

THINK COMPOSITES

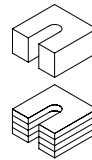


INTRODUCING ONSRUD'S COMPLETE LINE OF CUTTERS OFFERING SOLUTIONS FOR DIFFICULT TO CUT COMPOSITE MATERIALS

67-500 – CG Tool (Carbon Graphite)

The geometry of these tools increases the amount of effective cutting flutes resulting in superior performance over a standard burr.

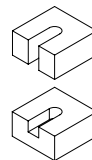
PART #	GED	CEL	SHK DIA	OAL
67-505	1/8	1/2	1/8	2
67-508	3/16	5/8	3/16	2
67-511	1/4	3/4	1/4	3
67-514	1/4	1 1/2	1/4	3
67-517	5/16	3/4	5/16	3
67-520	3/8	1 1/8	3/8	3
67-523	1/2	1 1/8	1/2	3 1/2
67-526	1/2	2 1/8	1/2	4



67-600 – FMR (Fiber Metal Router)

Material Similar to the CG Tool, but the enhanced tooth design allows the tool to cut fiber metals and other abrasive materials quickly and easily. The special clean out flutes allows the material to be quickly removed from the cutting area improving the surface finish.

PART #	GED	CEL	SHK DIA	OAL
67-605	1/8	1/2	1/8	2
67-608	3/16	5/8	3/16	2
67-611	1/4	3/4	1/4	3
67-614	1/4	1 1/2	1/4	3
67-617	5/16	3/4	5/16	3
67-620	3/8	1 1/8	3/8	3
67-623	1/2	1 1/8	1/2	3 1/2
67-626	1/2	2 1/8	1/2	4



THINK ONSRUD

08/04

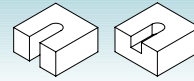


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67-400 NEW

Solid Carbide Un-Ruffer™ PATENTED



The unique design allows for the cutting performance of a burr while achieving a good surface finish.

■ Usage Composite panels

PART #	CED	CEL	SHK DIA	OAL
67-410	1/8	1/2	1/8	1 1/2
67-423	1/4	3/4	1/4	2
67-424	1/4	3/4	1/4	2 1/2
67-426	1/4	1	1/4	2 1/2

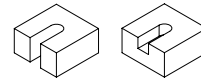
PART #	CED	CEL	SHK DIA	OAL
67-428	1/4	1	1/4	3
67-435	3/8	1	3/8	3
67-445	1/2	1	1/2	3

Tools can be diamond coated upon request



68-000 NEW

Double Edge - PCD Tipped Tooling



Designed for use in abrasive materials where cut quality and tool life are important.

■ Usage Composite panels and fiberglass

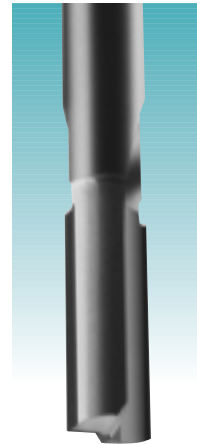
PCD TIPPED

PART #	CED	CEL	SHK DIA	OAL
68-005	1/4	3/4	1/4	3
68-010	3/8	3/4	3/8	3
68-020	1/2	3/4	1/2	4
68-030	3/4	1	3/4	4

PCD FULL FACE

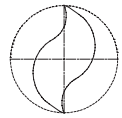
PART #	CED	CEL	SHK DIA	OAL
68-050	1/4	3/4	1/4	3
68-055	3/8	7/8	3/8	3
68-060	1/2	1 1/16	1/2	4 Down Shear
68-062	1/2	1 1/4	1/2	4
68-070	3/4	1 1/4	3/4	4
68-072	3/4	1 1/4	3/4	4 Down Shear

HELIX ANGLE = 0-3°



67-300 NEW

Double Edge - Solid Carbide Compression Spiral



Compression design for fast feed and excellent finish on both sides of the material.

