, & 20
 PCD = MAC 30
 TFd = MAC 40
 cBN = MAC 50

For less abrasive and less brittle materials, you may achieve a smoother surface finish with a lower MAC. sp³ recommends that you use the lowest MAC that is suitable for the material you are machining.

To select the correct MAC, find the application material in the chart below, then select the MAC from the column that corresponds to the operation you are performing.

Material Application Codes (MAC)

Material Type	Drilling	Endmilling		Sawing	Insert Milling	Turning	
		Roughing	Finishing			Roughing	Finishing
Graphite	5	5	3/5	14	18	18	18
Hard Carbon	7	7	5	14	18	18	18
Green Carbide	7	7	5	14	18	18	18
Green Ceramic	5	5	3	14	18	18	18
CMC (Ceramic Matrix Composite)	7	7	—	—	18	18	18
Concrete Materials	—	—	—	—	—	—	—
Plastic (Unfilled)	5	—	—	—	18	18	—
Filled Plastics	5/7	5/7	5	—	18	18	—
Thermoset Plastics	7	7	5	—	18	18	—
Carbon Fiber Composites	7/ 8	7/8	5/7/8	—	18	18	—
Glass Fiber Composites	7/8	7/8	5	—	20	20	—
Metal Clad Glass Fiber Composites	5	5	—	—	18	18	—
Aramid Fiber Composites	7/8	7/8	—	—	18	18	—
Kevlar Composites	8	8	—	—	—	—	—
Free Machining Aluminums	7/8	7/8	—	—	10	10	—
Low Silicon Aluminums (<12%)	7/8	7/8	—	—	18/30	18/30	—
High Silicon Aluminums (>12%)	7/8	7/8	—	—	20/30/40	20/30/40	—
MMC (Metal Matrix Composites)	7/8	7/8	7	—	20/30/40	20/30/40	—
Copper	5/7	7	—	—	—	—	—
Brass	5/7	7	—	—	—	—	—
Bronze	5/7	7	—	—	—	—	—
Nickel	—	—	—	—	—	—	—
Cast Iron	—	—	—	—	50	50	50
Steel	—	—	—	—	50	50	50
Cobalt	—	—	—	—	—	—	—
Chrome	—	—	—	—	—	—	—
Molybdenum	—	—	—	—	—	—	—
Tungsten	—	—	—	—	—	—	—
Titanium	—	—	—	—	—	—	—

Refer to the tool descriptions for available MACs.

If you have questions or need assistance in selecting the correct tool or MAC number for your application, please contact one of sp³'s experienced tool engineers at 888-547-4156.

DIAbide™ – A Proven Cutting Tool Material

The technology enabled by the **sp³** DIAbide process provides an entirely new type of cutting tool product offering. Unlike conventional PCD diamond composite products, DIAbide can be applied to the surfaces of endmills, drills, inserts, saws, and most other types of carbide fabricated tools. Producing these tools is an exacting

process conducted in high technology reactors over an extended period of time. **sp³** has refined the process to create useable CVD diamond tools for machining difficult, abrasive workpieces. The user of these tools should be aware of established tolerances and process options.

DIAbide™ Endmills Tolerances

	On the cutting diameter	On the shank	Runout	L.O.C.	O.A.L.
H6 Compatible Premium Moldmills	+0.000/-0.001 (+.000/-0.025 mm)	-0.0001/-0.0004 (-0.0025/-0.01 mm)	0.001 (0.025 mm)	+.060/-0.000 (+1.50/-0.00mm)	± .060 (±1.5mm)
Standard Endmills (MAC 3 & 5)	+0.000/-0.002 (+.000/-0.05 mm)	-0.0000/-0.0004 (-0.000/-0.01 mm)	0.001 (0.025 mm)	+.060/-0.000 (+1.50/-0.00mm)	± .060 (±1.5mm)
MAC 7 Endmills	+0.001/-0.001 (+.025/-0.025 mm)	-0.0000/-0.0010 (-0.000/-0.025 mm)	0.002 (0.05 mm)	+.060/-0.000 (+1.50/-0.00mm)	± .060 (±1.5mm)

- Any standard **sp³** MAC 3 or MAC 5 endmill can be ordered with the PREMIUM MOLDMILL tolerances.
- Tighter toleranced special tools can also be supplied. Contact **sp³**.

Features

Standard Endmills

- Three standard end styles are available: square end, with an end grind angle 1° to 3° concave, ball end and corner radius. All endmills are 30° spiral, right-hand, center cutting, and can be used for plunge cutting.

Endmill Options

- Corner Radii: Customer specifies radius
- Corner Chamfer: Customer specifies chamfer angle and width.
- Ball End: Gash style is standard. If elliptical gash is desired, the tool must be ordered as a special.
- Flat: For set screw. Standard Weldon flat is supplied unless customer specifies otherwise.
- Note-Brazed Assemblies: Steel shanks/brazed carbide blanks cannot be processed in CVD reactors.

12

DIAbide™ Drills Tolerances

	Diameter	L.O.C.	O.A.L.
MAC 3 & 5	+0.001/-0.00 (+0.025/-0.00mm)	+.060/-0.000 (+1.50/-0.00mm)	± .060 (±1.5mm)
MAC 7	+0.0025/-0.0000 (+0.065/-0.00 mm)	+.060/-0.000 (+1.50/0.00mm)	± .060 (±1.5mm)

Standard Drills

- **sp³** drills are industry-standard 2-flute spiral drills. End style is a 118° four-facet point. All drills over .042 diameter furnished with back taper for clearance.

Features

- Special drill sizes and forms are available on a special order basis.

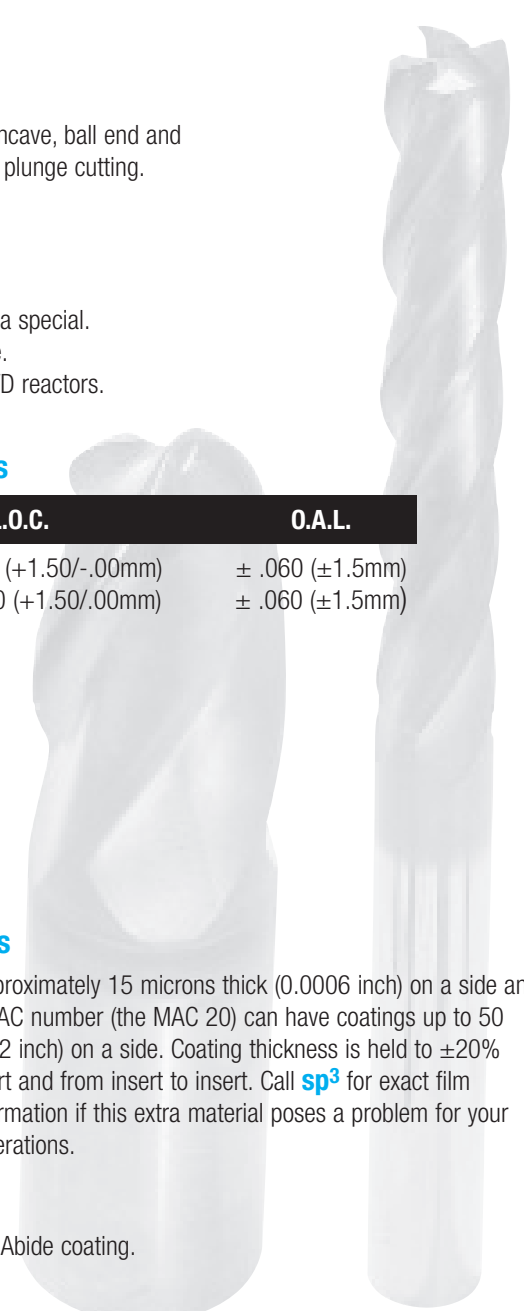
DIAbide™ Insert Tolerances

• DIAbide inserts are either purchased from traditional insert manufacturers or ground to **sp³** specifications. The industry standard ISO and ANSI tolerance protocols are followed. As per ISO and ANSI conventions, insert size and tolerance are established before any coatings are applied. The thickness of the diamond coating will vary as a function of the MAC number. The lowest MAC numbers such as MAC 10

have films approximately 15 microns thick (0.0006 inch) on a side and the highest MAC number (the MAC 20) can have coatings up to 50 microns (0.002 inch) on a side. Coating thickness is held to ±20% within an insert and from insert to insert. Call **sp³** for exact film thickness information if this extra material poses a problem for your machining operations.

Options

- Special inserts, including grooving, cut-off, and threading inserts can be provided with DIAbide coating.



DIAbide™ – GP End Mills

There has never been an offering of diamond end mills as extensive as that offered by **sp³**. We offer more than 300 styles, including a wide range of diameters, standard and extended flute lengths, with 2 and 4 flutes. Our standard offering includes square end tools with an end

grind angle 1° to 3° concave, as well as end mills with a corner radius and a ball nose variety. All end mills are 30° spiral, righthand, center cutting. Small diameter end mills are new. **sp³** will also grind custom end mills per customer specifications and apply DIAbide.

DIAbide End Mills - Standard Sizes

Diameter (inches)		Part Number				AVAILABILITY MAC		
Cutting	Shank	LOC (inches)	OAL (inches)	Number of Flutes	Square	Ball Nose	5	7
.010	1/8	.030	1-1/2	2	12205-		◆	2
		.030	1-1/2	2		12206-	◆	2
1/64	1/8	3/64	1-1/2	2	12120-		◆	2
		3/64	1-1/2	4	12121-		◆	◆
		3/64	1-1/2	2		12122-		◆
1/32	1/8	3/32	1-1/2	2	12102-		2	2
		3/32	1-1/2	2		12104-	2	2
		3/32	1-1/2	4	12103-		◆	2
		3/32	1-1/2	4		12105-	◆	2
3/64	1/8	3/16	1-1/2	2	12106-		2	2
		3/16	1-1/2	2		12108-	2	2
		3/16	1-1/2	4	12107-		◆	2
		3/16	1-1/2	4		12109-	◆	2
1/16	1/8	1/4	1-1/2	2	12091-		2	2
		1/4	1-1/2	2		12093-	2	2
		1/4	1-1/2	4	12092-		◆	2
		1/4	1-1/2	4		12094-	◆	2
5/64	1/8	1/4	1-1/2	2	12110-		◆	2
		1/4	1-1/2	2		12112-	2	2
		1/4	1-1/2	4	12111-		◆	2
		1/4	1-1/2	4		12113-	2	2
3/32	1/8	3/8	1-1/2	2	12118-		◆	2
		3/8	1-1/2	2		12119-	◆	2
		3/8	1-1/2	4	12039-		◆	2
		3/8	1-1/2	4		12048-	◆	2
1/8	1/8	1/2	1-1/2	2	12001-		◆	2
		1/2	1-1/2	2		12020-	◆	2
		1/2	1-1/2	4	12002-		◆	2
		1/2	1-1/2	4		12021-	◆	2
		1	3	4	12040-		◆	2
		1	3	4		12049-	◆	2
		1	4	4		12360-	2	2
3/16	3/16	5/8	2	2	12004-		2	2
		5/8	2	2		12023-	2	2
		5/8	2	4	12005-		◆	2
		5/8	2	4		12024-	◆	2
		1	4	4	12041-		◆	2
		1	4	4		12050-	◆	2

◆ = Stock Item # = Lead Time in Weeks

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number. For more information, refer to the MAC application chart on page 4. MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.

