



# DIMAR Composites tools



MILLING | DRILLING | SAWING | MOLDS



## DIMAR GROUP

Founded sixty years ago, DIMAR Group Ltd is a world class manufacturer of industrial cutting tools, with a global presence in more than 60 countries in different markets.

State-of-the-art manufacturing processes, advanced technology and uncompromising quality standards makes DIMAR's tools as the ultimate choice for the wood, aluminum, plastic and composite industries.

DIMAR manufacturing facilities based across Europe, offers the industry the latest solutions for cutting large variety of materials. Our professional R&D team continually looking for only the highest quality raw materials, grades and design to deliver the best solution for any application.

Global industries are choosing composite materials to reduce weight and increase strength. Cutting abrasive composite materials is a great challenge and a crucial part in the process. DIMAR's aim is to ensure that such producers are given the solutions to increase life-time of the tools, reduce cost and have optimum performance.

DIMAR has produced carbide tools for the composite market for decades. We are proud to launch a new range of composites, including CVD coating and diamond-plated options that offers the market with more effective solutions.

DIMAR extensive range of Composites tools provide the industry with the most cost effective tooling solutions, along with the highest quality and the full service back up.



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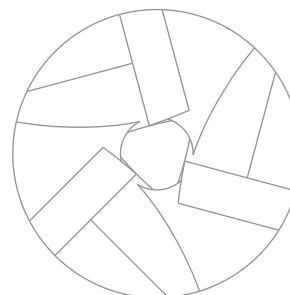
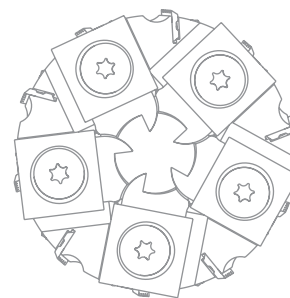
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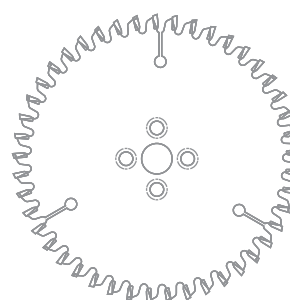
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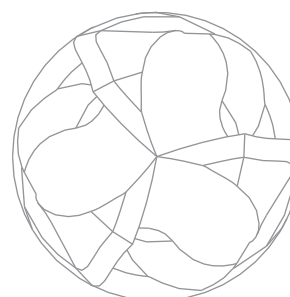
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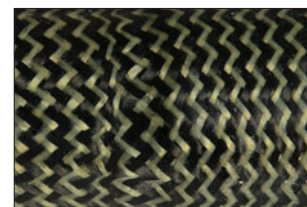
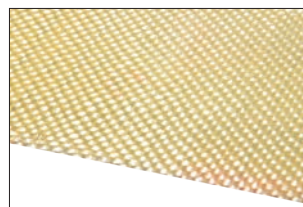
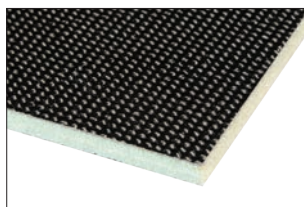
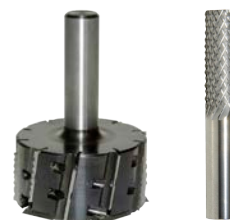
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# CUTTING TOOLS FOR COMPOSITE MATERIALS

## COMPOSITE MATERIALS

Composite materials are made from reinforcing fibers and a polymer matrix, which serves to bind the two materials together. When combined these two individual materials form a single material that has many desirable characteristics including very high specific strength, corrosion resistance, impact resistance, and excellent durability.



### FRP FIBER REINFORCED PLASTIC

Today's most popular composites use reinforcing fibers such as fiberglass, carbon, and aramid and are held together by a matrix of plastic resin that can be thermoset or thermoplastic.

## DIFFICULTIES IN MACHINING COMPOSITES

### TOOL LIFE

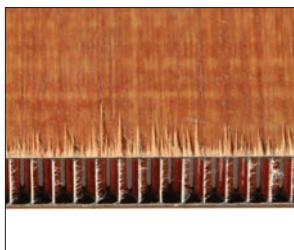
While these fibers offer great strength and durability to composite components they are also extremely abrasive and therefore negatively impact tool life.

### MACHINING HEAT GENERATION

Not all plastic matrix materials can withstand the heat generated during the machining of parts made from composites. Excessive heat generated during machining can melt the polymer matrix and damage the composite if care is not exercised.

### COMPOSITE DELAMINATION

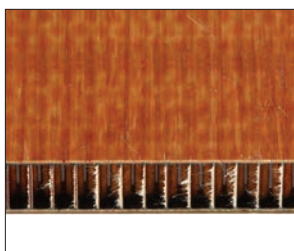
Components made from composite materials can be susceptible to delamination caused by machining. The damage may not be apparent to the naked eye but under magnification separation of the layers caused by the tool can be seen. This damage can be caused by excessive tool wear and improper tool selection.



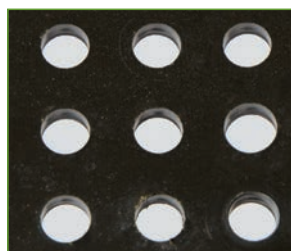
Damaged composites -  
incorrect tool choice



Damaged



Clean cut using correct tooling



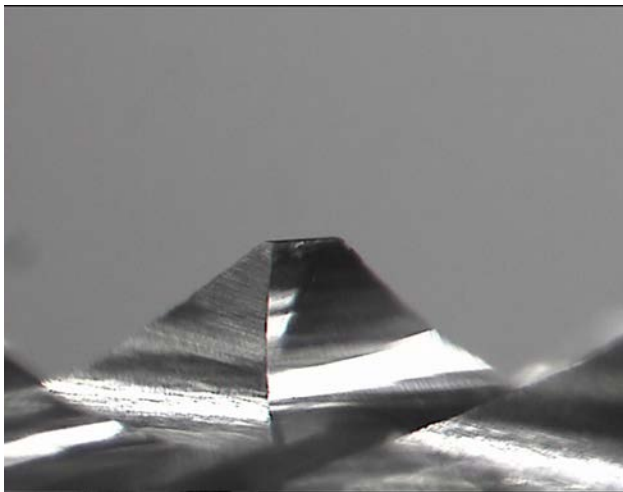
Clean

# CUTTING TOOLS FOR COMPOSITE MATERIALS

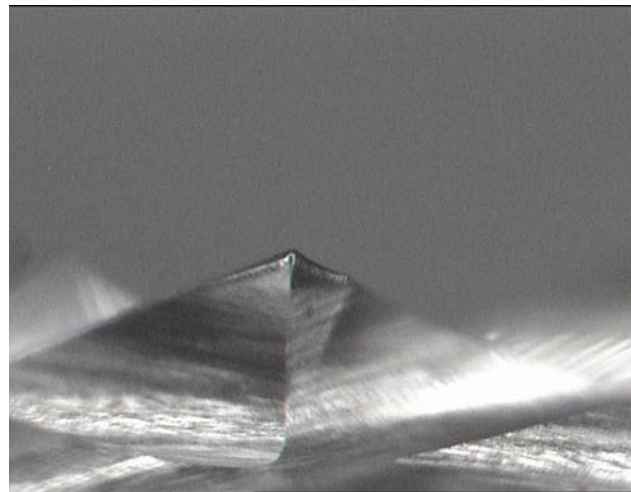
DIMAR HAS RECOGNIZED THE CHALLENGES OF MACHINING COMPOSITE MATERIALS AND HAVE DEVELOPED A GROUP OF TOOLS THAT OFFER SOLUTIONS TO THESE DEMANDS.

