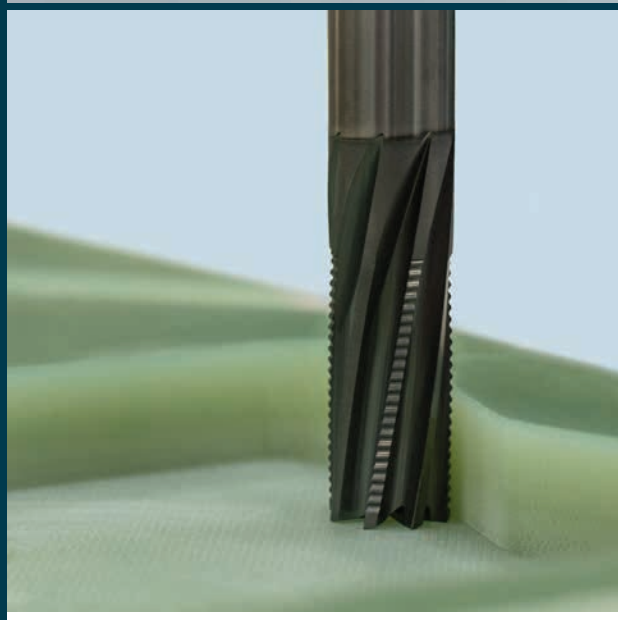


Production Cutting Tools

Wood, Plastic, Composite, Honeycomb, Aluminum

www.onsrud.com

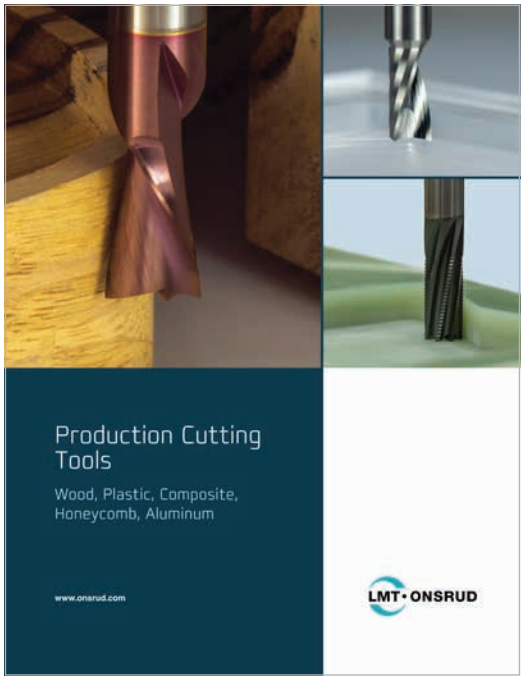
LMT • ONSRUD

Since our beginning over 75 years ago, LMT Onsrud has endeavored to innovate and to develop the best cutting tool solutions in the market. LMT Onsrud is recognized as a leading manufacturer of solid round tooling for a wide range of materials from plastics to composites to exotic metals.

Today our promise remains the same - to consistently provide premium cutting tool solutions to meet your needs and to provide exceptional support throughout all phases of planning, development and production.

Materials Cut:

- Composites
- Exotic Metals
- Honeycomb
- Non-Ferrous Metals
- Plastics and Acrylics
- Solid Surface
- Stainless Steels
- Wood and Composite Woods