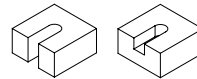
■ Usage Composite panels and honeycomb core

PART #	CED	CEL	SHK DIA	OAL	DIAMOND COATED #
67-305	1/4	7/8	1/4	2 1/2	67-305DFC
67-310*	3/8	7/8	3/8	3	-
67-314	3/8	1 1/8	3/8	3	67-314DFC

PART #	CED	CEL	SHK DIA	OAL	DIAMOND COATED #
67-320*	1/2	7/8	1/2	3	-
67-322	1/2	1 1/8	1/2	3	67-322DFC
67-324	1/2	1 5/8	1/2	4	-

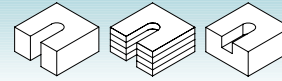
* = Mortise Compression

HELIX ANGLE = 30%



67-000
67-250

Solid Carbide Fiberglass Router



Designed as fiberglass routers. Their upcut/downcut diamond design effectively shears fibrous materials. Certain tools in the line have been further developed to cut aramid fiber composites.

■ **Usage** Fiberglass and phenolic

MEDIUM BURR W/END MILL POINT

PART #	CED	CEL	SHK DIA	OAL	DIAMOND COATED PART #
67-003	1/8	1	1/8	2	67-003DFC
67-010	1/4	3/4	1/4	2 1/2	67-010DFC
67-011	1/4	1 1/8	1/4	3	67-011DFC
67-012	1/4	1 1/4	1/4	3	67-012DFC
67-014	1/4	1 1/2	1/4	3	67-014DFC
67-017	1/4	2 1/8	1/4	4	67-017DFC
67-030	3/8	7/8	3/8	2 1/2	67-030DFC
67-021	3/8	1 1/8	3/8	3	67-021DFC

MEDIUM BURR W/PLUNGE POINT

PART #	CED	CEL	SHK DIA	OAL	DIAMOND COATED PART #
67-080	1/4	3/4	1/4	2 1/2	67-080DFC
67-120	3/8	7/8	3/8	2 1/2	67-120DFC
67-160	1/2	1	1/2	3	67-160DFC

2 FLUTE BURR

PART #	CED	CEL	SHK DIA	OAL	DIAMOND COATED PART #
67-082	1/4	3/4	1/4	2 1/2	67-082DFC
67-122	3/8	7/8	3/8	2 1/2	67-122DFC

ARAMID TOOL

PART #	CED	CEL	SHK DIA	OAL
67-084	1/4	3/4	1/4	2 1/2
67-124	3/8	7/8	3/8	2 1/2

3/E DOWNCUT DIAMOND GRIT TOOL

PART #	CED	CEL	SHK DIA	OAL
67-254	1/4	1 1/8	1/4	3

▶ **NEW TOOLS in BOLD**

MEDIUM BURR W/END MILL POINT

PART #	CED	CEL	SHK DIA	OAL	DIAMOND COATED PART #
67-023	3/8	1 5/8	3/8	3	67-023DFC
67-027	3/8	2 1/8	3/8	4	67-027DFC
67-031	1/2	1 1/8	1/2	3	67-031DFC
67-033	1/2	1 5/8	1/2	4	67-033DFC
67-037	1/2	2 1/8	1/2	4	67-037DFC
67-039	1/2	3 1/8	1/2	5	-
67-065	3/4	4 1/8	3/4	6	-

▶ **NEW TOOLS in BOLD**

MEDIUM BURR w/PLUNGE POINT

METRIC PART #	CED	CEL	SHK DIA	OAL	DIAMOND COATED PART #
67-090	4mm	16mm	6mm	50mm	67-090DFC
67-091	6mm	19mm	6mm	63mm	67-091DFC
67-092	6mm	25mm	6mm	75mm	67-092DFC
67-093	8mm	25mm	8mm	63mm	67-093DFC
67-094	10mm	25mm	10mm	75mm	67-094DFC
67-095	12mm	25mm	12mm	75mm	67-095DFC

2 FLUTE BURR

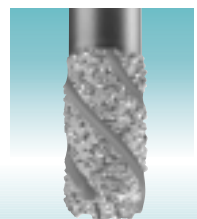
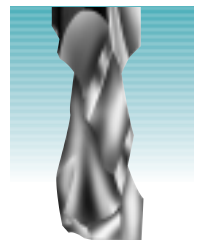
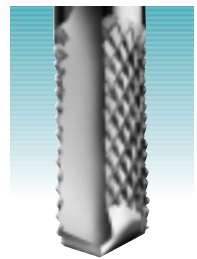
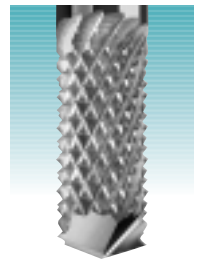
PART #	CED	CEL	SHK DIA	OAL	DIAMOND COATED PART #
67-162	1/2	1	1/2	3	67-162DFC