## THE DIFFERENCE - DIMAR TOOLS

With almost 60 years experience in developing and manufacturing cutting tools for diverse applications and industries, Dimar has used this experience to create cutting tools that can offer greater benefits over competition and meet the challenges faced by users machining modern composite materials.



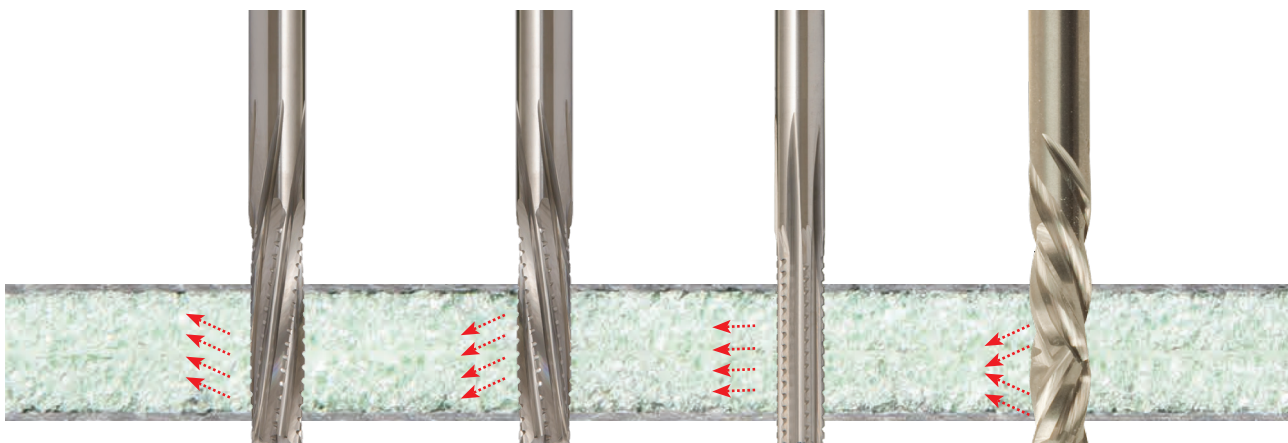
Dimar Burr tool - After 100 passes on CFRP



Competitor's Burr tool - After 100 passes on CFRP

## CHIP DIRECTION

The Dimar tool range allows the user to select the chip direction based on part geometry and composition. By choosing the correct helix angle the user can optimize the cutting quality and minimize chipping. Selections include right hand helix (up shear), left hand helix (down shear), straight helix and a combination of up shear and down shear on the same tools. Your Dimar representative will help you with the proper selection.



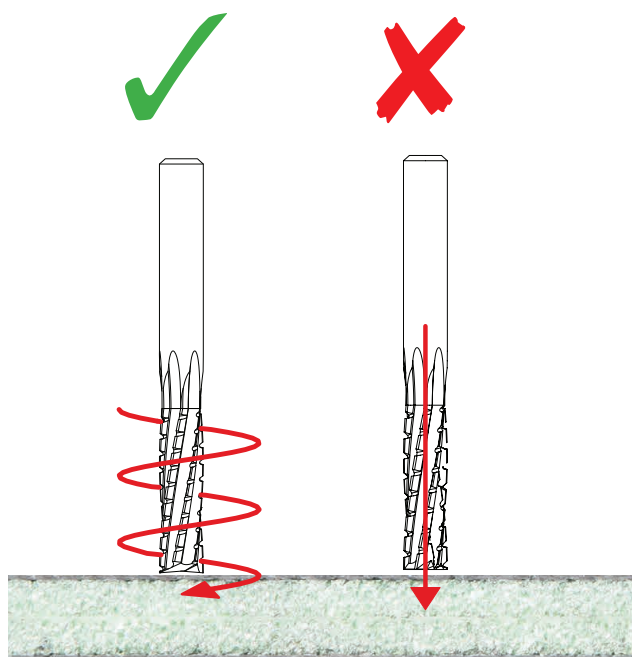
# CUTTING TOOLS FOR COMPOSITE MATERIALS

## MULTI-FLUTE TOOLS

Tools that are designed to machine composite materials will have more flutes than the tools for wood, aluminum or steel. With more cutting surfaces engaged in the part, the load on each cutting edge is reduced. As a result, tool life and finished part quality is significantly increased. Dimar Multi flute tools are highly recommended for machining of thin composite materials since delamination risks are reduced.

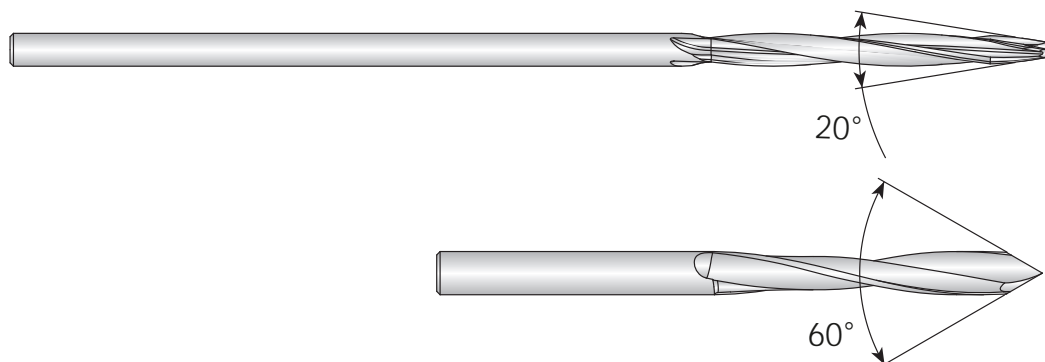
## PART PENETRATION

Dimar's geometry at the tool end provides the ability to penetrate the part the moment the tool starts working. The large number of tool flutes limits the chip out flow during initial penetration. For this reason it is recommended that a spiral motion is used.



## THROUGH HOLES

For through-holes in composite parts, Dimar recommends that a head of between 20-60 degrees be used when manual drilling is used. This geometry will provide the highest quality edge finish overall. For controlled feed drilling it is suggested that a tool with "up shear" helix be used.



