# Tools for COMPOSITES



### Composite Solutions

Scan this code to view:

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

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



### **CPCD-203 – Best Trimming Tool for Composites**

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

### Features:

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

# Composite Application **TOOLS**

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#### 100° Countersink with Threaded Shank and Diamond Coated Insert

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

### **COUNTERSINK BODIES**

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

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

### **COUNTERSINK INSERTS**

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

### Single Shot PCD Diamond Drills **PCD**





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

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

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

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

### **PCD** PCD-Tipped Diamond Drills





 $\begin{array}{l} \mbox{PCD-Tipped Drills Tolerances} \\ \mbox{Drill Dia.} &= +0.0000/-0.0005 \\ &+ 0.0000/-0.0013 mm \\ \mbox{Shank Dia.} &= -0.0001/-0.0002 \\ &- 0.002/-0.005 mm \\ \mbox{Flute Length} &= +0.030 \\ &+ 0.762 mm \\ \mbox{OAL} &= +0.060 \\ &+ 1.5 mm \\ \end{array}$ 



Any diameter available from .0620" to .5000"

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



R RobbJac

### Best Performing Drill in most Composites

Single Shot Drills and Reams in one operation





### **PCD** W Point PCD-Tipped Standard Length

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

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

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

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



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



#### See RobbJack Videos at



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

### PCD-Tipped Diamond Drills **PCD**



0AL = +0.060

+1.5mm

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



#### PCD 118° PCD-Tipped Standard Length – 4 Facet

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

Flute Lengt



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

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

# BG SOLUTIONS

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

#### Thru Coolant holes available per request

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



### P810/F104 Diamond Coated Aircraft Drills







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





#### **F104** Elliptical Diamond Coated Standard Length Drills

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



Get the advantage of geometries that used to be only available in carbide. Get the wear resistance of Diamond and the ability to re-sharpen PCD drills. Solid PCD Tips Available per request. Call or email for a quote.

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### Diamond Coated Drill/Reamer **P810**





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

### **P810** 4 Flute Diamond Coated Drill/Reamer

Drill	Tolerance fr	rom Nominal	Flute	Overall	Shank	Lead/Tip	Reach	Tool Number 🗨
Dlameter	Minimum	Maximum	Length	Length	Diameter	Length	Reach	Diamond Coated
0.1280"	+.0002"	0000"	1"	3"	1/4"	0.325	1-3/4"	P810-100512-1
0.1620"	+.0002"	0000"	1"	3"	1/4"	0.3668	1-3/4"	P810-100513-1
0.1910"	+.0002"	0000"	1-1/2"	3-1/2"	1/4"	0.475	2"	P810-100486-1
0.2240"	+.0002"	0000"	1-1/2"	3-1/2"	1/4"	0.418	2"	P810-100495-1
0.2340"	+.0002"	0000"	1-1/2"	3-1/2"	1/4"	0.5232	2-1/8"	P810-100551-1
0.2510"	+.0002"	0000"	1-1/2"	3-1/2"	1/4"	0.4684		P810-100494-1
0.2640"	+.0002"	0000"	1-1/2"	3-1/2"	1/4"	0.59		P810-100510-1
0.2730"	+.0002"	0000"	1-1/2"	3-1/2"	1/4"	0.617		P810-100537-1
0.3140"	+.0002"	0000"	1-1/2"	3-1/2"	1/4"	0.7059		P810-100549-1

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

## **SPECIALS**

### RobbJack can design and build a tool to your specifications.

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

- Reduced shank

- Multistep tools

#### **Typical Requests**

- Tighter tolerances
- Special corner radius
- Special angle







### **P810** Diamond Coated Standard Drills



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

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



<b>P81</b> 0	rills (4 facet)				
Cutting Diameter	Tolerance Minimum	Tolerance Maximum	Flute Length	Overall Length	Tool Number Diamond Coated
1/32"	-0.0003"	+0.0005"	5/16"	1-1/4"	P810-100180-1
1/16"	-0.0001"	+0.0006"	3/4"	1-1/2"	P810-100023-1
3/32"	-0.0001"	+0.0006"	1"	2"	P810-100016-1
1/8"	+0.0001"	+0.0010"	1-1/4"	2-1/4"	P810-100024-1
3/16"	+0.0003"	+0.0011"	1-5/8"	2-3/4"	P810-100027-1
1/4"	+0.0006"	+0.0016"	2"	3-1/4"	P810-100002-1