DIAbide® GP End Mills - Standard Sizes continued

Diameter (inches)					Part Number		Availability MAC	
Cutting	Shank	LOC (inches)	OAL (inches)	Number of Flutes	Square	Ball Nose	5	7
1/4	1/4	3/4	2-1/2	2	12007-		2	2
		3/4	2-1/2	2		12026-	2	2
		3/4	2-1/2	4	12008-		◆	◆
		3/4	2-1/2	4		12027-	◆	◆
		1-1/2	4	4	12042-		◆	2
		1-1/2	4	4		12051-	◆	2
		1-1/2	6	4	12043-		◆	2
		1-1/2	6	4		12052-	◆	2
5/16	5/16	7/8	2-1/2	2	12010-		2	2
		7/8	2-1/2	2		12029-	2	2
		7/8	2-1/2	4	12011-		2	◆
		7/8	2-1/2	4		12030-	2	2
		1.312	3	4	12369-		2	2
		1-1/2	4	4	12044-		◆	2
		1-1/2	4	4		12053-	◆	2
		1-1/2	6	4	12370-		2	2
3/8	3/8	1	2-1/2	2	12013-		2	◆
		1	2-1/2	2		12032-	2	2
		1	2-1/2	4	12014-		◆	◆
		1	2-1/2	4		12033-	◆	2
		1-1/2	4	4	12045-		◆	◆
		1-1/2	4	4		12054-	◆	2
		1-1/2	6	4	12046-		2	2
		1-1/2	6	4		12055-	◆	2
1/2	1/2	1.312	3	4	12374-		2	◆
		1	3	2	12016-		2	2
		1	3	2		12035-	2	2
		1	3	4	12017-		◆	◆
		1	3	4		12036-	◆	2
		2	4	4	12047-		◆	◆
		2	4	4		12056-	◆	2
		3	6	4	12019-		◆	2
3/4	3/4	3	6	4		12038-	◆	2
		1-1/2	4	4	12198-		◆	2-3
1	1	1-1/2	4	4		12200-	◆	2-3
		1-1/2	4	4	12199-		◆	2-3
		1-1/2	4	4		12201-	2-3	2-3

14

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number. For more information, refer to the MAC application chart on page 4. MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.

DIAbide® - Shortys, Standard Sizes

Diameter (inches)					Part Number		Availability MAC
Cutting	Shank	LOC (inches)	OAL (inches)	Number of Flutes	Square	5	
3/64	1/8	3/64	1-1/2	2	12822-		2-3
		3/64	1-1/2	4	12823-		2-3
3/32	1/8	1/8	1-1/2	2	12825-		2-3
		1/8	1-1/2	4	12826-		2-3
1/8	1/8	1/8	1-1/2	2	12827-		2-3

◆ = Stock Item # = Lead Time in Weeks

DIAbide™ GP End Mills

DIAbide™ End Mills - Metric Sizes

Diameter (mm)					Part Number		Availability	
Cutting	Shank	LOC (mm)	OAL (mm)	Number of Flutes	Square	Ball Nose	MAC	
							5	7
0.5	3	1.5	38	4	12203-		◆	2
		1.5	38	4		12204-	◆	2
1	3	4	38	2	12114-		2	2
		4	38	2		12116-	2	2
		4	38	4	12115-		2	2
		4	38	4		12117-	◆	2
2	3	10	40	4	12057-		2	2
		10	40	4		12074-	◆	2
		10	65	4	12058-		◆	2
		10	65	4		12075-	◆	2
3	3	15	40	4	12059-		◆	2
		15	40	4		12076-	◆	2
		25	75	4	12060-		◆	2
		25	75	4		12077-	◆	2
4	4	15	50	4	12061-		2	2
		15	50	4		12078-	◆	2
		25	75	4	12062-		◆	2
		25	75	4		12079-	◆	2
6	6	20	60	4	12063-		2	2
		20	60	4		12080-	2	2
		40	100	4	12064-		◆	2
		40	100	4		12081-	◆	2
		40	150	4	12065-		2	2
		40	150	4		12082-	2	2
8	8	20	65	4	12066-		2	2
		20	65	4		12083-	◆	2
		40	100	4	12067-		◆	2
		40	100	4		12084-	◆	2
10	10	26	65	4	12068-		2	2
		26	65	4		12085-	◆	2
		40	100	4	12069-		◆	2
		40	100	4		12086-	◆	2
		40	150	4	12070-		2	2
		40	150	4		12087-	2	2
12	12	30	75	4	12071-		2	2
		30	75	4		12088-	◆	2
		50	100	4	12072-		◆	2
		50	100	4		12089-	◆	2
		75	150	4	12073-		◆	2
		75	150	4		12090-	2	2

DIAbide™ - Shortys, Metric Sizes

Diameter (mm)					Part Number		Availability	
Cutting	Shank	LOC (mm)	OAL (mm)	Number of Flutes	Square	Ball	MAC	
							5	
1.0	3	1.5	38	2	12820-		2-3	
		1.5	38	4	12821-		2-3	
2.0	3	3	38	4	12824-		2-3	
3.0	3	3	38	4		12328-	◆	

◆ = Stock Item

= Lead Time in Weeks

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number. For more information, refer to the MAC application chart on page 4. MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.

DIAbide™ GP End Mills

DIAbide Square-End End Mills with Corner Radii, Standard Sizes

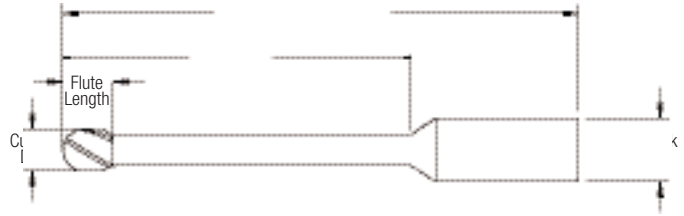
Diameter (inches)							Availability
Cutting	Shank	LOC (inches)	OAL (inches)	Corner Radius (inches)	Number of Flutes	Radius End Part Number	MAC
1/16	1/8	1/4	1-1/2	.010	4	12351-	2
		1/4	1-1/2	.015	4	12123-	2
		1/4	1-1/2	.020	4	12352-	2
3/32	1/8	3/8	1-1/2	.010	4	12353-	2
		3/8	1-1/2	.015	4	12354-	2
		3/8	1-1/2	.020	4	12355-	2
		3/8	1-1/2	.030	4	12356-	2
1/8	1/8	1/2	1-1/2	.010	4	12357-	2
		1/2	1-1/2	.015	4	12095-	◆
		1/2	1-1/2	.020	4	12358-	◆
		1/2	1-1/2	.030	4	12359-	2
		1	3	.015	4	12096-	◆
		1	3	.030	4	12124-	◆
3/16	3/16	5/8	2	.015	4	12361-	◆
		5/8	2	.020	4	12362-	◆
		5/8	2	.030	4	12363-	◆
1/4	1/4	3/4	2-1/2	.010	4	12364-	2
		3/4	2-1/2	.015	4	12097-	◆
		3/4	2-1/2	.020	4	12365-	2
		3/4	2-1/2	.030	4	12125-	◆
		3/4	2-1/2	.062	4	12366-	2
		1-1/2	4	.015	4	12098-	◆
		1-1/2	4	.030	4	12099-	◆
		1-1/2	4	.062	4	12367-	2
5/16	5/16	13/16	2-1/2	.030	4	12368-	◆
3/8	3/8	1	2-1/2	.020	4	12372-	2
		1	2-1/2	.030	4	12373-	◆
1/2	1/2	1	3	.015	4	12126-	◆
		1	3	.030	4	12375-	◆
		1	3	.062	4	12376-	2
		1	3	.125	4	12377-	2
		1-1/2	4	.015	4	12378-	◆
		1-1/2	4	.030	4	12379-	◆
		3	6	.015	4	12100-	◆
		3	6	.030	4	12101-	◆

◆ = Stock Item # = Lead Time in Weeks

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number. For more information, refer to the MAC application chart on page 4. MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.

DIAbide™ Profiling End Mills

Specially configured for your profiling and contouring needs, these end mills are the most cost-effective tools available for machining graphite electrodes and profiling composite materials. Today's graphite machining centers employ powerful computers to achieve extremely precise dimensional control making it possible to produce very complex EDM electrodes quickly and accurately.



DIAbide™ Profiling End Mills - Standard Sizes

Diameter (inches)								Part Number			Availability
Cutting	Shank	LOC (inches)	OAL (inches)	Reach (inches)	Corner Radius (inches)	Number of Flutes	Square	Corner Radius	Ball Nose	5	
1/64	1/8	.023	2 1/2	.125		2	12388-			◆	
		.023	2 1/2	.125		2			12389-	◆	
1/64	1/8	3/64	1 1/2	.125		2	12338-			◆	
		1/64	1 1/2	.125		2			12339-	◆	
1/32	1/8	3/64	2 1/2	.125		4	12390-			◆	
		3/64	2 1/2	.125		4			12391-	◆	
		3/64	2 1/2	.500	.010	4		12566-		◆	
1/32	1/8	3/32	1 1/2	.300		4	12340-			◆	
		1/32	1 1/2	.300		4			12341-	◆	
3/64	1/8	3/64	2 1/2	.625	.010	4		12567-		◆	
1/16	1/8	3/32	2 1/2	.50		4	12392-			◆	
		3/32	2 1/2	.50		4			12393-	◆	
		3/32	2 1/2	.625	.010	4		12568-		◆	
1/16	1/8	1/16	3	.75		4	12850-			◆	
		1/16	3	.75		4			12810-	◆	
5/64	1/8	5/64	2 1/2	.625	.010	4		12569-		◆	
3/32	1/8	9/64	2 1/2	.50		4	12394-			◆	
		9/64	2 1/2	.50		4			12395-	◆	
		9/64	2 1/2	1.00	.010	4		12570-		◆	
3/32	1/8	3/32	3	.75		4	12851-			◆	
		3/32	3	.75		4			12811-	◆	
1/8	1/8	3/16	2 1/2	1.00		4	12396-			◆	
		3/16	2 1/2	1.00		4			12397-	◆	
		3/16	2 1/2	0.80	.020	4		12571-		◆	
		3/16	2 1/2	0.80	.015	4		12572-		◆	
1/8	1/8	1/8	4	1.00		4		12342-		◆	

◆ = Stock Item # = Lead Time in Weeks

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number. For more information, refer to the MAC application chart on page 4. MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.