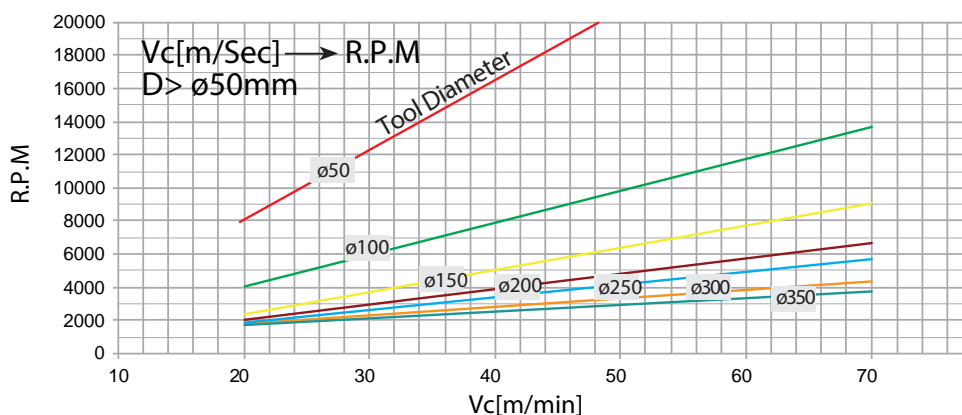
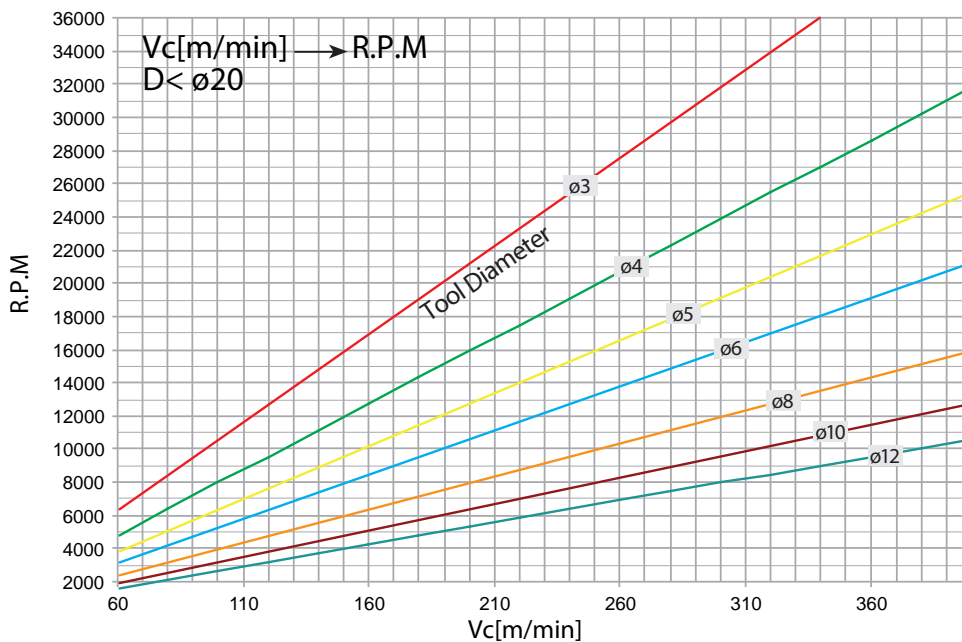


# CUTTING TOOLS FOR COMPOSITE MATERIALS





## CVD (DIAMOND) TOOLS

Some composite machining applications will require the use of high end tools referred to as CVD tools. Dimar's CVD (chemical vapor deposition) tools are comprised of 100% pure diamond permanently embedded on to tungsten carbide. The diamond coating can be applied at a thickness of 3-30 micron depending on the specific application. In other applications, the regular tungsten carbide tool will be the right solution.

Dimar's CVD tool range offers advantages and benefits when compared to traditional steel tools. Diamond, with its renowned reputation for hardness, offers significantly enhanced wear resistance in addition to a lower coefficient of friction and better heat dissipation. CVD tools have been known to last much longer than regular tools but it is also related to the specific application. In certain applications using a CVD tool may require higher tool speeds (100 - 200% faster than non-CVD tools) as well as higher feed rates (70-150% faster).



# TOOLS FOR COMPOSITES MATERIALS

Tool type		Tools	Page	
Milling	Burrs		10	
	Multi Flutes (up/down/straight shear)		11	
	Up & Down Compression Endmill		14	
	Aramid Endmill - Polished Straight Endmill		15	
	Aramid Endmill - Slotted Straight Endmill		16	
	Electro Plated Endmill		17	
	Hogger Endmill		18	
Drilling	Hogger Endmill		19	
	Manual Feed - through hole drills		20	
	Controlled Feed - through hole drills		21	
	Manual through hole step drills		22	
	Countersink		23	
	Countersink with integral pilot for microstop		24	
	Counterbore with exchangeable pilot for microstop		25	
	Counterbore with exchangeable pilot		26	
	Electro plating diamond disk		28-30	
	Solid carbide tipped disk		29	
	Ball Nose Endmill		31	



# TOOLS FOR COMPOSITES MATERIALS

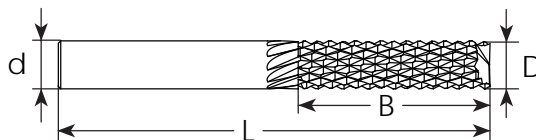
Composite material Type					
	GFRP Glass Fiber Reinforced Plastic	CFRP Carbon Fiber Reinforced Plastic	AFRP Aramid Fiber Reinforced Plastic	Honeycomb	MMC Metal Matrix Composite
	✓	✓			
	✓	✓			✓
	✓	✓			✓
			✓		
	✓	✓	✓		✓
				✓	
				✓	
	✓	✓	✓	✓	
	✓	✓	✓	✓	
	✓	✓	✓		✓
	✓		✓	✓	✓
	✓	✓	✓	✓	
	✓	✓	✓	✓	✓
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	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓
				✓	

# MILLING - STRAIGHT ENDMILLS

## BURRS TOOLS

### APPLICATION

Solid tungsten carbide endmill suitable for sizing, pockets and milling holes with rough-finish. For use on routers and machining centers.



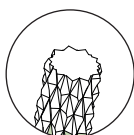
### Metric

D	B	L	d	Plane End	"Fish Tail" End	Multi Flutes End	"Multi flutes" End+CA
3	9	50	6	73001013	73001093	73001173	CA73001173
4	12	50	6	73001023	73001103	73001183	CA73001183
5	15	50	6	73001033	73001113	73001193	CA73001193
6	25	75	6	73001043	73001123	73001203	CA73001203
8	32	76	8	73001055	73001135	73001215	CA73001215
10	28	80	10	73001067	73001147	73001227	CA73001227
10	40	90	10	73001077	73001157	73001237	CA73001237
12	50	100	12	73001089	73001169	73001249	CA73001249

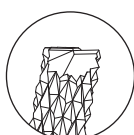
### Imperial

D	B	L	d	Plane End	"Fish Tail" End	Multi Flutes End	"Multi flutes" End+CA
1/8"	3/8"	2"	1/4"	73001254	73001334	73001414	CA73001414
3/16"	5/8"	2"	1/4"	73001264	73001344	73001424	CA73001424
1/4"	3/4"	2"	1/4"	73001274	73001354	73001434	CA73001434
1/4"	1"	2 1/2"	1/4"	73001284	73001364	73001444	CA73001444
5/16"	1 1/4"	3"	5/16"	7300129Z	7300137Z	7300145Z	CA7300145Z
3/8"	1 1/4"	3 1/4"	3/8"	73001306	73001386	73001466	CA73001466
3/8"	1 1/2"	3 1/4"	3/8"	73001316	73001396	73001476	CA73001476
1/2"	2"	4"	1/2"	73001328	73001408	73001488	CA73001488