ARAMID TOOL

PART #	CED	CEL	SHK DIA	OAL
67-164	1/2	1	1/2	3

3/E DOWNCUT DIAMOND GRIT TOOL

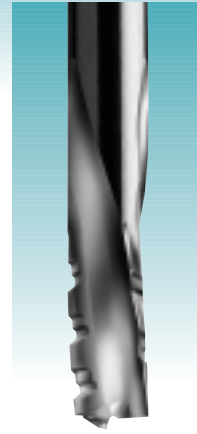
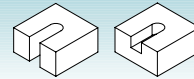
PART #	CED	CEL	SHK DIA	OAL
67-256	1/4	1 3/8	1/4	3
67-258	3/8	1 3/8	3/8	3



67-200 | Three Edge - Phenolic Cutter

Equally adaptable to low or high spindle speed applications in any CNC machining environment. The free cutting action of the tools provides for better finishes and significantly lower noise levels.

■ Usage Phenolic



UPCUT

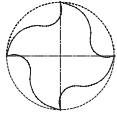
PART #	CED	CEL	SHK DIA	OAL
67-205	3/8	7/8	3/8	3
67-211	1/2	1 1/8	1/2	3
67-215	1/2	2 1/8	1/2	4

DOWNCUT

PART #	CED	CEL	SHK DIA	OAL
67-206	3/8	7/8	3/8	3
67-212	1/2	1 1/8	1/2	3 1/2
67-216	1/2	2 1/8	1/2	4 1/2

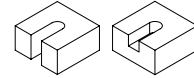
HELIX ANGLE = 10°

54-300 | Four Edge - Solid Carbide Downcut Spiral



Designed to be equally adaptable to low or high spindle speed applications in any CNC machining environment. The free cutting action of the tools provides for better finishes.

■ Usage Fiberglass



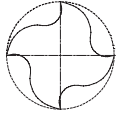
PART #	CED	CEL	SHK DIA	OAL
54-320	3/8	5/8	3/8	3
54-325	3/8	1 1/8	3/8	3

PART #	CED	CEL	SHK DIA	OAL
54-360	1/2	5/8	1/2	3 1/2
54-365	1/2	1 1/8	1/2	3 1/2

HELIX ANGLE = 30°

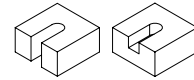
HELIX ANGLE = 30°

55-300 | Four Edge - Solid Carbide Upcut Spiral



Designed to be equally adaptable to low or high spindle speed applications in any CNC machining environment. The free cutting action of the tools provides for better finishes.

■ Usage Fiberglass



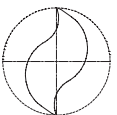
PART #	CED	CEL	SHK DIA	OAL
55-320	3/8	5/8	3/8	3
55-325	3/8	1 1/8	3/8	3

PART #	CED	CEL	SHK DIA	OAL
55-360	1/2	5/8	1/2	3 1/2
55-365	1/2	1 1/8	1/2	3 1/2

HELIX ANGLE = 30°

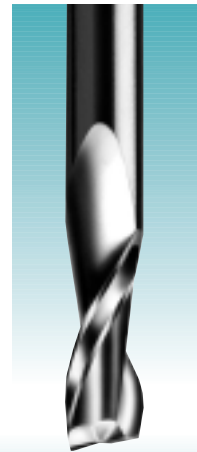
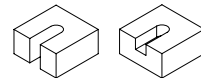
HELIX ANGLE = 30°

52-000 | Double Edge - Solid Carbide Upcut Spiral



Designed as a general purpose spiral with several times the life of their high speed steel counterparts. They are used when upward chip flow is preferred.