DIAbide™ Profiling End Mills

DIAbide Profiling End Mills - Standard Sizes (Continued)

Diameter (inches)		Part Number									Availability
Cutting	Shank	LOC (inches)	OAL (inches)	Reach (inches)	Corner Radius (inches)	Number of Flutes	Square	Corner Radius	Ball Nose	5	MAC
1/8	1/8	1/8	3	1.50		4	12852-				◆
		1/8	3	1.50	.015	4		12853-			2
		1/8	3	1.50		4			12812-		◆
		1/8	4	1.00		4	12854-				2
		1/8	4	1.00	.015	4		12855-			2
3/16	3/16	3/16	3	1.00		4	12398-				◆
		3/16	3	1.00		4			12399-		◆
		3/16	3	1.50	.020	4		12573-			◆
		3/16	4	1.87		4			12490-		◆
		3/16	4	1.87		4			12816-		◆
1/4	1/4	1/4	4	1.00		4	12491-				◆
		1/4	4	1.00		4			12492-		◆
1/4	1/4	1/4	4	2.00		4	12856-				◆
		1/4	4	2.00	.015	4		12857-			2
		1/4	4	2.00	.030	4		12574-			◆
		1/4	4	2.00	.062	4		12858-			2
		1/4	4	2.00		4			12813-		◆
5/16	5/16	5/16	4	2.00		4			12815-	2	
3/8	3/8	3/8	4	2.00		4	12859-				◆
		3/8	4	2.00	.015	4		12860-			◆
		3/8	4	2.00	.020	4		12576-			◆
		3/8	4	2.00		4			12814-		2
1/2	1/2	1/2	4	2.00		4	12861-				2
		1/2	4	2.00	.015	4		12862-			2
		1/2	4	2.00		4			12818-		2

◆ = Stock Item # = Lead Time in Weeks

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number. For more information, refer to the MAC application chart on page 4. MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.



DIAbide™ Profiling End Mills

DIAbide Profiling End Mills - Metric Sizes

Diameter (mm)		Part Number							Availability	
Cutting	Shank	LOC (mm)	OAL (mm)	Reach (mm)	Corner Radius (mm)	Number of Flutes	Square	Corner Radius	Ball Nose	MAC
3	3	3	75	20		4	12470-			2
		3	75	20	0.2	4		12471-		◆
		3	75	20		4			12472-	◆
6	6	6	100	38		4	12473-			2
		6	100	38	0.5	4		12474-		◆
		6	100	38		4			12475-	◆
8	8	8	100	50		4	12476-			2
		8	100	50	0.5	4		12477-		◆
		8	100	50		4			12478-	◆
10	10	10	100	50		4	12479			2
		10	100	50	0.5	4		12480-		◆
		10	100	50		4			12471-	◆
12	12	12	100	50		4	12482-			2
		12	100	50	0.5	4		12483-		◆
		12	100	50		4			12484-	◆

◆ = Stock Item # = Lead Time in Weeks

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number. For more information, refer to the MAC application chart on page 4. MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.

DIAbide™ Profiling Inserts

Profiling Inserts - U.S. Sizes

Insertable cutters are designed for critical blending of complex contours and shapes. **sp³** offers DIAbide **DAPRA** inserts in three 2-flute styles: ball nose, flat bottom and back draft. Sizes available range from 5/16-inch to 1-inch. **Millstar** inserts are also available as stock items. Contact **sp³**.



Diameter (inches)	Ball Nose Part Number	Flat Bottom Part Number	Back Draft Part Number	Availability
				MAC 5
5/16	BNR 0312 N	NA	NA	2
3/8	BNR 0375 N	NA	BDR 0375 N	◆
1/2	BNR 0500 N	FBR 0500 N	BDR 0500 N	◆
5/8	BNR 0625 N	FBR 0625 N	BDR 0625 N	◆
3/4	BNR 0750 N	FBR 0750 N	BDR 0750 N	◆
1	BNR 1000 N	FBR 1000 N	BDR 1000 N	◆

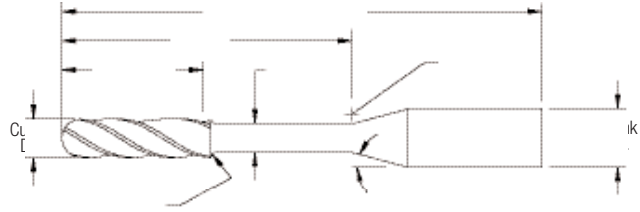
◆ = Stock Item # = Lead Time in Weeks

*Standard corner radius is 1/16". Alternate radius of 1/32" may be specified at time of order

PCD tipped **DAPRA** and **Millstar** inserts are also available. Contact **sp³** for pricing and availability.

DIAbide™ Premium Mold Mills

New to the **sp³** moldmaking line are Premium Mold Mills. These tools feature extended shanks for deeper cavity reach along with tighter tool tolerances. With the DIAbide premium CVD coating, the close tolerances, and additional tool reach, moldmakers can expect the best production results in more applications from these mold mills.



DIAbide Premium Mold Mills - Standard Sizes

Diameter (inches)				Part Number					Availability
Cutting	Shank	LOC (inches)	OAL (inches)	Corner Radius (inches)	Number of Flutes	Square	Corner Radius (inches)	Ball Nose	MAC 5
1/64	1/8	3/64	1-1/2		4	12157-			◆
	1/8	3/64	1-1/2		4			12179-	◆
1/32	1/8	3/32	1-1/2		4	12158-			◆
	1/8	1/4	3		4	12159-			◆
	1/8	3/32	1-1/2		4			12180-	◆
	1/8	1/4	3		4			12181-	◆
	1/8	1/4	1-1/2		4	12160-			◆
1/16	1/8	1/2	3		4	12161-			◆
	1/8	1/4	1-1/2	.015	4		12174-		◆
	1/8	1/4	1-1/2		4			12182-	◆
	1/8	1/2	3		4			12183-	◆
	1/8	1/4	1-1/2		4	12162-			◆
3/32	1/8	1/2	3		4	12163-			◆
	1/8	3/8	1-1/2		4			12184-	◆
	1/8	1/2	3		4			12185-	◆
	1/8	1/2	1-1/2		4	12164-			◆
1/8	1/8	1	3		4	12165-			◆
	1/8	1	3	.015	4		12175-		◆
	1/8	1	3	.030	4		12176-		◆
	1/8	1/2	1-1/2		4			12186-	◆
	1/8	1	3		4			12187-	◆
	1/8	1	3		4	12166-			◆
3/16	3/16	5/8	2		4	12167-			◆
	3/16	1	4		4			12188-	◆
	3/16	5/8	2		4			12189-	◆
	3/16	1	4		4				◆
1/4	1/4	3/4	2-1/2		4	12168-			◆
	1/4	1-1/2	4		4	12169-			◆
	1/4	1-1/2	4	.015	4		12177-		◆
	1/4	1-1/2	4	.030	4		12178-		◆
	1/4	3/4	2-1/2		4			12190-	◆
	1/4	1-1/2	4		4			12191-	◆
3/8	3/8	1	2-1/2		4	12170-			◆
	3/8	1-1/2	4		4	12171-			◆
	3/8	1	2-1/2		4			12192-	◆
	3/8	1-1/2	4		4			12193-	◆
1/2	1/2	1	3		4	12172-			◆
	1/2	2	4		4	12173-			◆
	1/2	1	3		4			12194-	◆
	1/2	2	4		4			12195-	◆

◆ = Stock Item # = Lead Time in Weeks

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number. For more information, refer to the MAC application chart on page 4. MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.

DIAbide™ Premium Mold Mills

DIAbide™ Premium Mold Mills - Long Reach, Standard Sizes

Diameter (inches)								Part Number		Availability	
Cutting	Shank	LOC (inches)	OAL (inches)	Reach (inches)	Corner Radius (inches)	Number of Flutes	Square	Corner Radius (inches)	Ball Nose	MAC 5	
1/64	1/8	3/64	1-1/2	.13		2	12156-			◆	
		3/64	1-1/2	.13		2			12138-	◆	
1/32	1/8	3/32	3	.31		4	12127-			◆	
		3/32	3	.31		4			12139-	◆	
3/64	1/8	3/16	3	.47		4	12128-			◆	
		3/16	3	.47		4			12140-	◆	
1/16	1/8	1/4	3	.63		4	12129-			◆	
		1/4	3	.63	.010	4		12150		◆	
		1/4	3	.63		4			12141-	◆	
3/32	1/8	3/8	3	1.00		4	12130-			◆	
		3/8	3	1.00	.015	4		12151-		◆	
		3/8	3	1.00		4			12142-	◆	
1/8	1/8	3/4	3	1.25		4	12131-			◆	
		3/4	3	1.50		4	12132-			◆	
		3/4	3	1.50	.015	4		12152-		◆	
		3/4	3	1.50	.030	4		12153-		◆	
		1	3	1.50		4			12143-	◆	
3/16	3/16	1	4	1.88		4	12133-			◆	
		1	4	1.88		4			12145-	◆	
1/4	1/4	1 1/2	4	2.00		4	12134-			◆	
		1 1/2	4	2.00	.015	4		12154-		◆	
		1 1/2	4	2.00	.030	4		12155-		◆	
		1 1/2	4	2.00		4			12146-	◆	

DIAbide™ Premium Mold Mills - Long Reach, Metric Sizes

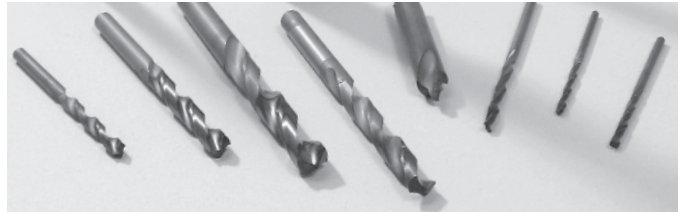
Diameter (mm)								Part Number		Availability	
Cutting	Shank	LOC (mm)	OAL (mm)	Reach (mm)	Number of Flutes	Square	Ball Nose	MAC 5			
1	3	4	75	10	4	12135-				◆	
		4	75	10	4			12147-		◆	
2	3	10	75	20	4	12136-				2	
		10	75	20	4			12148-		◆	
3	3	15	75	30	4	12137-				◆	
		15	75	30	4			12149-		◆	

◆ = Stock Item # = Lead Time in Weeks

MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.

DIAbide™ Drills

sp³ is the first to apply diamond as a cutting material for spiral fluted drills. Diamond coverage begins approximately one drill diameter from the tip. We offer the largest inventory of industrial-standard 2-flute spiral drills with 118° four facet points. Spotting and center drills are stocked. Custom drills are available by special order.