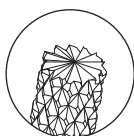
Plain End



Fish Tail End



Multi Flutes End



## MACHINING CONDITIONS RECOMMENDATION

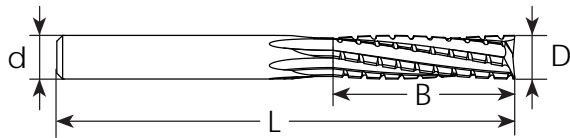
Type of composite materials	Uncoated		CA coating	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
GFRP Glass Fiber Reinforced Thermosetting Plastics	90-130	0.1-0.4	200-350	0.2-0.6
CFRP Carbon Fiber Reinforced Thermosetting Plastics	100-120	0.1-0.4	200-400	0.2-0.6
AFRP Aramid Fiber Reinforced Thermosetting Plastics	-	-	-	-
HONEYCOMB	-	-	-	-
MMC Metal Matrix Composite	-	-	-	-

# MILLING - STRAIGHT ENDMILLS

## MULTI FLUTES ENDMILL - UP SHEAR

### APPLICATION

Solid tungsten carbide endmill suitable for sizing, pockets and milling holes with fine-finish. Upshear spiral for optimum chip flow and improved finish on the bottom of the FRP parts. For use on routers and machining centers.

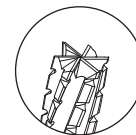


### Metric

D	B	L	d	No. of Flutes	Uncoated	CA coating
6	25	60	6	6	73003013	CA73003013
8	32	76	8	8	73003025	CA73003025
10	40	90	10	10	73003037	CA73003037
12	35	100	12	12	73003049	CA73003049

### Imperial

D	B	L	d	No. of Flutes	Uncoated	CA coating
1/4"	1"	2 1/2"	1/4"	6	73003054	CA73003054
5/16"	1 1/4"	3"	5/16"	9	7300306Z	CA7300306Z
3/8"	1 1/2"	3 1/4"	3/8"	10	73003076	CA73003076
1/2"	2"	4"	1/2"	12	73003088	CA73003088



## MACHINING CONDITIONS RECOMMENDATION

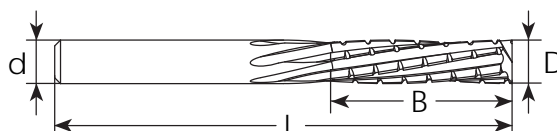
Type of composite materials	Uncoated		CA coating	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	90-130	0.08-0.25	200-350	0.15-0.4
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	100-120	0.08-0.25	200-400	0.15-0.4
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	-	-	-	-
<b>HONEYCOMB</b>	-	-	-	-
<b>MMC</b> Metal Matrix Composite	60-80	0.005-0.007	-	-

# MILLING - STRAIGHT ENDMILLS

## MULTI FLUTES ENDMILL - DOWN SHEAR

### APPLICATION

Solid tungsten carbide endmill suitable for sizing, pockets and milling holes with fine finish. Down shear spiral for optimum chip flow and improved finish on the bottom of the FRP parts. For use on routers and machining centers.



### Metric

D	B	L	d	No. of Flutes	Uncoated	CA coating
6	25	60	6	6	73005013	CA73005013
8	32	76	8	8	73005025	CA73005025
10	40	90	10	10	73005037	CA73005037
12	35	100	12	12	73005049	CA73005049

### Imperial

D	B	L	d	No. of Flutes	Uncoated	CA coating
1/4"	1"	2 1/2"	1/4"	6	73005054	CA73005054
5/16"	1 1/4"	3"	5/16"	8	7300506Z	CA7300506Z
3/8"	1 1/2"	3 1/4"	3/8"	10	73005076	CA73005076
1/2"	2"	4"	1/2"	12	73005088	CA73005088



## MACHINING CONDITIONS RECOMMENDATION

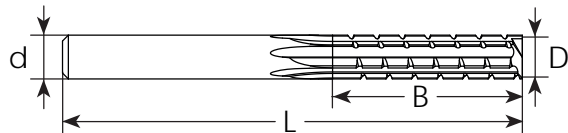
Type of composite materials	Uncoated		CA coating	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	90-130	0.08-0.25	200-350	0.15-0.4
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	100-120	0.08-0.25	200-400	0.15-0.4
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	-	-	-	-
<b>HONEYCOMB</b>	-	-	-	-
<b>MMC</b> Metal Matrix Composite	30-600	0.005-0.007	-	-

# MILLING - STRAIGHT ENDMILLS

## MULTI FLUTES ENDMILL- STRAIGHT SHEAR

### APPLICATION

Solid tungsten carbide straight shear endmill suitable for sizing, pockets and milling holes. For use on routers and machining centers.

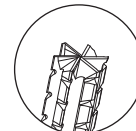


### Metric

D	B	L	d	No. of Flutes	Uncoated	CA coating
6	25	60	6	6	73007013	CA73007013
8	32	76	8	8	73007025	CA73007025
10	40	90	10	10	73007037	CA73007037
12	35	100	12	12	73007049	CA73007049

### Imperial

D	B	L	d	No. of Flutes	Uncoated	CA coating
1/4"	1"	2 1/2"	1/4"	6	73007054	CA73007054
5/16"	1 1/4"	3"	5/16"	8	7300706Z	CA7300706Z
3/8"	1 1/2"	3 1/4"	3/8"	10	73007076	CA73007076
1/2"	2"	4"	1/2"	12	73007088	CA73007088



## MACHINING CONDITIONS RECOMMENDATION

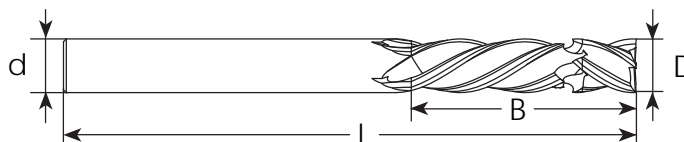
Type of composite materials	Uncoated		CA coating	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	90-130	0.08-0.25	200-350	0.15-0.4
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	100-120	0.08-0.25	200-400	0.15-0.4
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	-	-	-	-
<b>HONEYCOMB</b>	-	-	-	-
<b>MMC</b> Metal Matrix Composite	60-80	0.005-0.007	-	-

# MILLING - STRAIGHT ENDMILLS

## UP & DOWN COMPRESSION ENDMILL

### APPLICATION

Solid tungsten carbide endmill suitable for sizing, pockets, and milling holes. With fine finish. High feed rate on CFRP and GFRP parts. Carbide grade for maximum durability on abrasive material. Upshear spiral combined with down shear spiral for improved finish and prevention of delamination on top and bottom. For use on routers and machining centers.