LMT Onsrud
Production Cutting Tools

LMT Onsrud
High Performance Milling

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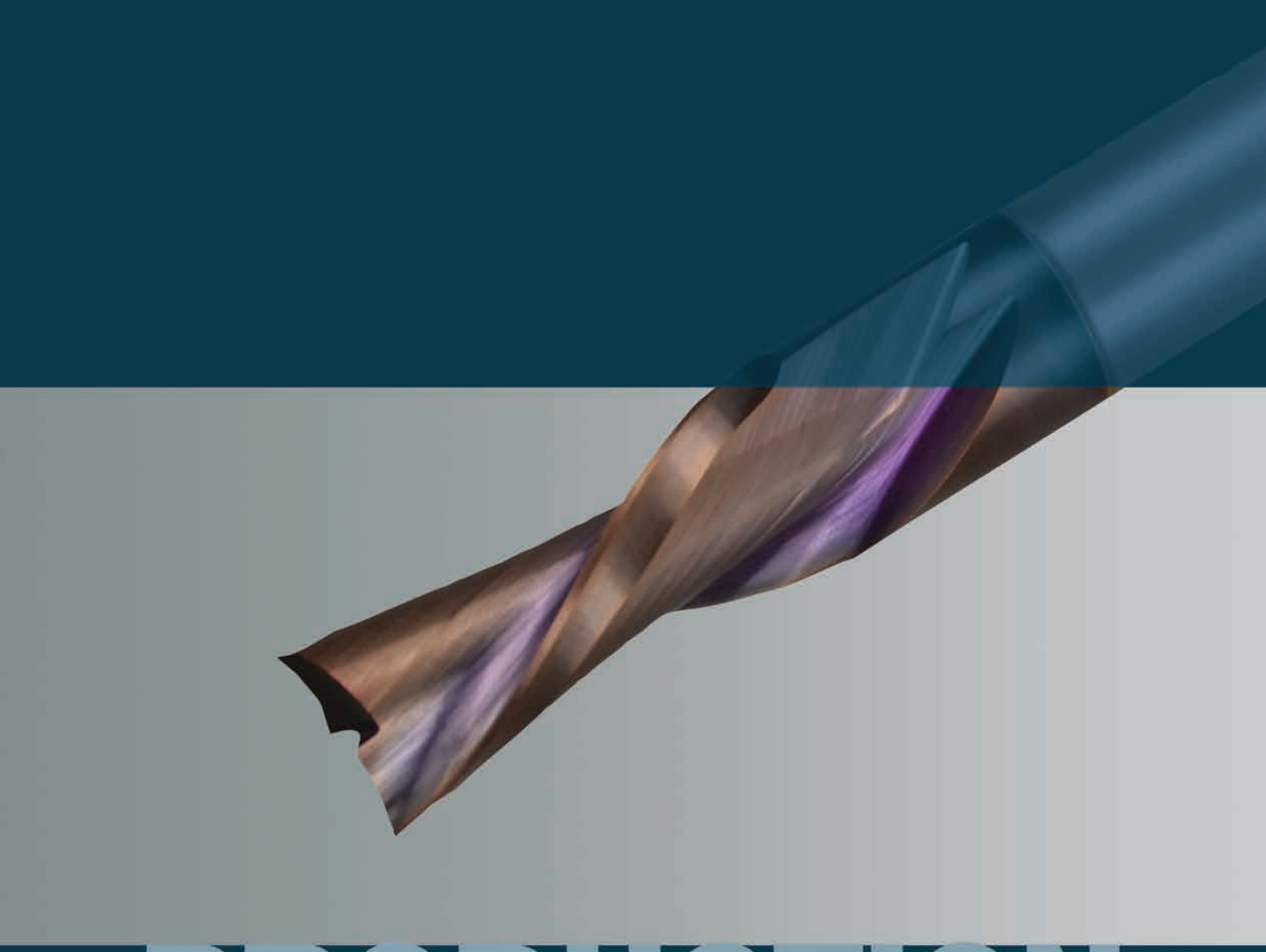
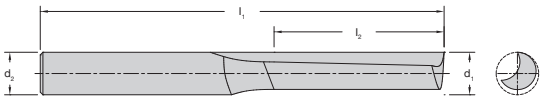


PRODUCTION
CUTTING TOOLS

10-00 Series O Flute Straight

HSS | 0° | SW | SP

Combines an open flute design with single flute geometry to provide optimum chip removal at fast feed rates. Excellent for hand-fed operations.



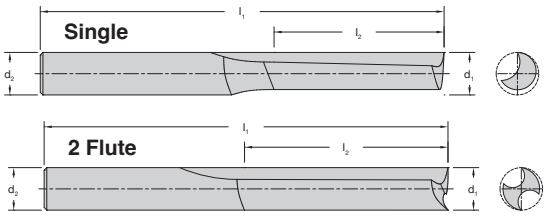
10-00 Series O Flute Straight Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
10-00	2600000	1/16	3/16	1/4	2	1
10-01	2600001	3/32	3/8	1/4	2	1
10-02	2600002	1/8	3/8	1/4	2	1
10-20	2600006	1/8	1/2	1/4	2	1
10-22	2600007	3/16	3/4	1/4	2	1
10-07	2600004	1/4	1	1/4	2 3/8	1
10-78	2600008	1/4	1 1/4	1/4	2 5/8	1

11-00 Series O Flute Straight

HSS | 0° | HP | SP

Designed for cutting softer more flexible plastics. Single flute for faster feed rates. Double flute for smoother finish. Excellent for hand-fed operations.



11-00 Series Single Flute - High Speed Steel O Flute **Straight** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
11-01	2600010	1/8	1/2	1/4	2	1
11-75*	2600021	1/8	5/8	1/4	3 1/4	1
11-77*	2600023	3/16	3/4	1/4	3 1/4	1
11-71*	7100352	1/4	3/4	1/4	3 1/4	1
11-07	2600016	1/4	1	1/4	2 3/8	1
11-09	2600017	3/8	1	3/8	2 1/2	1

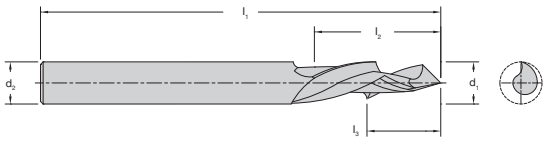
11-00 Series Two Flute - High Speed Steel O Flute **Straight** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
11-00	2600009	3/16	5/8	1/4	2	2
11-02	2600011	1/4	3/4	1/4	2 1/8	2
11-72*	2600019	1/4	3/4	1/4	3 1/4	2
11-76*	2600022	1/4	3/4	1/4	3 3/4	2
11-04	2600013	1/4	1	1/4	2 3/8	2
11-78*	2600024	1/4	2	1/4	3 1/4	2
11-74*	2600020	3/8	1	3/8	3 1/2	2

*These tools are designed and toleranced for air routers with guide bushings.