DIAbide™ Drills - U.S. Fractional & Wire Sizes

22

Part Number	Size	Decimal Equiv.	LOC (inches)	OAL (inches)	Availability	
					MAC 5	MAC 7
13100-	70	0.028	5/16	1-1/4	2	2
13101-	69	0.0292	5/16	1-1/4	2	2
13102-	68	0.031	5/16	1-1/4	◆	2
13103-	1/32	0.0312	5/16	1-1/4	◆	2
13104-	67	0.032	5/16	1-1/4	◆	2
13105-	66	0.033	5/16	1-1/4	◆	2
13106-	65	0.035	5/8	1-1/2	◆	2
13107-	64	0.0366	5/8	1-1/2	◆	2
13108-	63	0.037	5/8	1-1/2	◆	2
13109-	62	0.038	5/8	1-1/2	◆	2
13110-	61	0.039	5/8	1-1/2	2	2
13112-	60	0.04	3/4	1-1/2	2	2
13113-	59	0.041	3/4	1-1/2	◆	2
13114-	58	0.042	3/4	1-1/2	◆	2
13115-	57	0.043	3/4	1-1/2	◆	2
13116-	56	0.0465	3/4	1-1/2	2	2
13117-	3/64	0.0469	3/4	1-1/2	◆	2
13118-	55	0.052	3/4	1-1/2	◆	2
13119-	54	0.055	3/4	1-1/2	◆	2
13121-	53	0.0595	3/4	1-1/2	◆	2
13122-	1/16	0.0625	3/4	1-1/2	◆	◆
13123-	52	0.0635	3/4	1-1/2	2	◆
13124-	51	0.067	3/4	1-1/2	◆	2
13125-	50	0.07	7/8	1-3/4	2	◆
13126-	49	0.073	7/8	1-3/4	◆	◆
13127-	48	0.076	7/8	1-3/4	◆	2
13128-	5/64	0.0781	7/8	1-3/4	◆	2
13129-	47	0.0785	7/8	1-3/4	2	2
13131-	46	0.081	7/8	1-3/4	◆	2
13132-	45	0.082	7/8	1-3/4	2	2
13133-	44	0.086	1	2	2	2
13134-	43	0.089	1	2	2	2

Part Number	Size	Decimal Equiv.	LOC (inches)	OAL (inches)	Availability	
					MAC 5	MAC 7
13135-	42	0.0935	1	2	2	2
13136-	3/32	0.0938	1	2	◆	2
13137-	41	0.096	1	2	2	2
13138-	40	0.098	1	2	2	2
13140-	39	0.0995	1-1/4	2-1/4	◆	2
13141-	38	0.1015	1-1/4	2-1/4	2	2
13149-	37	0.104	1-1/4	2-1/4	◆	2
13150-	36	0.1065	1-1/4	2-1/4	2	2
13142-	7/64	1.1094	1-1/4	2-1/4	2	2
13143-	35	0.11	1-1/4	2-1/4	◆	2
13144-	34	0.111	1-1/4	2-1/4	2	2
13145-	33	0.113	1-1/4	2-1/4	2	◆
13146-	32	0.116	1-1/4	2-1/4	◆	◆
13148-	31	0.12	1-1/4	2-1/4	2	2
13001-	1/8	0.125	1-1/4	2-1/4	◆	2
13002-	30	0.1285	1-3/8	2-1/2	◆	◆
13003-	29	0.136	1-3/8	2-1/2	◆	◆
13005-	28	0.1405	1-3/8	2-1/2	◆	2
13006-	9/64	0.1046	1-3/8	2-1/2	◆	2
13007-	27	0.144	1-3/8	2-1/2	◆	◆
13008-	26	0.147	1-3/8	2-1/2	2	◆
13009-	25	0.1495	1-3/8	2-1/2	◆	◆
13010-	24	0.152	1-3/8	2-1/2	2	2
13011-	23	0.154	1-3/8	2-1/2	◆	2
13012-	5/32	0.1562	1-3/8	2-1/2	◆	2
13013-	22	0.157	1-3/8	2-1/2	2	2
13015-	21	1.159	1-3/8	2-1/2	2	2
13016-	20	0.161	1-3/8	2-1/2	◆	2
13017-	19	0.166	1-5/8	2-3/4	◆	2
13018-	18	0.1695	1-5/8	2-3/4	2	2
13019-	11/64	0.1719	1-5/8	2-3/4	2	2
13020-	17	0.173	1-5/8	2-3/4	◆	2

◆ = Stock Item # = Lead Time in Weeks

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number. For more information, refer to the MAC application chart on page 4. MAC 1 DLC (Diamond Like Coating) is available on all standard end mills; allow for one to two week lead time.

Drilling graphite parts - Another sp³ Success Story

A graphite manufacturer uses sp³ CVD diamond drills on various graphite parts. In one application, .250" diameter drills are used at 3500 rpm (230 sfm), feed .015 ipr, and DOC .280". Air coolant is used. With the sp³ tool 30,000 holes are obtained vs. 100 for uncoated micrograin carbide. The sp³ drill lasts through 45 shifts vs. 1 shift for the uncoated carbide. The cost per part is \$.004 for the sp³ drill vs. \$.27 for the carbide.

DIAbide® Drills - U.S. Fractional & Wire Sizes

Part Number	Size	Decimal Equiv.	LOC (inches)	OAL (inches)	Availability	
					MAC 5	MAC 7
13021-	16	0.177	1-5/8	2-3/4	◆	2
13023-	15	0.18	1-5/8	2-3/4	◆	2
13024-	14	0.182	1-5/8	2-3/4	◆	◆
13025-	13	0.185	1-5/8	2-3/4	◆	2
13026-	3/16	0.1875	1-5/8	2-3/4	◆	◆
13027-	12	0.189	1-5/8	2-3/4	◆	◆
13028-	11	0.191	1-5/8	2-3/4	2	2
13029-	10	0.1935	1-5/8	2-3/4	2	2
13030-	9	0.196	1-3/4	3	◆	2
13032-	8	0.199	1-3/4	3	◆	◆
13033-	7	0.201	1-3/4	3	◆	2
13034-	13/64	0.2031	1-3/4	3	◆	◆
13035-	6	0.204	1-3/4	3	◆	2
13036-	5	0.2055	1-3/4	3	◆	2
13037-	4	0.209	1-3/4	3	2	2
13038-	3	0.213	1-3/4	3	2	2
13040-	7/32	0.2188	1-3/4	3	◆	◆
13041-	2	0.221	1-3/4	3	◆	◆
13042-	1	0.228	1-3/4	3	◆	◆
13043-	A	0.234	2	3-1/4	2	◆
13044-	15/64	0.2344	2	3-1/4	2	2
13046-	B	0.238	2	3-1/4	2	2
13047-	C	0.242	2	3-1/4	2	2
13048-	D	0.246	2	3-1/4	◆	◆
13049-	1/4	0.25	2	3-1/4	◆	◆
13051-	F	0.257	2	3-1/4	2	2
13052-	G	0.261	2-1/8	3-1/2	◆	2
13053-	17/64	0.2656	2-1/8	3-1/2	◆	2
13054-	H	0.266	2-1/8	3-1/2	2	2
13055-	I	0.272	2-1/8	3-1/2	◆	2
13057-	J	0.277	2-1/8	3-1/2	2	2
13058-	K	0.281	2-1/8	3-1/2	◆	2

Part Number	Size	Decimal Equiv.	LOC (inches)	OAL (inches)	Availability	
					MAC 5	MAC 7
13059-	9/32	0.2812	2-1/8	3-1/2	◆	2
13060-	L	0.29	2-1/8	3-1/2	◆	2
13061-	M	0.295	2-3/8	4	◆	2
13063-	19/64	0.2969	2-3/8	4	◆	◆
13064-	N	0.302	2-3/8	4	◆	2
13065-	5/16	0.3125	2-3/8	4	◆	2
13067-	O	0.316	2-3/8	4	2	2
13068-	P	0.323	2-3/8	4	2	2
13069-	21/64	0.3281	2-1/2	4	◆	2
13070-	Q	0.332	2-1/2	4	2	◆
13072-	R	0.339	2-1/2	4	2	2
13073-	11/32	0.3438	2-1/2	4	2	2
13074-	S	0.348	2-1/2	4	2	2
13076-	T	0.358	2-3/4	4-1/4	◆	◆
13077-	23/64	0.3594	2-3/4	4-1/4	2	2
13078-	U	0.368	2-3/4	4-1/4	2	2
13080-	3/8	0.375	2-3/4	4-1/4	◆	◆
13081-	V	0.377	2-3/4	4-1/4	2	2
13082-	W	0.386	2-7/8	4-1/2	◆	◆
13083-	25/64	0.3906	2-7/8	4-1/2	2	2
13085-	X	0.397	2-7/8	4-1/4	2	2
13086-	Y	0.404	2-7/8	4-1/4	2	2
13087-	13/32	0.4062	2-7/8	4-1/4	◆	◆
13088-	Z	0.413	2-7/8	4-1/4	◆	2
13090-	27/64	0.4219	2-7/8	4-1/4	◆	◆
13092-	7/16	0.4375	2-7/8	4-1/4	◆	◆
13094-	29/64	0.4531	3	4-3/4	◆	2
13095-	15/32	0.4688	3	4-3/4	2	2
13097-	31/64	0.4844	3	4-3/4	◆	◆
13099-	1/2	0.5	3	4-3/4	◆	2
13154-	5/8	0.625	4	6	2	2
13155-	3/4	0.75	4	6	◆	2

◆ = Stock Item

= Lead Time in Weeks

MAC 1 coating is available on all standard drills; allow for one to two week lead time.