### Metric

D	B	L	d	No. of Flutes	Uncoated	CA coating
6	20	60	6	4+4	73009013	CA73009013
8	32	76	8	4+4	73009025	CA73009025
10	40	90	10	4+4	73009037	CA73009037
12	50	100	12	6+6	73009049	CA73009049

### Imperial

D	B	L	d	No. of Flutes	Uncoated	CA coating
1/4"	1"	2 1/2"	1/4"	4+4	73009054	CA73009054
5/16"	1.1/4"	3"	5/16"	4+4	7300906Z	CA7300906Z
3/8"	1 1/2"	3 1/2"	3/8"	4+4	73009076	CA73009076
1/2"	1 3/8"	4"	1/2"	6+6	73009088	CA73009088



## MACHINING CONDITIONS RECOMMENDATION

Type of composite materials	Uncoated		CA coating	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
GFRP Glass Fiber Reinforced Thermosetting Plastics	90-130	0.03-0.07	200-350	0.05-0.13
CFRP Carbon Fiber Reinforced Thermosetting Plastics	100-120	0.03-0.07	200-400	0.05-0.13
AFRP Aramid Fiber Reinforced Thermosetting Plastics	-	-	-	-
HONEYCOMB	-	-	-	-
MMC Metal Matrix Composite	30-600	0.005-0.007	30-600	0.005-0.007

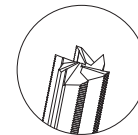


# MILLING - STRAIGHT ENDMILLS

## ARAMID ENDMILL - POLISHED STRAIGHT ENDMILL

### APPLICATION

Solid tungsten carbide endmill suitable for sizing, pockets and milling holes in parts with resin, fine finish. AFRP carbide grade for maximum durability on abrasive materials. For use on routers and machining centers.



### Metric

D	B	L	d	No. of Flutes	Uncoated
6	16	60	6	2+2	73011013
10	22	80	10	2+2+2	73011027

øD	Flat end	B	Z	L	ød
6.35	73017054	25.4	3	63.5	6.35
9.52	73017026	38.1	4	76.0	9.52
12.7	73017068	50.8	5	101.6	12.7

### Imperial

D	B	L	d	No. of Flutes	Uncoated
1/4"	5/8"	2 1/2"	1/4"	2+2	73011034
3/16"	5/8"	2 1/2"	3/16"	2+2	7301105z
3/8"	7/8"	3 1/4"	3/8"	2+2+2	73011046

## MACHINING CONDITIONS RECOMMENDATION

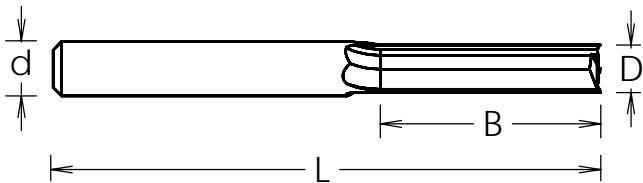
Type of composite materials	Uncoated		CA coating	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
GFRP Glass Fiber Reinforced Thermosetting Plastics	-	-	-	-
CFRP Carbon Fiber Reinforced Thermosetting Plastics	-	-	-	-
AFRP Aramid Fiber Reinforced Thermosetting Plastics	80-100	0.1-0.2	-	-
HONEYCOMB	-	-	-	-
MMC Metal Matrix Composite	-	-	-	-

# MILLING - STRAIGHT ENDMILLS

## ARAMID ENDMILL - SLOTTED STRAIGHT ENDMILL

### APPLICATION

Text Text Text Text Text Text Text Text Text



### Metric

D	B	L	d	No. of Flutes	Uncoated
6	25	70	6	3	73017233
10	40	80	10	4	73017247
12	50	100	12	5	73017259

### Imperial

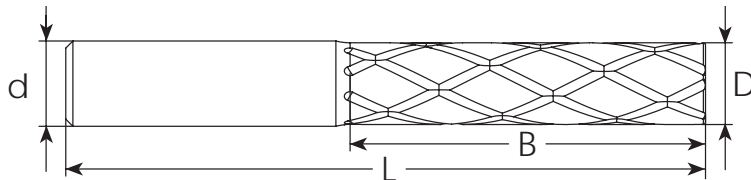
D	B	L	d	No. of Flutes	Uncoated
6.35	25.4	63.5	6.35	3	73017204
9.52	38.1	76	9.52	4	73017216
12.7	50.8	101.6	12.7	5	73017228

# MILLING - STRAIGHT ENDMILLS

## ELECTRO PLATED ENDMILL

### APPLICATION

Alloy steel endmill coated with diamonds, suitable for sizing and pockets milling on GFRP/ CFRP/ AFRP or metal matrix parts, fine-finish. For use on routers and machining centers.



Milling

### Metric

D	B	L	d	Diamond Coated	
				Fine	Rough
3	9	45	6	CA73013013	CAa73014013
4	12	50	6	CA73013023	CA73014023
5	15	55	6	CA73013033	CA73014033
6	25	60	6	CA73013043	CA73014043
8	30	65	8	CA73013055	CA73014055
10	40	80	10	CA73013067	CA73014067
12	50	90	12	CA73013079	CA73014079

### Imperial

D	B	L	d	Diamond Coated	
				Fine	Rough
1/8"	3/8"	1 3/4"	1/4"	CA73013084	CA73014084
5/32"	1/2"	2"	1/4"	CA73013094	CA73014094
3/16"	5/8"	2 1/4"	1/4"	CA73013104	CA73014104
1/4"	1"	2 1/2"	1/4"	CA73013114	CA73014114
5/16"	1 1/4"	2 1/2"	5/16"	CA7301312Z	CA7301412Z
3/8"	1 5/8"	3 1/4"	3/8"	CA73013136	CA73014136
1/2"	2"	4 1/2"	1/2"	CA73013148	CA73014148

## MACHINING CONDITIONS RECOMMENDATION

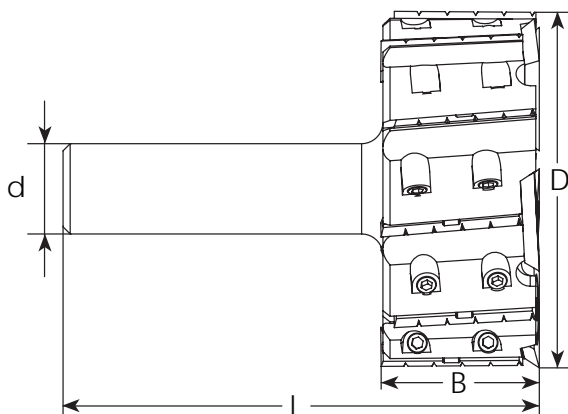
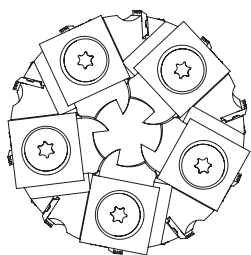
Type of composite materials	Uncoated		Electro plated	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Sec)	Feed (mm/REV)
GFRP Glass Fiber Reinforced Thermosetting Plastics	-	-	40-70	0.005-0.1
CFRP Carbon Fiber Reinforced Thermosetting Plastics	-	-	40-70	0.005-0.1
AFRP Aramid Fiber Reinforced Thermosetting Plastics	-	-	40-70	0.005-0.1
HONEYCOMB	-	-		
MMC Metal Matrix Composite	-	-	40-70	0.005-0.008

# MILLING - HOGGER

## HOGGER ENDMILL

### APPLICATION

Alloy steel body with disposable tungsten carbide knives suitable for sizing and flatness of honeycomb parts. Disposable tungsten carbide inserts for maximum durability.