■ Usage Fiberglass, phenolic, acetal, solid surface and aluminum slab



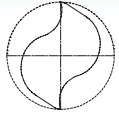
PART #	CED	CEL	SHK DIA	OAL
52-040	1/8	1/2	1/4	2
52-050	5/32	9/16	1/4	2
52-060	3/16	5/8	1/4	2
52-060L	3/16	5/8	1/4	2
52-070	7/32	5/8	1/4	2 1/2
52-080	1/4	3/4	1/4	2 1/2

PART #	CED	CEL	SHK DIA	OAL
52-080L	1/4	3/4	1/4	2 1/2
52-090	9/32	3/4	3/8	2 1/2
52-100	5/16	13/16	3/8	2 1/2
52-120	3/8	7/8	3/8	2 1/2
52-140	7/16	1	1/2	3
52-160	1/2	1	1/2	3

HELIX ANGLE = 30°

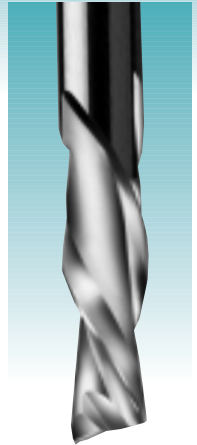
L=Left Hand Rotation

57-000 Double Edge - Solid Carbide Downcut Spiral



Designed as a general purpose spiral with several times the life of their high speed counterparts. They are used when a downward chipflow action is preferred.

Usage Aluminum, composite plastic and solid surface



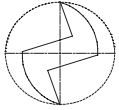
PART #	CED	CEL	SHK DIA	OAL
57-040	1/8	1/2	1/4	2
57-050	5/32	9/16	1/4	2
57-060	3/16	5/8	1/4	2
57-070	7/32	5/8	1/4	2 1/2
57-080	1/4	3/4	1/4	2 1/2

HELIX ANGLE = 30°

PART #	CED	CEL	SHK DIA	OAL
57-090	9/32	3/4	3/8	2 1/2
57-100	5/16	13/16	3/8	2 1/2
57-120	3/8	7/8	3/8	2 1/2
57-140	7/16	1	1/2	3
57-160	1/2	1	1/2	3

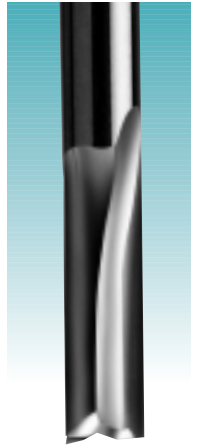
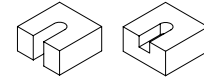
HELIX ANGLE = 30°

56-000P Double Edge - Solid Carbide Straight



Designed specifically to rout harder, more rigid plastics.

Usage Foam, fiberglass, phenolic, acrylic, nylon, PVC, ABS, acetal and solid surface



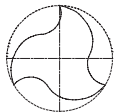
PART #	CED	CEL	SHK DIA	OAL
56-041	1/8	1/4	1/4	2
56-061	3/16	3/8	1/4	2
56-062	3/16	5/8	1/4	2
56-062L	3/16	5/8	1/4	2
56-063*	3/16	5/8	1/4	4
56-081	1/4	3/8	1/4	2 1/2
56-082	1/4	3/4	1/4	2 1/2
56-082L	1/4	3/4	1/4	2 1/2
56-086*	1/4	1 1/4	1/4	4

L = Left Hand Rotation

PART #	CED	CEL	SHK DIA	OAL
56-121	3/8	5/8	3/8	2 1/2
56-122	3/8	7/8	3/8	2 1/2
56-122L	3/8	7/8	3/8	2 1/2
56-124*	3/8	1 5/8	3/8	6
56-162	1/2	1	1/2	3
56-162L	1/2	1	1/2	3
56-164*	1/2	2 1/8	1/2	6

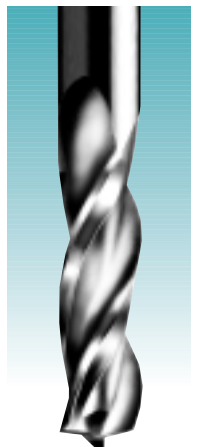
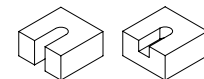
* These tools are designed and toleranced for Air Routers with guide

58-000 Three Edge - Solid Carbide Upcut Spiral



Designed to rout difficult to cut material when horsepower or spindle speed may be a problem. They employ upcut router geometry rather than end mill geometry for better chip removal and smoother finish.