DIAbide® Drills - Metric Sizes

Part Number	Size (mm)	LOC (mm)	OAL (mm)	Availability	
				MAC 5	MAC 7
13111-	1	16.00	38	2	
13120-	1.5	19	38	◆	
13130-	2	22	44	◆	
13139-	2.5	25.5	51	2	◆
13147-	3	32	57	◆	
13151-	3.25	35	63.5	2	
13004-	3.5	35	63.5	◆	2
13014-	4	35	63.5	2	2
13022-	4.5	41	70	◆	2
13031-	5	44.5	76	◆	2
13039-	5.5	44.5	76	◆	2
13045-	6	51	82.5	◆	2
13050-	6.5	51	82.5	2	2
13152-	6.7	51	82.5	◆	2
13056-	7	54	89	◆	2
13062-	7.5	60.5	101.5	2	2
13066-	8	60.5	101.5	◆	◆
13153-	8.4	60.5	101.5	2	2
13071-	8.5	60.5	101.5	2	2
13075-	9	70	108	2	2
13079-	9.5	70	108	2	2
13084-	10	73	114.5	◆	◆
13089-	10.5	73	114.5	◆	2
13091-	11	73	114.5	2	2
13093-	11.5	76	120.5	2	2
13096-	12	76	120.5	◆	2
13098-	12.5	76	120.5	2	2

Spotting Drills

Diameter	Angle	Flute	OAL	Part Availability	
				Number	MAC 5
1/8	90	0.62	2.5	13810	2
3/16	90	0.75	2.5	13811	◆
1/4	90	1	2.5	13812	◆

Center Drills - 60 Degree

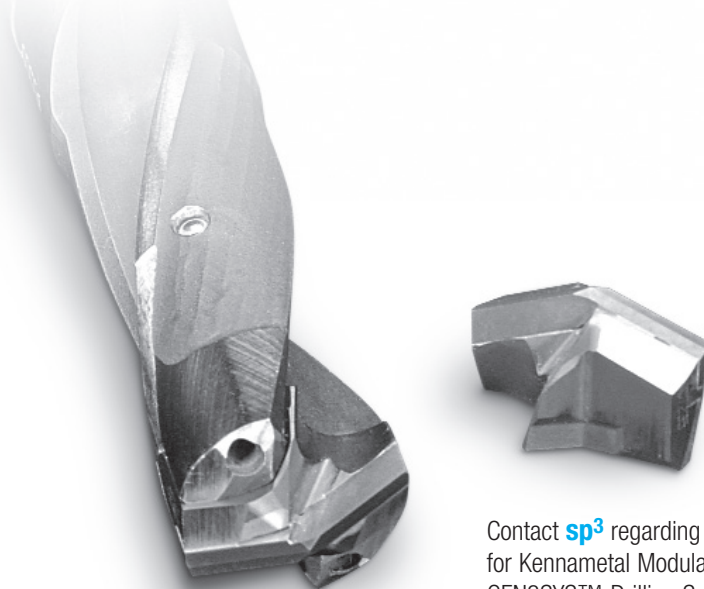
Size	Diameter	Angle	OAL	Shank	Part Availability	
					Number	MAC 5
00	.025	60	1-1/2	1/8	13421-	◆
0	1/32	60	1-1/2	1/8	13422-	2
1	3/64	60	1-1/2	1/8	13423-	2
2	5/64	60	2	3/16	13424-	2
3	7/64	60	2	1/4	13425-	◆
4	1/8	60	2-1/8	5/16	13426-	2
5	3/16	60	2-3/4	7/16	13427-	◆

Center Drills - 90 Degree

Size	Diameter	Angle	OAL	Shank	Part Availability	
					Number	MAC 5
1	3/64	90	1.5	1/8	13801	◆
2	5/64	90	2	3/16	13802	◆
3	7/64	90	2	1/4	13803	◆
4	1/8	90	2.125	5/16	13804	◆
5	3/16	90	2.75	7/16	13805	◆
6	7/32	90	3	1/2	13506	◆

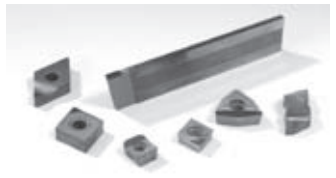
24

◆ = Stock Item # = Lead Time in Weeks



Contact **sp³** regarding PCD replaceable drill tips for Kennametal Modular Drills and Allied Machine GEN3SYS™ Drilling Systems.

DIAbide™, PCD, TFD, and cBN Inserts



sp³ offers hundreds of insert styles including multiple cutting edges, cut or molded in chipbreakers, full tops, and more. Often, a specific application can benefit from the different diamond styles we supply. Consult with sp³ for your specific needs. No one in the industry offers more diamond solutions than sp³.

Diabide: MAC 18 & 20
 PCD: Mac 30
 TFD: Mac 40
 CBN: Mac 50

All inserts are ANSI/ISO standard sizes and tolerances.
 Diamond coating (Mac 18 and 20) will add 25-50 microns per side depending on coating.

Diamond Inserts

Part Number	ANSI I.D.	I.C.	MAC			
			18	30	40	50
16101	CCGX-21.50	1/4	◆			
16102	CCGX-21.51	1/4	◆			
16103	CCGX-32.51	3/8	2			
16104	CCGX-32.52	3/8	◆			
16105	CCGX-431	1/2	2			
16106	CCGX-432	1/2	2			
16107	CCMT-21.51	1/4	◆	◆-2	◆	◆
16108	CCMT-21.52	1/4	◆	2-3	3-4	3
16109	CCMT-32.51	3/8	2	◆	3-4	3
16110	CCMT-32.52	3/8	2	◆	3-4	3
16111	CCMT-431	1/2	◆	◆-2	3-4	3
16112	CCMT-432	1/2	◆	◆-2	3-4	3
16113	CDCD-500	5/32	◆	2-3	3-4	3
16114	CDCD-505	5/32	◆	2-3	3-4	◆
16115	CDCD-51	5/32	◆	2-3	3-4	3
16116	CNGP-431	1/2	◆	◆	3-4	3
16117	CNGP-432	1/2	2	◆	◆	◆
16118	CNMP-431	1/2	◆	◆	3-4	3
16119	CNMP-432	1/2	◆	◆	◆	◆
16120	CNMP-433	1/2	◆	2-3	3-4	◆
16121	CPG-421	1/2	◆	◆	◆	3
16122	CPG-422	1/2	◆	2-3	◆	3
16123	CPG-633	3/4	2-3			
16124	CPGM-21.51	1/4	◆	2-3	3-4	3
16125	CPGM-21.52	1/4	◆	2-3	3-4	3
16126	CPGM-32.51	3/8	◆	2-3	3-4	3
16127	CPGM-32.52	3/8	◆	2-3	3-4	3
16128	CPGT-21.51	1/4	◆	◆	◆	3
16129	CPGT-21.52	1/4	◆	◆	3-4	3
16130	CPGT-32.51	3/8	◆	◆	◆	3
16131	CPGT-32.52	3/8	◆	◆	◆	3
16132	CPGW-1.81.51	7/32	◆	◆	3-4	3
16133	CPGW-21.51	1/4	◆	◆	◆	3
16134	CPGW-21.52	1/4	◆	◆	3-4	3
16135	CPGW-32.51	3/8	◆	◆	◆	3
16136	CPGW-32.52	3/8	◆	◆	◆	3
16137	CPGW-431	1/2	◆	2-3	◆	3
16138	CPGW-432	1/2	◆	2-3	◆	3
16150	DCGX-21.50	1/4	◆			
16151	DCGX-21.51	1/4	◆			
16152	DCGX-32.50	3/8	◆			
16153	DCGX-32.51	3/8	◆			
16154	DCGX-32.52	3/8	◆			

Part Number	ANSI I.D.	I.C.	MAC			
			18	30	40	50
16155	DCMT-21.52	1/4	◆	2	3-4	3
16156	DCMT-32.51	3/8	◆	◆	◆	3
16157	DCMT-32.52	3/8	◆	◆	◆	3
16158	DDGB-522	5/8	◆			
16173	DNGP-432	1/2	◆	◆	◆	3
16159	DNMP-431	1/2	◆	◆	◆	3
16160	DNMP-432	1/2	◆	◆	◆	3
16161	DNMP-433	1/2	◆	2	◆	3
16162	DPG-432	1/2	◆	2	◆	3
16163	DPG-532	5/8	◆			
16164	DPGT-21.51	1/4	◆	2	◆	3
16165	DPGT-21.52	1/4	◆	◆	3-4	3
16166	DPGT-32.51	3/8	◆	2	3-4	3
16167	DPGT-32.52	3/8	◆	2	3-4	3
16168	DPGW-21.51	1/4	2	2	◆	3
16169	DPGW-21.52	1/4	2	◆	3-4	3
16170	DPGW-32.51	3/8	◆	2	3-4	3
16171	DPGW-32.52	3/8	2	2	3-4	3
16172	DPGW-32.53	3/8	◆			
16183	GFN-2	1/4	◆			
16184	GFN-3	1/4	◆			
16185	GFN-4	1/4	◆			
16186	GTN-3	1/4	◆			
16187	GTN-4.8	1/4	3			
16188	RCMT-32.5	3/8	◆			
16189	RCMT-43	1/2	◆			
16194	RD-6P	3/8	◆			
16195	RD-8P	1/2	2			
16190	RD-10P	5/8	◆			
16191	RD-12P	3/4	◆			
16192	RD-16P	1	◆			
16193	RD-20P	1-1/4	◆			
16197	RFG-21	5/16	◆			
16198	RNG-83	1	◆			
16200	RPG-22	1/4	2			
16201	RPG-32	3/8	2			
16202	RPG-42	1/2	2	3	◆	◆
16203	RPGW-32.5	3/8	◆			
16204	RPGW-43	1/2	◆			
16215	SD-322P	3/8	◆			
16216	SD-422P	1/2	◆			
16217	SD-531P	5/8	◆			
16218	SD-532P	5/8	◆			

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number.
 For more information, refer to the MAC application chart on page 4.

Diamond Inserts (continued)

Part Number	ANSI I.D.	I.C.	MAC			
			18	30	40	50
16220	SD-8P	1/2	◆			
16221	SDH-2.522	5/16	2			
16222	SEC-322A	3/8	◆			
16224	SEC-424A	1/2	◆			
16223	SEC-422A	1/2	◆			
16225	SEC-42E3TL	1/2	3			
16226	SEC-42E3TR	1/2	3			
16227	SEC-632A	3/4	3			
16228	SEC-633A	3/4	3			
16229	SECN-63A8A	3/4	◆			
16232	SEEN-43EDTR	1/2	4-5			
16231	SEEN-42E4TR20W	1/2	4-5			
16234	SEKN-42A6T	1/2	◆			
16235	SNG434	1/2	◆			
16239	SPEW-43EDTR	1/2	3			
16241	SPG-322	3/8	◆	◆	◆	3
16242	SPG-421	1/2	◆	2	◆	3
16243	SPG-422	1/2	◆	2	◆	3
16245	SPG-424	1/2	◆	2	3-4	3
16246	SPG-428	1/2	◆			
16247	SPG-432	1/2	◆			
16248	SPG-433	1/2	◆			
16249	SPG-632	3/4	◆			
16250	SPG-633	3/4	◆			
16252	SPGW-32.51	3/8	◆	2	3-4	3
16253	SPGW-32.52	3/8	◆	◆	◆	3
16255	SPGW-32.53	3/8	◆	2	3-4	3
16256	SPGW-431	1/2	◆	2	3-4	3
16257	SPGW-432	1/2	◆	2	3-4	3
16268	TCGX-1.81.50	1/4	3			
16269	TCGX-1.81.51	1/4	◆			
16270	TCGX-21.50	1/4	◆			
16271	TCGX-21.51	1/4	◆			
16272	TCGX-32.51	3/8	◆			
16273	TCGX-32.52	3/8	◆			
16274	TCMT-21.51	1/4	◆	◆	3-4	3
16275	TCMT-21.52	1/4	◆	◆	◆	3
16276	TCMT-32.51	3/8	◆	◆	◆	3
16277	TCMT-32.52	3/8	◆	2	◆	3
16278	TCMW-32.51	3/8	◆	◆	◆	3
16280	TD-6P	3/8	◆			
16284	TD-8P	1/2	◆			
16285	TDAB-500	5/32	◆			
16310	TNMP-332	3/8	◆			
16311	TNMP-432	1/2	◆	◆	3-4	3
16312	TNMP-433	1/2	◆			
16314	TP-41A	1/2	2			
16315	TP-42A	1/2	2			
16316	TPCB-220	1/4	◆			
16317	TPCB-221	1/4	◆			
16318	TPCB-222	1/4	◆			