### Metric

D	B	L	d	No. of Flutes	Uncoated
50	22	67	12	10	73015018

### SPARE PARTS

T.C. Blade	T.C. Blade	Torx screw	Allen screw	Torx key	Allen key
# 320 838 7	# 300 850 3	#193 370 0	#193 035 0	#194 106 0	#194 008 0
20x5.5x11	14x14x2	M5x6.1	M3x4	T20	S1.5

### MACHINING CONDITIONS RECOMMENDATION

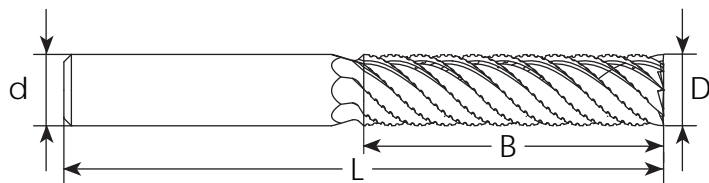
Type of composite materials	Uncoated		CA coating	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	-	-	-	-
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	-	-	-	-
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	-	-	-	-
<b>HONEYCOMB</b>	40-100	0.3-1	-	-
<b>MMC</b> Metal Matrix Composite	-	-	-	-

# MILLING - HOGGER

## HOGGER ENDMILL

### APPLICATION

Solid tungsten carbide endmill, suitable for sizing and flatness of honeycomb parts. Carbide will offer maximum durability. For use on routers and machining centers.



Milling

### Metric

D	B	L	d	No. of Flutes	Uncoated
10	40	80	10	8	73017017



### Imperial

D	B	L	d	No. of Flutes	Uncoated
3/8"	7/8"	3"	3/8"	8	73017026

## MACHINING CONDITIONS RECOMMENDATION

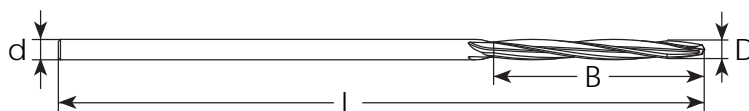
Type of composite materials	Uncoated		CA coating	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
GFRP Glass Fiber Reinforced Thermosetting Plastics	-	-	-	-
CFRP Carbon Fiber Reinforced Thermosetting Plastics	-	-	-	-
AFRP Aramid Fiber Reinforced Thermosetting Plastics	-	-	-	-
HONEYCOMB	40-100	0.3-1	-	-
MMC Metal Matrix Composite	-	-	-	-

# DRILLING - SOLID CARBIDE DRILLS

## MANUEL FEED THROUGH HOLE DRILLS

### APPLICATION

Solid tungsten carbide drill, suitable for making clean through holes by manual feed. Carbide will offer maximum durability.



### Imperial

D	B	L	d	Uncoated
0.1285"	2"	6"	0.1285"	7302301Z
0.190"	2"	6"	0.190"	7302302Z
0.204"	2"	6"	0.204"	7302303Z
0.2244"	2"	6"	0.2244"	7302304Z
0.250"	2"	6"	0.250"	73023054
0.257"	2"	6"	0.257"	7302306Z
0.269"	2"	6"	0.269"	7302307Z
0.3125"	2"	6"	0.3125"	7302308Z

## MACHINING CONDITIONS RECOMMENDATION

Type of composite materials	Max. R.P.M.
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	Max 6000
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	Max 6000
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	Max 6000
<b>HONEYCOMB</b>	Max 6000
<b>MMC</b> Metal Matrix Composite	-

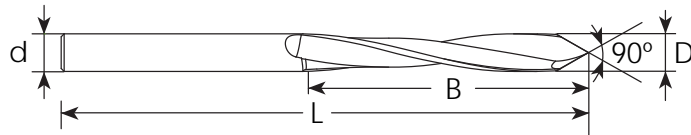


# DRILLING - SOLID CARBIDE DRILLS

## CONTROLLED FEED THROUGH HOLE DRILLS

### APPLICATION

Solid tungsten carbide drill, suitable for making clean through holes by controlled feed.



### Metric / Imperial

D	B	L	d	Mirror finish	CA coating
2.5	20	55	3	7302513z	CA7302513z
2.5	13	50	3	7302518z	CA7302518z
3	15	50	3	7302519z	CA7302519z
3.1	15	50	3	7302520z	CA7302520z
3.1	20	55	3	7302517z	CA7302517z
3.25	20	55	4	7302514z	CA7302514z
4.1	40	76	6	73025013	CA73025013
4.2	20	55	5	7302515z	CA7302515z
5.04	36	76	6	73025033	CA73025033
6	36	76	6	73025043	CA73025043
6	40	76	6	73025053	CA73025053
6.7	35	100	8	7302516z	CA7302516z
10	2 1/2"	102	10	73025107	CA73025107
1/4"	1 27/64"	3"	1/4"	73025064	CA73025064
1/4"	2"	3.5"	1/4"	73025074	CA73025074
3/16"	40	3"	6	73025023	CA73025023
3/8"	63	4"	3/8"	73025096	CA73025096
1/2"	3"	4"	1/2"	73025128	CA73025128
5/16"	50	89	5/16"	7302508z	CA7302508z
7/16"	3"	4"	7/16"	7302511z	CA7302511z



Drilling

## MACHINING CONDITIONS RECOMMENDATION

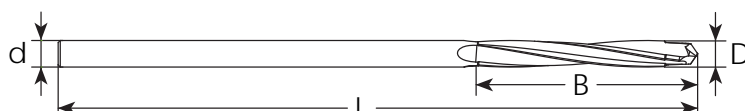
Type of composite materials	Uncoated		CVD coating	
	Vc (m/Min)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	90-130	0.01-0.05	200-350	0.01-0.05
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	100-120	0.01-0.05	200-400	0.01-0.05
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	70-100	0.01-0.03	150-300	0.01-0.05
<b>HONEYCOMB</b>	100-120	0.01-0.05	200-400	0.01-0.05
<b>MMC</b> Metal Matrix Composite				

# DRILLING - SOLID CARBIDE DRILLS

## MANUAL THROUGH HOLE STEP DRILLS

### APPLICATION

Solid tungsten carbide through hole step drill, suitable for making clean through holes in metal matrix composite.



### Imperial

D	B	d	L	Uncoated
0.1285"	2"	0.1285"	6"	7302701Z
0.190"	2"	0.190"	6"	7302702Z
0.204	2"	0.204	6"	7302703Z
0.2244"	2"	0.2244"	6"	7302704Z
0.250"	2"	0.250"	6"	73027054
0.257"	2"	0.257"	6"	7302706Z
0.269"	2"	0.269"	6"	7302707Z
0.3125"	2"	0.3125"	6"	7302708Z

## MACHINING CONDITIONS RECOMMENDATION

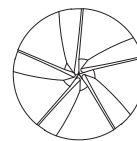
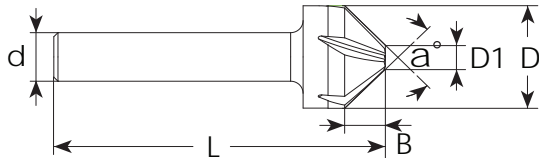
Type of composite materials	Max. R.P.M.
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	Max 6000
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	Max 6000
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	Max 6000
<b>HONEYCOMB</b>	
<b>MMC</b> Metal Matrix Composite	Max 6000

# DRILLING - SOLID CARBIDE DRILLS

## COUNTERSINK

### APPLICATION

Solid Tungsten carbide head suitable for making countersink of 90° or 100°, carbide grade offers maximum durability.