#### **P810** 2 Flute Cernter Drills (only one end coated)

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

#### PCD-Tipped Router Bits **CPCD/MCPCD** QUANTITY DISCOUNTS Available at Qty 7, 13 and 20+



ŧ Shank

Diamete

ŧ







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Cutting Diamete

1/8"

3/16'

1/4"

3/8"

1/2"

5/8"

Shank Diameter

1/8"

3/16"

1/4"

3/8"

1/2"

5/8"

#### Flute Length **MCPCD** Tolerances Cutting Dia. = $\pm 0,076$ mm Shank Dia. = -0,003/-0,005 mm Flute Length = $\pm 0,76$ mm $OAL = \pm 1,5mm$

PCD-203 2 Flute Square End Standard Length

Overall Length

1-1/2"

2"

2"

2-1/2'

3"

3-1/2"

4"

Flute Length

3/8"

1/2"

5/8"

3/4"

1"

1"

1"

Overall Length





Drill Ti

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CPCD-203 2 Flute Drill Point Composite Standard Length

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



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

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

3/4"	3/4"	1"	4
	MCP	<b>CD-20</b>	<b>3</b> METRIC

2 Flute Square End Composite Std. Lgth.

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





### PCD-201BN 2 Flute Ball End Stub Length

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







### PCD-203 2 Flute Square End Standard Length

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

Diame

New

specifically

designed for

**Materials** 

Tool Number

PCD-203-04-CF

PCD-203-06-CF

PCD-203-08-CF

PCD-203-12-CF

PCD-203-16-CF

PCD-203-20-CF

PCD-203-24-CF

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PCD Grade & Geometries

## **CR/MCR** Compression Router



6

4





#### **CR** Tolerances

Cutting Dia. = -.001/-.003Shank Dia. = -.0001/-.0002Flute Length (<0.3125) = +.020/+.030(>0.3125) = +.030/+.060 $\mathsf{OAL}~=~\pm.060$ 

#### **MCR** Tolerances

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







**CR** Compression Router – 4/6 Flute Uncoated

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

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

# **DLC COATED**





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

METRIC

CR	compress	ion Rout	ter – 4/6	Flute B	lack Wid	ow DLC Coated	MC	<b>R</b> Comp	ression	Router –	4/6 Flu	te Black	Widow DLC Coated
Cutting Diameter	Shank Diameter	Number of Flutes	Upshear Length	Flute Length	Overall Length	Tool Number DLC Coated	Cutting Diameter	Shank Diameter	Number of Flutes	Upshear Length	Flute Length	Overall Length	Tool Number 🔊 🔊
1/4"	1/4"	4	3/16"	3/4"	2-1/2"	CR-402-08-DLC	6mm	6mm	4	5mm	20mm	63mm	MCR-402-06-DLC
3/8"	3/8"	6	1/4"	1"	2-1/2"	CR-602-12 <b>-DLC</b>	10mm	10mm	6	6mm	25mm	63mm	MCR-602-10-DLC
1/2"	1/2"	6	1/4"	1-1/8"	3"	CR-602-16 <b>-DLC</b>	12mm	12mm	6	6mm	28mm	76mm	MCR-602-12 <b>-DLC</b>



**CR** Compression Router – 4/6 Flute Diamond Coated

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



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

			1				
Cutting Diameter	Shank Diameter	Number of Flutes	Upshear Length	Flute Length	Overall Length	Tool Number Diamond Coated <del>(</del>	2
6mm	6mm	4	5mm	20mm	63mm	MCR-402-06 <b>-D</b>	
10mm	10mm	6	6mm	25mm	63mm	MCR-602-10 <b>-D</b>	
12mm	12mm	6	6mm	28mm	76mm	MCR-602-12 <b>-D</b>	