Part Number	ANSI I.D.	I.C.	MAC			
			18	30	40	50
16319	TPEB-320.5	3/8	◆			
16320	TPEB-6.421	3/4	◆			
16321	TPEE-731	7/32	◆			
16322	TPEW-332PDTR	3/8	3			
16324	TPG-221	1/4	◆	◆	◆	3
16326	TPG-222	1/4	◆	◆	◆	3
16327	TPG-321	3/8	◆	2	◆	3
16328	TPG-322	3/8	◆	◆	◆	3
16219	TPG-323	3/8	2	2	3-4	3
16330	TPG-324	3/8	◆	◆	3-4	3
16331	TPG-431	1/2	◆	2	3-4	3
16332	TPG-432	1/2	◆	2	3-4	3
16335	TPGB-322	3/8	◆			
16336	TPGH-221	1/4	◆			
16337	TPGH-321	3/8	◆			
16338	TPGH-322	3/8	◆			
16339	TPGH-431	1/2	2			
16340	TPGT-1.81.51	7/32	2			
16341	TPGT-21.51	1/4	◆	2	3-4	3
16342	TPGT-21.52	1/4	◆	2	3-4	3
16343	TPGT-32.51	3/8	◆	2	◆	3
16344	TPGT-32.52	3/8	◆	◆	◆	3
16345	TPGW-21.51	1/4	◆	2	3-4	3
16346	TPGW-21.52	1/4	◆	2	3-4	3
16347	TPGW-32.51	3/8	◆	2	◆	3
16348	TPGW-32.52	3/8	◆	◆	◆	3
16349	TPGW-431	1/2	◆			
16350	TPGW-432	1/2	◆			
16353	TPMR-321	3/8	2			
16354	TPMR-322	3/8	2			
16366	VBMT-331	3/8	◆	2	◆	3
16367	VBMT-332	3/8	◆	◆	◆	3
16369	VCGX-21.50	1/4	◆			
16370	VCGX-21.51	1/4	◆			
13671	VCGX-331	3/8	2			
16372	VCGX-332	3/8	◆			
16373	VCGX-333	3/8	◆			
16374	VNGA-431	1/2	◆	◆	3-4	3
16375	VNGP-330.5	3/8	◆			
16376	VNMG-332	3/8	◆			
16378	VNMG-431	1/2	◆			
16379	VNMG-432	1/2	◆			
16381	VNMP-331	3/8	◆			
16382	VNMP-332	3/8	◆			
16383	VPGR-331	3/8	◆	◆	3-4	3
16384	VPGR-332	3/8	2	2	3-4	3
16385	VPGR-333	3/8	◆			
16386	VPGT-331	3/8	◆			
16387	VPGT-332	3/8	◆			
16388	VPGT-333	3/8	◆			

◆ = Stock Item # = Lead Time in Weeks

To order the tool you need, choose a part number, and then add the correct MAC as a suffix to the part number.

For more information, refer to the MAC application chart on page 4.

sp³ Tools for Composite Machining

High performance aircraft, racing cars, boats, and other applications that demand light weight combined with high strength are turning to carbon fiber composite materials for structural components. Carbon fiber presents machining challenges that are perfectly answered by high performance diamond tools.

sp³ has developed special tools for machining composites. Different coating processes, geometries, and edge preparation than those used for machining other materials are required for success. sp³ has developed these tools expressly for long life in carbon fiber composite materials. We also produce special tools for these applications. All sp³ tools for composites use our exclusive edge prep and drill point geometry to minimize uncut fibers. Call sp³ for your composite machining needs.

DIAbide® End Mills / Routers

Availability					
Diameter	Flute Length (inches)	OAL (inches)	Number of Flutes	Part Number	Mac 8
3/16	5/8	2	2	12521-08	2
			4	12522-08	2
1/4	3/4	2-1/2	2	12523-08	2
			4	12524-08	2
			6	12525-08	◆
5/16	13/16	2-1/2	2	12526-08	2
			4	12527-08	◆
			6	12528-08	2
3/8	1	2-1/2	2	12529-08	◆
			4	12531-08	◆
			8	12549-08	◆
1/2	1	3	2	12507-08	◆
			4	12513-08	◆
			8	12550-08	◆

◆ = Stock Item # = Lead Time in Weeks

Call sp³ for quotes on special tools for composite machining.

DIAbide® Drills

Availability					
Diameter	Flute Length (inches)	OAL (inches)	Number of Flutes	Part Number	Mac 8
3/16	1-5/8	2-3/4	2	13026-08	◆
1/4	2	3-1/4	2	13049-08	◆
3/8	2-3/4	4-1/4	2	13080-08	◆

DIAbide® Drill / 100 Degree Countersink

Diameter	Flute Length (inches)	OAL (inches)	Number of Flutes	Part Number	Mac 8
3/16	1-5/8	2-3/4	2	13330-08	◆
3/16	1-5/8	3	2	13333-08	◆
1/4	2	3	2	13331-08	◆
3/8	2-3/4	4-1/4	2	13332-08	◆

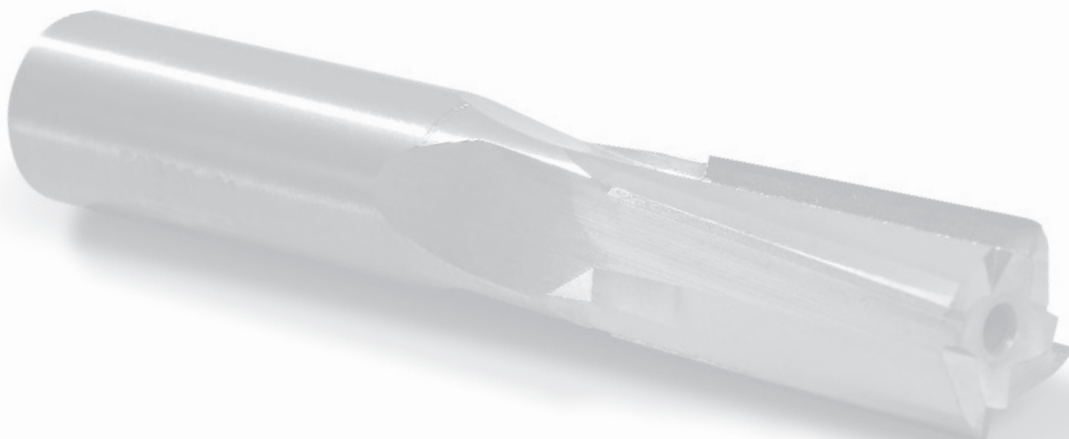
27

PCD Routers

Diameter	Flute Length (inches)	OAL (inches)	Number of Flutes	Part Number	Mac 30
1/4	1/2	2	3	44619-01	◆-4
3/8	1	3	4	44618-01	◆-4
1/2	1	3	4	44617-01	◆-4

TFd® Routers

Diameter	Flute Length (inches)	OAL (inches)	Number of Flutes	Part Number	Mac 40
1/4	1/2	2	3	52534-01	◆-4
3/8	1	3	4	52545-01	◆-4
1/2	1	3	4	52530-01	◆-4



Custom Coating

Custom DIAbide Parts

sp³ will coat customer supplied tools, such as grooving inserts, form tools and wear parts. These may be standard tools purchased by the customer or tools manufactured to a special configuration. sp³ will also grind tools to a customer supplied print.

Service Coating Requirements

sp³ will apply a diamond coating to most styles of tools furnished by the customer, given they meet sp³ requirements for carbide grade. Inserts should be medium grain size, C2 tungsten carbide – see the list of approved grades below. Inserts will be coated one side only. Sharp and honed edges are acceptable. Lightly honed edges are preferred.

sp³ approves the more commonly used grades, but does not preclude other grades from being used as the base carbide. Consult sp³ for additional information regarding acceptable grades of tungsten carbide.

sp³ will coat customer supplied round tools if ground from sp³ approved carbide blanks. sp³ will not coat used inserts, TiC-base cermets, CVD or PVD coated inserts, or previously diamond coated inserts. Laser marking affects the adhesion of the diamond and should not be close to a cutting edge.

Specifying Application

As with all DIAbide diamond, the selection begins with the Material Application Chart (MAC) on page 4. When ordering custom DIAbide parts, always refer to this chart and specify which code best fits your application. These are more commonly used grades.

Supplier	Approved Grades	APPROVED GRADES					
		Round Tools			Inserts		Saws
		MAC	MAC	MAC	MAC	MAC	MAC
		3	5	7	1 0	18	1 4
Allied CarbiTech	E6				◆	◆	
Carboly-Seco	883, HX				◆	◆	
Circle	C25				◆	◆	
Dapra	F		◆				
Duramet	DU2		◆		◆	◆	
Extramet	EMT806	◆	◆	◆			
Fansteel/Hydro Carbide	HCUS10, HC290	◆	◆	◆	◆	◆	
Iscar	IC20, IC28				◆	◆	
Ingersol	ICT111				◆	◆	
Kennametal	K68		◆				
Millstar	–				◆	◆	
Mitsubishi	HTi20T						◆
Robb Jack	VC101				◆	◆	
RTW	CQ2				◆	◆	
Sandvik	H10, H13A				◆	◆	
TCM	5120	◆	◆	◆	◆	◆	
Teledyne	HA, H21				◆	◆	
Tool Flo	C25				◆	◆	
Toshiba Tungaloy	TH10						
Ultramet	Z22				◆	◆	
Walmet	WA2	◆	◆	◆			
Valenite-Widia	VC2, VC3, THM						

Silicon Carbide Wear Parts and Seals

In addition to custom coating inserts, endmills and drills, sp³ applies DIAbide film to silicon carbide wear parts and seals as well as tungsten carbide parts. The same high quality, continuous pure diamond film covers the target surface for maximum wear and corrosion resistance. Contact sp³ for details and recommendations.