Drilling

### Metric

D	B	L	d	No. of Flutes	a°	D1	Uncoated
12	4	40	6	5	100°	3	73018023
12.7	5	40	6	5	90°	3	73018013
16	5	40	8	5	100°	4	73018045
16	6	40	8	5	90°	4	73018035
1/2"	5	40	1/4	5	90°	3	73018014
5/8"	6	50	1/2	5	90°	4	73018038

## MACHINING CONDITIONS RECOMMENDATION

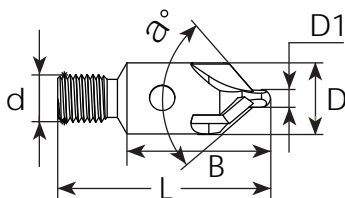
Type of composite materials	Max. R.P.M.
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	Max 6000
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	Max 6000
<b>HONEYCOMB</b>	Max 6000
<b>MMC</b> Metal Matrix Composite	Max 6000

# DRILLING - SOLID CARBIDE DRILLS

## COUNTERSINK WITH INTEGRAL PILOT FOR MICROSTOP

### APPLICATION

Countersink of 100° to be used with microstop 1/4"-28 thread.



### Imperial

D	B	L	d	No. of Flutes	a°	D1	Uncoated
3/8"	3/4"	1 1/8"	1/4"-28	3	100°	3/32"	7302001z
3/8"	3/4"	1 1/8"	1/4"-28	3	100°	11/64"	7302004z
3/8"	3/4"	1 1/8"	1/4"-28	3	100°	5/32"	7302005z
1/2"	11/16"	1 1/8"	1/4"-28	3	100°	3/32"	7302002z
1/2"	11/16"	1 1/8"	1/4"-28	3	100°	5/16"	7302006z
1/2"	11/16"	1 1/8"	1/4"-28	3	100°	11/64"	7302007z
1/2"	11/16"	1 1/8"	1/4"-28	3	100°	5/32"	7302008z
1/2"	11/16"	1 1/8"	1/4"-28	3	100°	7/32"	7302009z
5/8"	53/64"	1 1/4"	1/4"-28	3	100°	1/8"	7302003z

### MACHINING CONDITIONS RECOMMENDATION

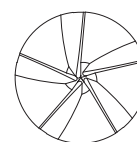
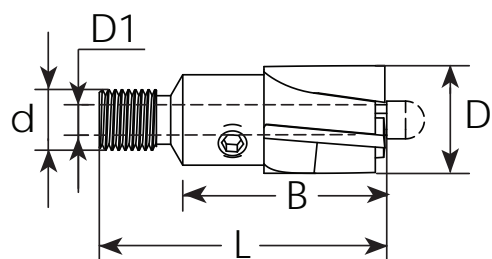
Type of composite materials	Max. R.P.M.
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	Max 6000
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	Max 6000
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	Max 6000
<b>HONEYCOMB</b>	Max 6000
<b>MMC</b> Metal Matrix Composite	Max 6000

# DRILLING - SOLID CARBIDE DRILLS

## COUNTERBORE WITH BORE FOR EXCHANGABLE PILOT FOR MICROSTOP

### APPLICATION

Counterbore to be used with microstop.



### Metric / Imperial

D	B	L	d	No. of Flutes	D1 Bore diameter D1 Lochdurchmesser	Uncoated
11.4	20	30	1/4"-28	3	1/8"	7302101Z
14.2	20	30	1/4"-28	3	1/8"	7302102Z
17.4	30	40	7/16"-28	3	3/16"	7302103Z

Pilot Table on Page 26

### MACHINING CONDITIONS RECOMMENDATION

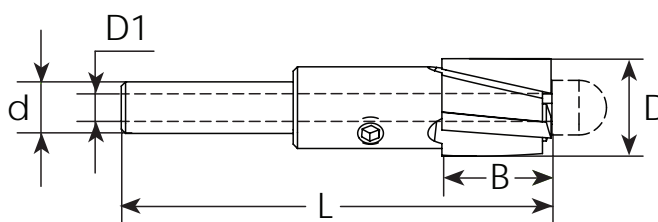
Type of composite materials	Max. R.P.M.
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	Max 6000
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	Max 6000
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	Max 6000
<b>HONEYCOMB</b>	Max 6000
<b>MMC</b> Metal Matrix Composite	

# DRILLING - SOLID CARBIDE DRILLS

## COUNTERBORE WITH BORE FOR EXCHANGABLE PILOT

### APPLICATION

Counterbore.



Metric / Imperial

D	B	L	d	No. of Flutes	D1	Uncoated
11.4	12.7	50	6	3	1/8"	73022013
14.2	12.7	50	6	3	1/8"	73022023
17.4	12.7	50	8	3	3/16"	73022035

Pilot Table on Page 26

### MACHINING CONDITIONS RECOMMENDATION

Type of composite materials	Max. R.P.M.
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	Max 6000
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	Max 6000
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	Max 6000
<b>HONEYCOMB</b>	Max 6000
<b>MMC</b> Metal Matrix Composite	Max 6000

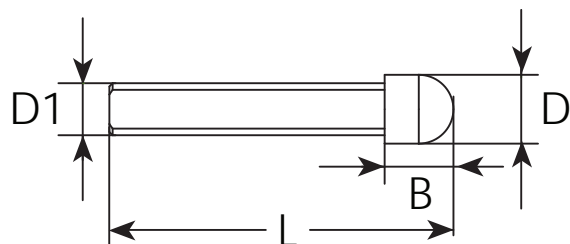


# DRILLING - ACCESSORIES

## EXCHANGABLE PILOT

### APPLICATION

Exchangable pilot tools, for use with product codes: 730210 & 730220. On pages 24-25.



### Imperial

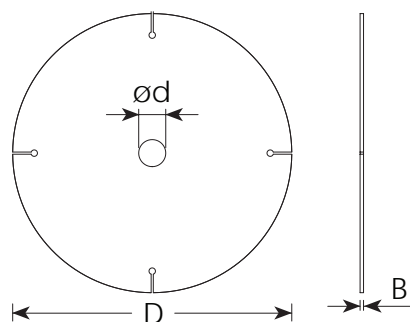
D	B	L	D1	Uncoated
5/32"	5/32"	1 5/32"	1/8"	7301901Z
3/16"	3/16"	1 6/32"	1/8"	7301902Z
7/32"	7/32"	1 7/32"	1/8"	7301903Z
1/4"	1/4"	1 8/32"	1/8"	7301904Z
9/32"	9/32"	1 9/32"	1/8"	7301905Z
5/16"	5/16"	1 10/32"	1/8"	7301906Z
1/4"	1/4"	1 1/4"	3/16"	7301907Z
3/8"	3/8"	1 3/8"	3/16"	7301908Z
1/2"	1/2"	1 1/2"	3/16"	7301909Z
5/8"	5/8"	1 5/8"	3/16"	7301910Z

# SAWING - DIAMOND SAW

## ELECTRO PLATED DIAMOND DISK

### APPLICATION

Electro plated diamond disk suitable for straight fast cutting of variable height, can be used on table saw, hand saw and angle grinder.