## Carbide Composite Router **CE/MCE**

Characteristics Square End 6 Flute 8 Flute	
Applications	Dry Wet Cold Air Spray Mist
Materials Composites	
Coatings Coated (DCC) Diamond-Like Carbon (DLC)	
Overall Length     Overall	CE Tolerances         MCE Tolerances           Cutting Dia. $001/003$ Cutting Dia. $-0.025/-0.075$ mm           Shank Dia. $0001/0002$ Shank Dia. $-0.002/-0.005$ mm           Flute Length ( $<0.3125$ ) $+.020/+.030$ Flute Length $= +0.500/+1.500$ mm $(>0.3125)$ $+.030/+.060$ OAL $= \pm 10$ mm





CE Carbide Composite Router – 6/8 Flute Uncoated

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



MCE Carbide Composite Router – 6/8 Flute Uncoated METRIC

				1	
Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number Uncoated
6mm	6mm	6	20mm	63mm	MCE-602-06
10mm	10mm	8	25mm	63mm	MCE-802-10
12mm	12mm	8	28mm	76mm	MCE-802-12







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

			-,-							-/		
Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number DLC Coated	Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Overall Length	Tool Number / Real DLC Coated	
1/4"	1/4"	6	3/4"	2-1/2"	CE-602-08-DLC	6mm	6mm	6	20mm	63mm	MCE-602-06 <b>-DLC</b>	
3/8"	3/8"	8	1"	2-1/2"	CE-802-12-DLC	10mm	10mm	8	25mm	63mm	MCE-802-10-DLC	
1/2"	1/2"	8	1-1/8"	3"	CE-802-16-DLC	12mm	12mm	8	28mm	76mm	MCE-802-12-DLC	



CE Carbide Composite Router – 6/8 Flute Diamond Coated

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



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

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

METRIC

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



6mm

6mm

6mm

8mm

10mm

12mm

 $4 \, \text{mm}$ 6 m m

6 m m

8<sub>mm</sub>

10mm

12mm

14 mm

14mm

22mm

25mm

25mm

50mm

57 mm

63mm

72mm

83mm

MPM-106-05

MPM-106-06

MPM-108-08

MPM-110-10

MPM-112-12

### Replaceable Tip End Mills **P820**



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

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

14	<b>P820</b>	4 & 6 Flut	e 1/2" Re	eplaceable T	'ip End Mill (w	ith 1/4" h6 s	hank)
914	Cutting Diameter	Shank Diameter	Flute Length	Flute Number	Corner Radius	Overall Length	Tool Number Diamond Coated
	1/2"	1/4"	1/2"	6	Sq. End	1-1/2"	P820-201143-1
	1/2"	1/4"	1/2"	4	Sq. End	1-1/2"	P820-201142-1
	1/2"	1/4"	1/2"	4	.030"	1-1/2"	P820-201206-1
	1/2"	1/4"	1/2"	4	Ball End	1-1/2"	P820-201145-1