Machining Parameters

Machining Graphite

DIAbide diamond tools are a perfect match for machining the graphite moldforms for EDM. The abrasive nature of EDM graphite grades severely limit the life of carbide tools, and PCD diamond tools are not available in the configurations required for detailed moldmaking. Tools with diamond on the surface wear longer and have a lower coefficient of friction. These characteristics provide substantial benefit to the machining operation.

Because diamond tools last much longer - 15 to 50x the life of carbide - they:

- Easily pay for themselves
- Greatly reduce the number of tool changes, increasing productivity
- Allow much longer periods of unattended machining
- Improve the dimensional consistency of the machined parts
- Eliminate changing tools mid-cut

Turning Graphite

Getting Started

- Rigid setup
- No coolants/cutting fluids
- Inserts without chip groove
- Positive rake tools
- Nose radius 1/64" or 1/32"
- Adjust pressure with feed; keep maximum DOC possible
- Adjust surface finish with nose radius rather than feed; check workpiece deflection

Starting Parameters for Turning Graphite		
Operation	Cutting Speed (sfm)	Feed Rate (fpr-in/rev)
Rough	2000-3000	.010 - .020
Finish	3000-4000	.003 - .010

30

Milling Graphite with Inserted Cutters

Getting Started

- Rigid setup
- No coolants/cutting fluids
- Positive rake tools
- Nose radius 1/64" or 1/32"
- Adjust pressure with feed; keep maximum DOC possible
- Adjust surface finish with nose radius rather feed; check workpiece stress

Starting Parameters for Milling Graphite		
Operation	Cutting Speed (sfm)	Feed Rate (fpr-in/rev)
Rough	2000-4000	.003 - .008
Finish	2000-4000	.003 - .008

Profiling Graphite - Profiling Inserts

rpm = revolutions per minute
 sfm = surface feet per minute
 fpr = feed per revolution
 fpt = feed per tooth per revolution

Starting Parameters for Profiling Graphite				
Cutting Dia. (in.)	Machine Speed (rpm)	Cutting Speed (sfm)	Operation	Feed Rate (fpt-in/tooth)
5/16	7,500-16,000	640-1,320	General Finish	.005 - .008 .001 - .004
3/8	6,500-13,500	640-1,320	General Finish	.005 - .008 .001 - .004
1/2	4,900-10,000	640-1,320	General Finish	.009 - .015 .002 - .008
5/8	3,900-8,000	640-1,320	General Finish	.009 - .015 .002 - .008
3/4	3,200-6,700	640-1,320	General Finish	.009 - .015 .002 - .008
1	2,400-5,000	640-1,320	General Finish	.013 - .020 .004 - .012
1 1/4	2,000-4,000	640-1,320	General Finish	.013 - .020 .004 - .012

Milling Graphite with Endmills

Getting Started

- Rigid setup
- No coolants/cutting fluids
- Solid cutter, small diameter
- Use Inserted cutter over 1/2" diameter
- Minimum 2 flute/cutter
- Adjust pressure with feed; keep maximum DOC possible

Slotting Applications: Speed should be reduced to approximately 80% of lowest range value. High end ranges are for light radial depth of cut. When using long and extended length end mills reduce feed and speed accordingly. The above recommendations are for width of cuts or axial lengths of cuts not to exceed 1-1/2 times the cutter diameter.

Starting Parameters for Profiling Graphite				
Endmill (in.)	Machine Speed (rpm)	Cutting Speed (sfm)	Operation	Feed Rate (fpt-in/tooth)
1/64	20,000-40,000	80-160	Finish	.0002 - .0005
1/32	18,000-40,000	150-325	Finish	.0005 - .001
1/16	12,000-40,000	200-650	General	.001 - .002
			Finish	.0005 - .001
1/8	6,000-40,000	200-1,300	General	.001 - .002
			Finish	.0005 - .001
3/16	4,000-40,000	200-1,950	General	.001 - .002
			Finish	.0005 - .001
1/4	3,000-36,700	200-2,450	General	.002 - .004
			Finish	.001 - .002
5/16	2,500-31,800	200-2,600	General	.002 - .004
			Finish	.001 - .002
3/8	2,000-28,500	200-2,800	General	.003 - .005
			Finish	.001 - .003
1/2	1,500-23,000	200-3,000	General	.003 - .005
			Finish	.001 - .003

Drilling Graphite

Getting Started

- Dust removal is critical
- Adjust pressure with feed; keep maximum DOC possible

Starting Parameters for Drilling Graphite		
Cutting Dia. (in.)	Cutting Speed (sfm)	Feed Rate (fpr-in/rev)
1/32 - 3/16	200-3000	.001 - .004
3/16 - 1/4	200-3000	.002 - .006
1/4 - 5/16	200-3000	.002 - .006
5/16 - 3/8	200-3000	.002 - .008
3/8 - 1/2	200-3000	.002 - .010

Milling Graphite with Endmills

Starting Parameters for Drilling (All Materials)						
Drill Diameter (inch)	Graphite, Hard Carbon Cutting Speed sfm 200-1500	Green Ceramic, Green Ceramic, Powder Filled Plastics Cutting Speed sfm 200-1000	Unfilled Plastics Cutting Speed sfm 200-700	Fiber Reinforced Plastics Cutting Speed sfm 200-500	Duraclan Cutting Speed sfm 100-500	Free Machining and Low Silicon Aluminums Cutting Speed sfm 100-600
	Feed Rate ipr	Feed Rate ipr	Feed Rate ipr	Feed Rate ipr	Feed Rate ipr	Feed Rate ipr
1/32 - 3/16	.00025 - .001	.0002 - .00075	.00025 - .001	.00025 - .001	—	—
1/16 - 1/8	.0005 - .002	.0005 - .002	.0005 - .002	.0005 - .002	—	—
1/8 - 3/16	.001 - .004	.001 - .003	.001 - .004	.001 - .004	.001 - .003	.001 - .003
3/16 - 1/4	.002 - .005	.002 - .004	.002 - .005	.002 - .005	.002 - .004	.002 - .004
1/4 - 5/16	.002 - .006	.002 - .005	.002 - .006	.002 - .006	.002 - .005	.002 - .005
5/16 - 3/8	.002 - .008	.002 - .006	.002 - .008	.002 - .008	.002 - .006	.002 - .006
3/8 - 1/2	.002 - .010	.002 - .008	.002 - .010	.002 - .008	.002 - .008	.002 - .008

Machining Parameters

Starting Parameters for Endmilling Green Ceramics, Powder Filled Plastics and Thermoset Plastics

Endmill Dia. (in.)	Machine Speed rpm	Cutting Speed sfm	Operation	Feed Rate fpt
1/64	6,100 - 20,000	25 - 80	Finish	.0002 - .0005
1/32	6,100 - 20,000	50 - 160	Finish	.0005 - .001
1/16	6,100 - 20,000	100 - 325	General Finish	.001 - .002 .0005 - .001
1/8	4,600 - 16,000	150 - 500	General Finish	.001 - .002 .0005 - .001
3/16	4,100 - 15,000	200 - 750	General Finish	.001 - .002 .0005 - .001
1/4	3,050 - 12,000	200 - 750	General Finish	.002 - .004 .001 - .002
5/16	2,400 - 11,000	200 - 900	General Finish	.002 - .004 .001 - .002
3/8	2,000 - 11,200	200 - 1,100	General Finish	.003 - .005 .001 - .003
1/2	1,500 - 10,000	200 - 1,300	General Finish	.003 - .005 .001 - .003

Starting Parameters for Endmilling Fiber Filled Plastics

Endmill Dia. (in.)	Machine Speed rpm	Cutting Speed sfm	Operation	Feed Rate fpt
1/16	3,700 - 7,300 5,200 - 10,400	60 - 120 85 - 170	General Finish	.001 - .002 .0005 - .001
1/8	3,600 - 7,300 5,200 - 9,200	120 - 240 170 - 300	General Finish	.0005 - .001 .0025 - .0005
3/16	4,100 - 7,100 6,100 - 10,200	200 - 350 300 - 500	General Finish	.001 - .002 .0005 - .001
1/4	4,600 - 6,900 5,300 - 8,400	300 - 450 350 - 550	General Finish	.001 - .002 .0005 - .001
5/16	4,300 - 6,100 4,300 - 7,300	350 - 500 350 - 600	General Finish	.001 - .002 .0005 - .001
3/8	4,100 - 5,600 3,500 - 6,600	400 - 550 350 - 650	General Finish	.002 - .004 .001 - .002
1/2	3,400 - 4,600 2,600 - 5,700	450 - 600 350 - 750	General Finish	.002 - .004 .001 - .002

Starting Parameters for Endmilling Free Machining Aluminums & Low Silicon (<10%) Aluminums

Endmill Dia. (in.)	Machine Speed rpm	Cutting Speed sfm	Operation	Feed Rate fpt
1/8	3,000 - 9,200 7,600 - 13,700	100 - 300 250 - 450	General Finish	.0005 - .001 .0025 - .0005
3/16	3,000 - 7,100 6,100 - 11,200	150 - 350 300 - 550	General Finish	.001 - .002 .0005 - .001
1/4	3,800 - 6,100 4,600 - 9,900	250 - 400 300 - 650	General Finish	.001 - .002 .0005 - .001
5/16	3,000 - 5,500 4,300 - 8,600	250 - 450 350 - 700	General Finish	.001 - .002 .0005 - .001
3/8	3,000 - 5,100 4,100 - 8,150	300 - 500 400 - 800	General Finish	.002 - .004 .001 - .002
1/2	2,500 - 3,800 3,000 - 6,900	325 - 500 400 - 900	General Finish	.002 - .004 .001 - .002

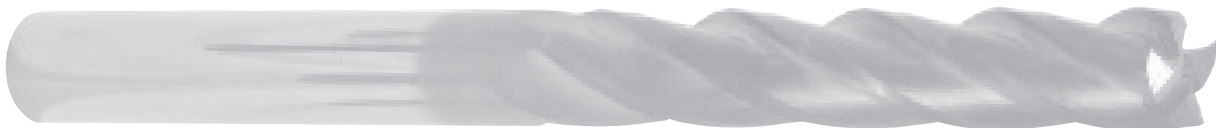
Starting Parameters for Endmilling Metal Matrix Composites (MMC)

Endmill Dia. (in.)	Machine Speed rpm	Cutting Speed sfm	Operation	Feed Rate fpt
1/8	3,000 - 9,200 6,100 - 12,200	100 - 300 200 - 400	General Finish	.0005 - .001 .0025 - .0005
3/16	3,000 - 7,100 5,100 - 9,200	150 - 350 250 - 450	General Finish	.001 - .002 .0005 - .001
1/4	3,000 - 6,100 4,600 - 7,600	200 - 400 300 - 500	General Finish	.001 - .002 .0005 - .001
5/16	3,000 - 5,500 4,300 - 7,300	250 - 450 350 - 600	General Finish	.001 - .002 .0005 - .001
3/8	3,000 - 5,100 4,100 - 6,600	300 - 500 400 - 650	General Finish	.002 - .004 .001 - .002
1/2	2,500 - 3,800 3,000 - 5,700	325 - 500 400 - 750	General Finish	.002 - .004 .001 - .002