### Metric

D	B	d	Grade	Electro plated coating
60	1.4	6	Fine	73033043
100	2.2	22	Standard	73033034
125	2.2	22	Standard	73033064
180	2.0	16	Rough	7303305Z
250	3.0	30	Rough	73033026
300	3.0	30	Rough	73033016

## MACHINING CONDITIONS RECOMMENDATION

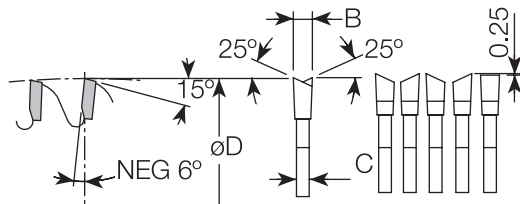
Type of composite materials	Uncoated		CVD coating	
	Vc (m/Sec)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	40-70	-	-	-
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	90-70	-	-	-
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	40-70	-	-	-
<b>HONEYCOMB</b>	40-70	-	-	-
<b>MMC</b> Metal Matrix Composite	30-50	-	-	-

# SAWING - DIAMOND SAW

## SOLID CARBIDE TIPPED DISK

### APPLICATION

Solid carbide tipped disk mounted on an arbor. Suitable for straight, fast cutting of edges at variable heights. Can be used on 5-axis CNC machines. Ideal for use on honeycomb parts with outer layer of GFRP - Glass Fiber Reinforced Thermosetting Plastics, CFRP - Carbon Fiber Reinforced Thermosetting Plastics, diamond and AFRP - Aramid Fiber Reinforced Plastics.



øD	B	Code No.	c	Teeth	ød		n
100	2.4	95801611	1.8	30	15.87	4x7.1xø30	
150	2.4	95801621	1.8	45	15.87	4x7.1xø30	

## ELECTRO-PLATED DIAMOND DISK

### APPLICATION

Electro-plated diamond disk mounted on an arbor. Suitable for straight, fast cutting of edges at variable heights. Can be used on 5-axis CNC machines. Ideal for GFRP - Glass Fiber Reinforced Thermosetting Plastics and CFRP - Carbon Fiber Reinforced Thermosetting Plastics. Diamond grain size can be adapted to the cutting quality required.



øD	B	Code No.	c	Grade	ød		n
100	3.0	73033161	2.0	Rough	15.87	4x6.5xø30	
150	3.0	73033171	2.6	Fine	15.87	4x5.3xø30	

## CNC ARBOR

### SPARE PARTS

1930426 M5x12	1940035 S3



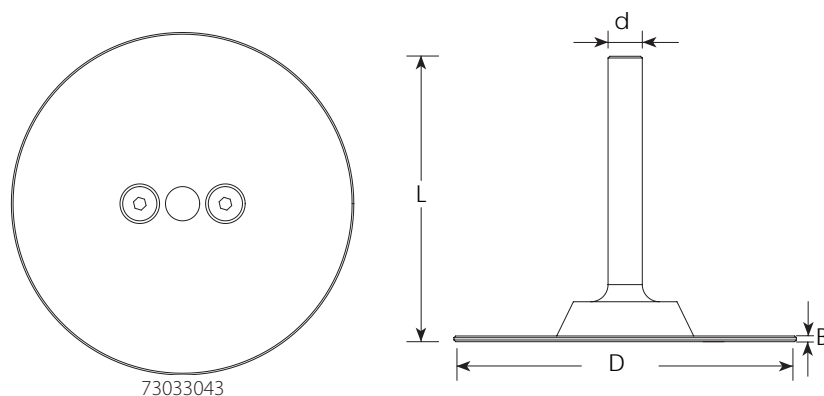
øD	øD1	Code No.	L		ød
45.0	15.87	1901218	82.55	4xM5xø30	12.7
40.0	15.87	1902292	150.0	4xM5xø30	19.05
40.4	15.87	1902290	150.0	4xM5xø30	20.0

# SAWING - DIAMOND SAW

## ELECTRO PLATED DIAMOND DISK

### APPLICATION







Electro plated diamond disk suitable for trimming, sanding and cutting of variable height, can be used with pneumatic hand tools. The mini slotter can be replaced.



### Metric

D	B	L	d	Electro plated coating Set
60	1.4	50	6	7303305Z
60	1.4	50	6.35	73033054
60	1.4	100	12.7	73033058

### SPARE PARTS

					
73033043 60x1.4	1900263 d = 6	1900264 d = 6.35	1900268 d = 12.7	1930401 M3x5	1940200 S2

### MACHINING CONDITIONS RECOMMENDATION

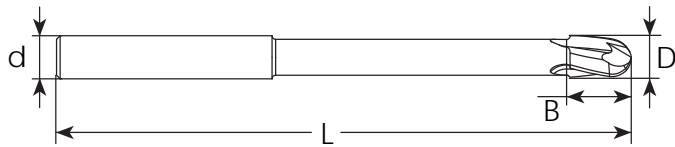
Type of composite materials	Uncoated		CA coating	
	Vc (m/Sec)	Feed (mm/REV)	Vc (m/Min)	Feed (mm/REV)
<b>GFRP</b> Glass Fiber Reinforced Thermosetting Plastics	40-70	-	-	-
<b>CFRP</b> Carbon Fiber Reinforced Thermosetting Plastics	90-70	-	-	-
<b>AFRP</b> Aramid Fiber Reinforced Thermosetting Plastics	40-70	-	-	-
<b>HONEYCOMB</b>	40-70	-	-	-
<b>MMC</b> Metal Matrix Composite	30-50	-	-	-

# TOOLS FOR MOLDS

## BALL NOSE ENDMILL

### APPLICATION

Solid tungsten carbide router, suitable for round corner, edges, pockets and 3D curving. For use in all types of materials such as MDF, plastics and aluminium. All tools made with neck clearance for deep cuts.

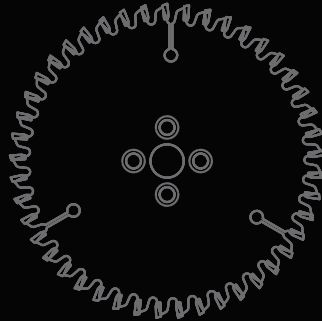
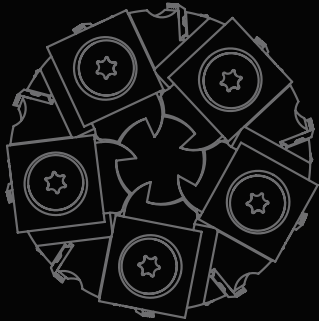


### Metric

D	B	L	d	No. of Flutes	Uncoated
6	9	80	6	3	73034013
8	12	85	8	3	73034025
10	15	100	10	3	73034037
12	16	100	12	3	73034049
16	25	150	16	4	7303405E

### Imperial

D	B	L	d	No. of Flutes	Uncoated
1/4"	3/8"	3"	1/4"	3	73034064
5/16"	1/2"	3 1/2"	5/16"	3	7303407Z
3/8"	5/8"	4"	3/8"	3	73034086
1/2"	3/4"	5"	1/2"	3	73034098
5/8"	1"	6 1/2"	5/8"	4	7303410Z



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