### **P38** Lightning Diamond Coated Series End Mills





### P38 2 Flute Lightning Diamond Coated End Mills

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



#### **P38** 4 Flute Lightning Diamond Coated End Mills

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



Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number	₽
1/16"	1/8"	3/16"	Ball End	_	1-1/2"	P38-200175-1	
1/16"	1/8"	3/16"	Ball End	_	3"	P38-005128-1	
1/16"	1/8"	3/16"	Sa. End	3/4"	3"	P38-005132-1	
1/16"	1/8"	3/16"	.010"	3/4"	3"	P38-005133-1	
1/16"	1/8"	3/16"	Ball End	3/4"	3"	P38-005131-1	
1/16"	1/8"	3/16"	Sa. End	1"	3"	P38-005135-1	
1/16"	1/8"	3/16"	.010"	1"	3"	P38-005136-1	
1/16"	1/8"	3/16"	Ball End	1"	3"	P38-005134-1	
3/32"	3/32"	3/32"	Sq. End	11/32"	3"	P38-005158-1	
3/32"	3/32"	3/32"	Ball End	11/32"	3"	P38-005157-1	
3/32"	1/8"	9/32"	Sq. End		3"	P38-005138-1	
3/32"	1/8"	9/32"	.010"		3"	P38-005139-1	
3/32"	1/8"	9/32"	Ball End		3"	P38-005137-1	
3/32"	1/8"	9/32"	Sq. End	1"	3"	P38-005141-1	
3/32"	1/8"	9/32"	.010"	1"	3"	P38-005142-1	
3/32"	1/8"	9/32"	Ball End	1"	3"	P38-005140-1	
3/32"	1/8"	9/32"	Sq. End	1-1/2"	3"	P38-005144-1	
3/32"	1/8"	9/32"	.010"	1-1/2"	3"	P38-005145-1	
3/32"	1/8"	9/32"	Ball End	1-1/2"	3"	P38-005143-1	
3/32"	1/8"	3/8"	Sq. End	—	1-1/2"	P38-200002-1	
3/32"	1/8"	3/8"	Ball End		1-1/2"	P38-200004-1	
1/8"	1/8"	1/8"	Sq. End	5/8"	3"	P38-005160-1	
1/8"	1/8"	1/8"	.015"	5/8"	3"	P38-005161-1	
1/8"	1/8"	1/8"	.031"	5/8"	3"	P38-005162-1	
1/8"	1/8"	1/8"	Ball End	5/8"	3"	P38-005159-1	
1/8"	1/8"	3/8"	Sq. End		3"	P38-005147-1	
1/8"	1/8"	3/8"	.010"		3"	P38-005148-1	
1/8"	1/8"	3/8"	Ball End	_	3"	P38-005146-1	
1/8"	1/8"	3/8"	Sq. End	1"	3"	P38-005150-1	
1/8"	1/8"	3/8"	.010"	1"	3"	P38-005151-1	
1/8"	1/8"	3/8"	Ball End	1"	3"	P38-005149-1	
1/8"	1/8"	3/8"	Sq. End	2"	3"	P38-005153-1	
1/8"	1/8"	3/8"	.010"	2"	3"	P38-005154-1	
1/8"	1/8"	3/8"	Ball End	2"	3"	P38-005152-1	
1/8"	1/8"	1/2"	Sq. End		1-1/2"	P38-200006-1	
1/8"	1/8"	1/2"	Ball End		1-1/2"	P38-200008-1	
1/8"	1/8"	I"	Sq. End		3"	P38-200010-1	
1/8"	1/8"	l"	Ball End		3"	P38-200012-1	
3/16"	3/16"	3/16"		0.688	3	P38-005164-1	
3/16"	3/16"	3/16"	.062"	0.688"	3"	P38-005165-1	
3/16"	3/16"	3/16"	Ball End	0.688	3" 0"	P38-005163-1	
3/10	3/10	5/8 E /0#	SQ. EIIU		2	P38-200014-1	
3/10	3/10	3/8 1// "	Ball Ella	2//	<u> </u>	P38-200010-1	
1/4	1/4	1/4	015"	3/4	4	P30-003107-1	
1/4	1/4	1/4	.015	3/4	4	P30-005100-1	
1/4	1/4	1/4	.030	3/4	4 //"	P30-005109-1	
1/4	1/4	1/4	Ball End	3/4	4 //"	P38 005166 1	
1/4	1/4	2//	Sa End	5/4	4 2_1/2"	P38 200022 1	
1/4	1/4	3/4	Ball End		2-1/2	P38_200022-1	
1/4	1/4	1_1/4"	Sa End		3"	P38-200024-1	
1/4	1/4"	1_1/4"	Ball End		3"	P38-200028-1	
3/8"	3/8"	7/8"	Sa End	_	2-1/2"	P38-200038-1	
3/8"	3/8"	7/8"	Ball End		2-1/2"	P38-200040-1	
1/2"	1/2"	1"	Sa End	_	.3"	P38-200054-1	
1/2"	1/2"	1"	Ball Fnd	_	3"	P38-200056-1	
1/2"	1/2"	- 2"	Sa. Fnd	_	4"	P38-200058-1	
1/2"	1/2"	2"	Ball End		4"	P38-200060-1	

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



## **P38/P820** Graphite Machining

### **Speeds and Feeds for Graphite**

#### **CUTTING FEEDS**

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

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

#### **CUTTING SPEEDS**

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





## FROM ROBBJACK: **2 Great Problem Solving Tools** Made to Order



### **Dove Tail Cutters – Cut 40 Hours Off Operation!**



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



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

## **Composites Tools in Other Sections**