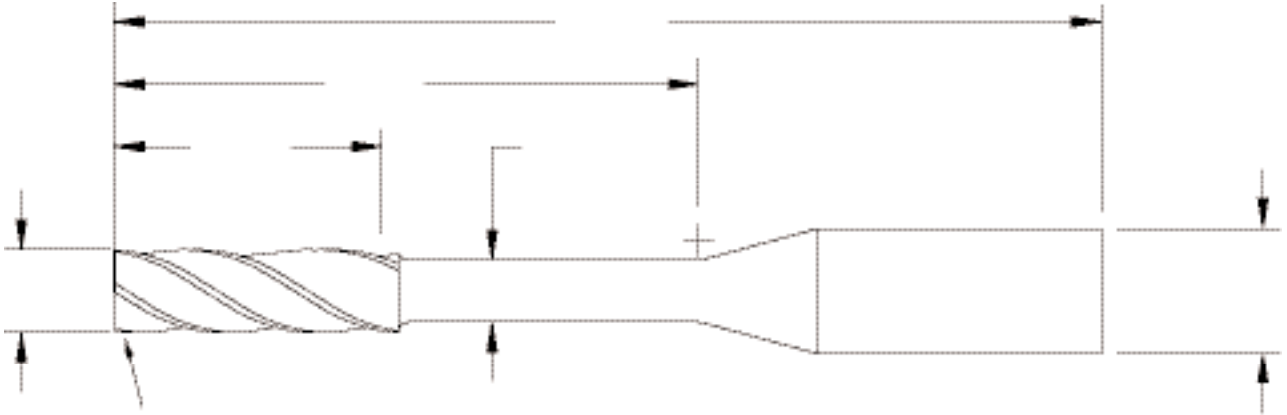
32

*General purpose where cosmetic finish is not critical sfm = surface feet per minute fpr = feed per revolution fpt = feed per tooth per revolution

Slotting Applications: Speed should be reduced to approximately 80% of lowest range value. High end ranges are for light radial depth of cut. When using long and extended length end mills reduce feed and speed accordingly. The above recommendations are for width of cuts or axial lengths of cuts not to exceed 1-1/2 times the cutter diameter.



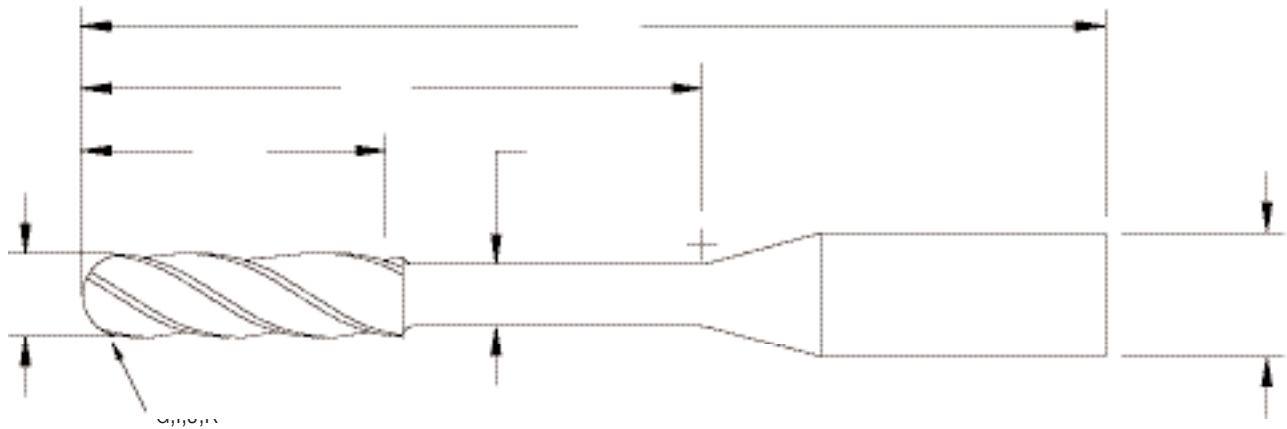
sp³ Square End Mill Configurator



A: Cutter Diameter _____
 B: Overall Length _____
 C: Shank Diameter _____
 D: Length of Cut _____
 E: Relief Diameter _____
 F: Length of Reach _____

G: Number of Flutes _____
 H: Corner Radius _____
 I: Material Being Cut _____
 J: Spiral (RH / LH / STR) _____
 K: Helix Angle _____
 L: Coating _____

sp³ Ball End Mill Configurator

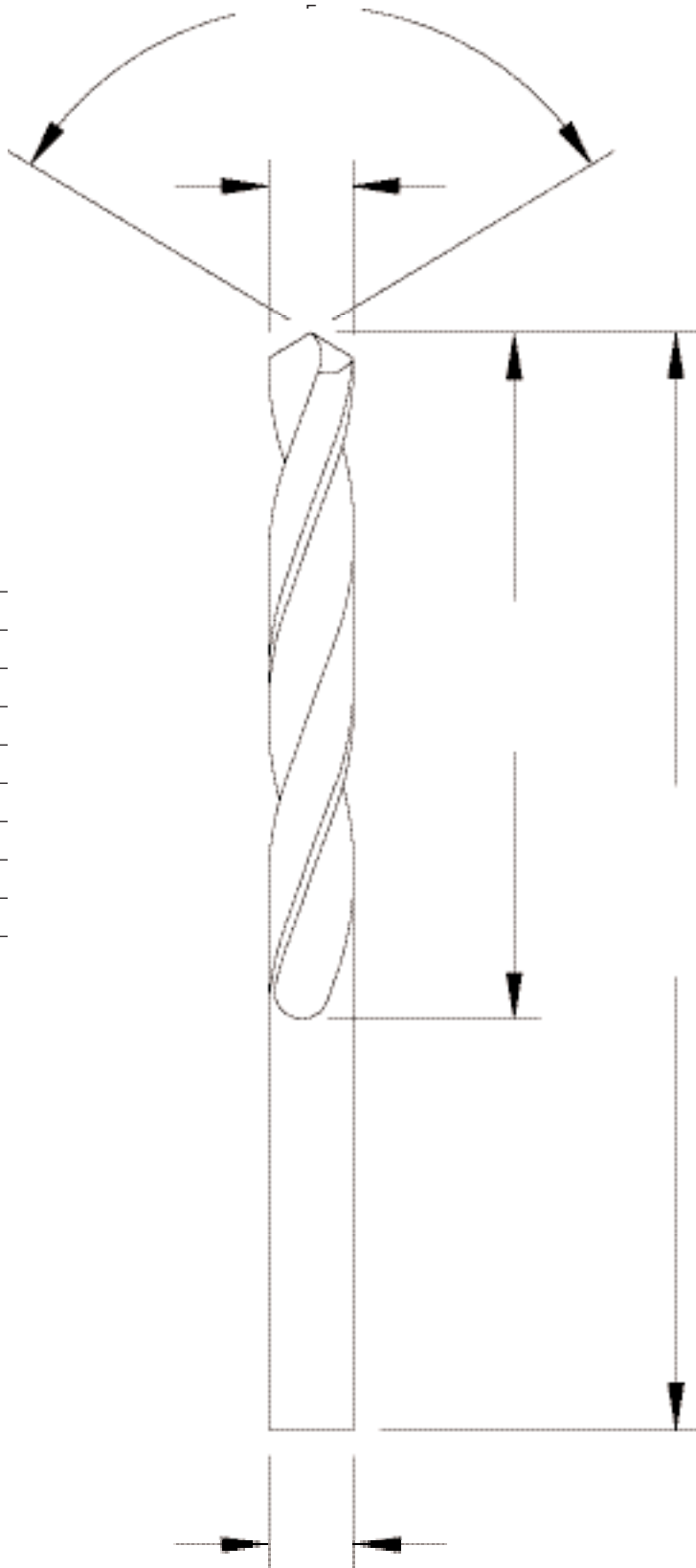


A: Cutter Diameter _____
 B: Overall Length _____
 C: Shank Diameter _____
 D: Length of Cut _____
 E: Relief Diameter _____
 F: Length of Reach _____

G: Number of Flutes _____
 H: Material Being Cut _____
 I: Spiral (RH / LH / STR) _____
 J: Helix Angle _____
 K: Coating _____

** When sending this form to **sp³** - please also include the customer data information as shown on the quote/sample request form on page 39.

sp³ Drill Configurator



- A: Tool Diameter _____
- B: Overall Length _____
- C: Shank Diameter _____
- D: Length of Cut _____
- E: Point Angle _____
- G: Number of Flutes _____
- I: Material Being Cut _____
- J: Spiral (RH / LH / STR) _____
- K: Helix Angle _____
- L: Coating _____

Quote / Sample Request

Reference Quote # _____

Request for Quote

Sales Person: _____

Sample

Date Entered: _____ Date Required: _____

Test

Customer Data

Distributor: _____

End User: _____

Contact Person: _____

Contact Person: _____

Phone Number: _____

Phone Number: _____

Address: _____

Address: _____

Ship To: Customer: _____ Distributor: _____ Other: _____ Special Instructions (Note Below)

Current Process Conditions

Inch: _____ Metric: _____

Milling: Turning: Boring: Drilling: Other: _____

Material to Cut: _____ Spindle RPM: _____ Feed Rate IPM: _____ DOC: _____

Current Tool: Carbide: PCD: Other: _____

Surface Finish Required: _____ Coolant: _____ Thru Spindle: Shower Screw: Flood:

Common Failure Mode: Finish: Wear: Chipping: Burr: Other: _____

Desired Improvement Over Current Tool: Life: Cost: Finish: Other: _____

Proposed Tool

Projected Annual Usage: _____

Catalog: Yes No

New Tool #: _____

Quote Quantity: _____

Description: _____

Cutter Diameter / IC: _____

of Stations / Blades: _____ LH: _____ RH: _____ MAC: 3 5 7 10 14 17 18 20

Cartridge Style / Insert: (Geometry) _____ PDC TFD

Depth of Cut: _____

Customer Supplied Insert / Tool: Yes No Grade: _____ Manufacturer: _____

Special Requirements

SP3 DIAMOND CUTTING TOOLS



sp³ Cutting Tools, Inc.

3531 West US Hwy 224, Decatur, IN 46733

Phone: 888-547-4156 • Phone: 260-547-4150 • Fax: 260-547-4214 • E-mail: sales@sp3inc.com

Web: www.sp3inc.com