Usage Composites, fiberglass and phenolic



UPCUT

PART #	CED	CEL	SHK DIA	OAL
58-040	1/8	1/2	1/4	2
58-060	3/16	5/8	1/4	2
58-080	1/4	3/4	1/4	2 1/2

HELIX ANGLE = 30°

DOWNCUT

PART #	CED	CEL	SHK DIA	OAL
59-040	1/8	1/2	1/4	2
59-060	3/16	5/8	1/4	2
59-080	1/4	3/4	1/4	2 1/2

HELIX ANGLE = 30°

DOWNCUT

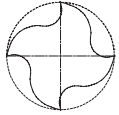
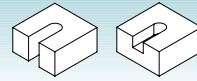
METRIC

PART #	CED	CEL	SHK DIA	OAL
59-440	3mm	12mm	6mm	64mm
59-460	5mm	16mm	6mm	64mm
59-480	6mm	19mm	6mm	76mm

HELIX ANGLE = 30°

54-000
55-000

Four Edge - Solid Carbide Spiral



■ **Usage:** Composites, fiberglass and phenolic

Equally adaptable to low or high spindle speed applications in any CNC machining environment. The free cutting action of the tools provides for better finishes.

DOWNCUT

PART #	CED	CEL	SHK DIA	OAL
54-040	1/8	1/2	1/4	2
54-050	5/32	9/16	1/4	2
54-060	3/16	5/8	1/4	2
54-080	1/4	3/4	1/4	2 1/2

HELIX ANGLE = 30°

DOWNCUT

PART #	CED	CEL	SHK DIA	OAL
54-440	3mm	12mm	6mm	64mm
54-460	5mm	16mm	6mm	64mm
54-480	6mm	19mm	6mm	76mm

HELIX ANGLE = 30°

METRIC



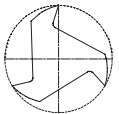
UPCUT

PART #	CED	CEL	SHK DIA	OAL
55-040	1/8	1/2	1/4	2
55-050	5/32	9/16	1/4	2
55-060	3/16	5/8	1/4	2
55-080	1/4	3/4	1/4	2 1/2

HELIX ANGLE = 15°

53-000

Three Edge - Solid Carbide Straight

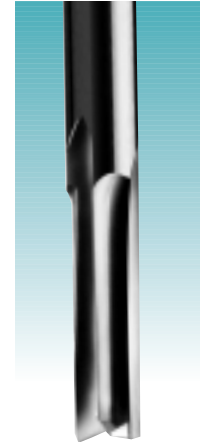


Designed for routing extremely hard materials or when spindle RPM is lower than normal for routing.

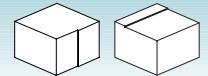
■ **Usage** Natural wood and wood composites

PART #	CED	CEL	SHK DIA	OAL
53-040	1/8	1/2	1/4	2

PART #	CED	CEL	SHK DIA	OAL
53-080	1/4	3/4	1/4	2 1/2



30-000 | Replaceable Ring Type Honeycomb Cutter



These tools are for contouring, carving and chamfering cuts of .25" or less. The unique patented holding system prevents the solid carbide blades from coming out of the holder if it is fractured.

■ **Usage** For contouring, carving and chamfering cuts

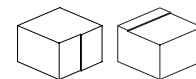
The HSS saw blades and the diamond plated blades dish on the bottom so they clear the cut core finish like the hollow ground solid carbide style rings. The solid carbide rings may be reground several times at the factory making them very economical to use.

The HSS saw and diamond plated blades are disposable, offering the convenience of a constant diameter.

CUTTING BLADE OPTIONS

SHANK ASSEMBLY	BLADE DIAMETER	SOLID CARBIDE	DIAMOND PLATED	HSS SAW	REPLACEMENT SCREW
30-011	1"	30-012	30-112	30-213	30-011-2
30-021	2"	30-022	30-122	30-222	30-020-4
30-031	3"	30-032	30-132	30-232	30-030-4
30-041	4"	30-042	30-142	30-242	30-040-4

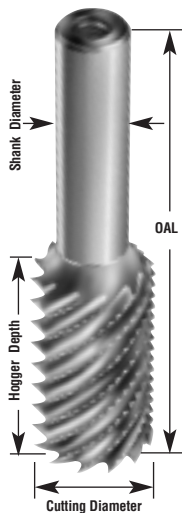
30-300 | PM-HSS Integral Shank Honeycomb Hogger Cutter



*Super PM High Speed Steel Hoggers • High Speed Replaceable Saw Blade
Solid Carbide Replaceable Blade • Diamond Plated Replaceable Blade*

The spiral hogger geometry ground integral to the shank allows for faster feed rates and deeper cuts than any previous cutter. The availability of several different blades makes this cutter suitable for most core types. The new hogger design also imparts less force as it evacuates and shreds scrap.

■ **Usage** CNC machining of honeycomb core

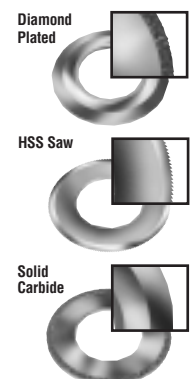


PM-HSS HOGGER CUTTERS (body only)					CUTTING BLADE OPTIONS				
PART #	CUTTING DIAMETER	HOGGER DEPTH	SHANK DIAMETER	OAL	DIA	SOLID CARBIDE	DIAMOND PLATED	HSS SAW	REPLACEMENT SCREW
30-310	7/8	1½	½	3½	1"	30-012	30-113	30-213	30-011-2
30-315	1¼	1½	½	3½	1.5"	30-014	30-114	30-214	30-020-4
30-321	1¾	1½	½	3½	2"	30-022	30-122	30-222	30-020-4
30-331	2¾	1	½	3½	3"	30-032	30-132	30-232	30-030-4
30-341	3¾	1	¾	3½	4"	30-042	30-142	30-242	30-040-4

FEEDS & SPEEDS 30-000/30-300

CORE TYPE	FEED RATES		
	SOLID CARBIDE	DIAMOND PLATED	HSS SAW
Aluminum, Less than 5#/cuft	100	NR	150
Aluminum, More than 5#/cuft	100	NR	100
Paper based	400	NR	250
Paper, based with Fiber Reinforcement	800	400	150
Fiberglass	600	600	NR
Phenolic	200	400	NR
Polycarbonate	NR	800	NR
Aramid, Less than 5#/cuft	800	400	150
Aramid, More than 5#/cuft	800	400	NR

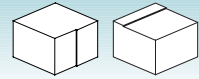
SPINDLE SPEED	
DIA	MAX RPM
1	25000
1½	25000
2	18000
3	15000
4	12000



Feedrate = Inches Per Minute (IPM)

NOTE: 30-300 assembly requires one (1) hogger and one (1) blade

31-000 | High Speed Steel Cutter



This cutter is designed primarily for use on aluminum core, offering the versatility of smaller sizes for use on hand-held machines in field or maintenance type repairs. This cutter offers the strength of an integral shank and blade that has an edge sharpness unattainable with any other material. This sharpness and the relieved bottom yield part surfaces that require a minimum of preparation before bonding operation.

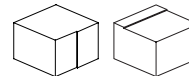
■ Usage Aluminum Core

PART #	CED	SHK DIA	OAL
31-010	1/2	1/4	2 1/16
31-015	3/4	1/4	2 3/32
31-020	1	1/4	2 1/8
31-025	1 1/2	1/2	2 1/4
31-030	2	1/2	2 3/4
31-040	3	1/2	2 15/16

CORE TYPE	RATING
Aluminum, Lo Density (Less than 5#/cuft)	1
Aluminum, Hi Density (More than 5#/cuft)	2
Paper	2
Paper, Reinforced	N
Fiberglass	N
Phenolic	N
Polycarbonate	N
Aramid	N

1 - Excellent, 2 - Good, N - Not Recommended

32-000 | PM High Speed Steel Hogger



These cutters are specifically designed for fast (low force) removal of excess core followed by a final finish pass to obtain excellent finishes with one tool. These cutters enable cuts of up to .60" depths in a single pass. The availability of several different blades makes this cutter suitable for most core types. All assemblies require a shank, hogger and blade.

■ Usage Fast removal of excess core



PM-HSS HOGGER			SHK	CUTTING BLADE OPTIONS					
PART #	HOGGER DIAMETER	HOGGER DEPTH	SHANK PART #	BLADE DIAMETER	SOLID CARBIDE	DIAMOND PLATED	HSS WAVY RING	HSS SAW	ADAPTER FOR HSS SAW
32-022	(44mm)	(16mm)	32-021	(45mm) 1.77"	32-026	-	32-023	-	-
	1.73"	0.63"		(50mm) 1.97"	-	32-029*	-	32-027*	32-028
32-032	(61.5mm)	(16mm)	32-031	(63mm) 2.48"	32-036	-	32-033	-	-
	2.42"	0.63"		(75mm) 2.95"	-	32-039*	-	32-037*	32-038

(All Shanks are 1/2" Diameter)

32-100 Wrench for 32-000 Series Tools

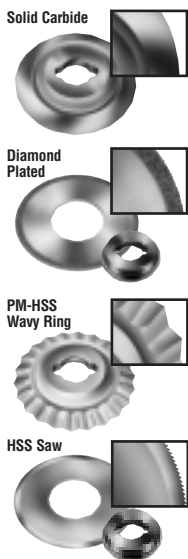
* Requires adapter for saws

FEEDS AND SPEEDS

Available Cutting Blades for 31-000 and 32-000 Series.

CORE TYPE	FEED RATES					SPINDLE SPEED	
	SOLID CARBIDE	DIAMOND PLATED	HSS SAW	HSS WAVY	HSS (31-000)	DIA	MAX RPM
Aluminum, Less than 5#/cuft	100	NR	150	100	100-140	1/2	35000
Aluminum, More than 5#/cuft	100	NR	100	100	70	3/4	35000
Paper based	300	NR	200	300	50	1	30000
Paper, based with Fiber Reinforcement	400	300	600	300	100-150	1 1/2	25000
Fiberglass	NR	600	NR	NR	NR	1 3/4	25000
Phenolic	NR	600	NR	NR	NR	2	20000
Polycarbonate	NR	800	NR	NR	NR	2 1/2	20000
Aramid, Less than 5#/cuft	200	NR	150	200	100-150	3	20000
Aramid, More than 5#/cuft	200	400	NR	NR	NR		

Feedrate = Inches Per Minute (IPM)



THINK SPECIALTY COMPOSITE MILLING

68-200 SERIES



PCD Roughing & Finishing Tool

SERF (Sinusoidal Edge Rougher Finisher) design provides the benefits of a roughing mill with the edge quality of a finishing mill in a Polycrystalline Diamond double-flute tool on solid-carbide body.

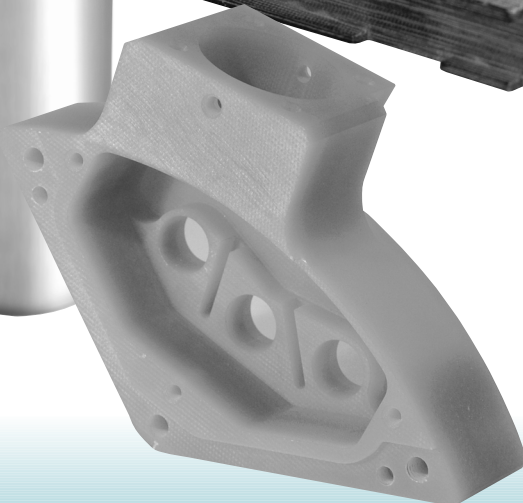
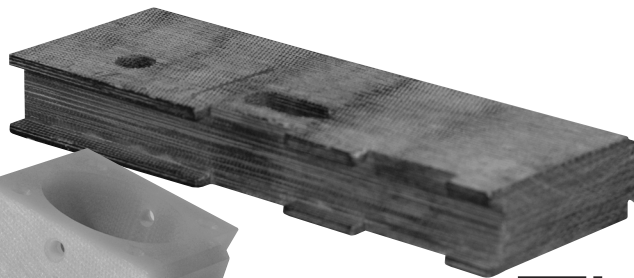
The unique SERF geometry results in reduced impact forces during the cut resulting in longer tool life, less cutting force, greater feed rates and reduced noise.

Edge finish in fibrous composite materials is improved due to the overlapping sinusoidal edge pattern which is designed to impart a fiber shearing action during the cut.

Usage: Carbon Fiber, G-10 and other Fiberglass

PRODUCT OFFERING

PART #	CED	CEL	SHANK	OAL
68-210	¼	¾	¼	3
68-213	¼	¾	¼	3
68-216	¼	1	¼	3½
68-220	¾	¾	¾	3
68-223	¾	¾	¾	3
68-226	¾	1	¾	3½
68-230	½	¾	½	4
68-233	½	1	½	4
68-236	½	1¼	½	4



THINK ONSRUD

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