15-40 Series Compression Dor Bits

HSS ESG D



Designed to rout steel doors, these bits reduce the frayed edges on the top and bottom of the cut producing a clean finish. Tools are ESG coated for longer tool life!

Features and Benefits

- Upcut and downcut compression flutes reduce material fraying.
- Single flute design allows for rapid chip removal.
- ESG coated for increased tool life.

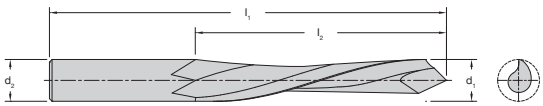
15-40 Series High Speed Steel Compression Dor Bit Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LoC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
15-43	2648495	1/2	2 1/2	1.067	1/2	5 1/2	1
15-47*	2648496	1/2	2 1/2	1.067	1/2	5 1/2	1

*With FLAT

15-50 Series Dor-Bits

HSS TIN D



Designed to rout steel doors.

15-50 Series Single Flute - High Speed Steel Dor-Bits Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Door Machine	Flutes
15-52	2600038	1/2	2 1/4	1/2	5 1/4	RUVO	1
15-53	2600039	1/2	2 1/2	1/2	5 1/2	RUVO	1
15-54	2600040	1/2	2 1/2	1/2	5	ACE	1
15-55*	2600041	1/2	2 1/2	1/2	5 1/2	FALCON	1
15-57*	2600042	1/2	2 1/2	1/2	5 1/2	NORFIELD	1
15-60	2600043	1/2	2 1/2	1/2	5 1/2	RUVO	1
15-61*	2600044	1/2	2 1/2	1/2	5 1/2		1

TiN COATED 15-50 Series Single Flute - High Speed Steel Dor-Bits Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Door Machine	Flutes
TiN15-52	2605275	1/2	2 1/4	1/2	5 1/4	RUVO	1
TiN15-53	2828469	1/2	2 1/2	1/2	5 1/2	RUVO	1
TiN15-54	2605276	1/2	2 1/2	1/2	5	ACE	1
TiN15-55*	2605277	1/2	2 1/2	1/2	5 1/2	FALCON	1
TiN15-57*	2605278	1/2	2 1/2	1/2	5 1/2	NORFIELD	1
TiN15-60	2605279	1/2	2 1/2	1/2	5 1/2	RUVO	1
TiN15-61*	2605280	1/2	2 1/2	1/2	5 1/2		1

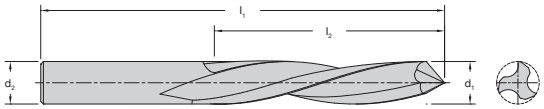
HELIX ANGLE 18° - 32°

*With FLAT

15-75 Series TiN Coated CNC Dor-Bits

HSS | TIN | D

Downcut tools designed specifically for machining metal clad doors in a CNC environment. The tool geometry facilitates piercing steel and produces a superior cut for door lites and hardware openings.



15-75 Series High Speed Steel TIN Coated CNC Dor-Bits Product Offering

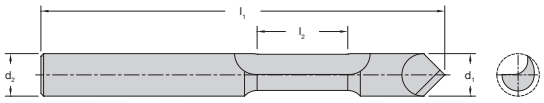
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Door Machine	Flutes
TiN15-75	2605281	1/2	3	1/2	6	KVAL	3

HELIX ANGLE 18°

18-00 Series Straight Pilot

HSS | 0° | CM / DW

Straight flute tools with boring points and pilots are the workhorse of the mobile home, modular home and RV industries.



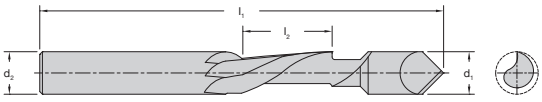
18-00 Series Single Flute - High Speed Steel Straight Pilot Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
18-00	2600045	1/4	3/4	1/4	2 3/4	1
18-02	2600046	3/8	7/8	3/8	2 7/8	1

20-00 Series Downcut Spiral Pilot

HSS | CM / DW

Spiral tools designed to push chips away from the operator in mobile home and RV manufacturing plants.



20-00 Series Single Flute - High Speed Steel **Downcut** Spiral Pilot Product Offering

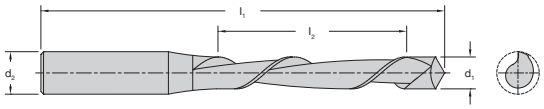
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
20-00	2600048	1/4	3/4	1/4	3	1
20-02	2600049	3/8	1	3/8	3 7/16	1
20-03	2600050	1/2	1 1/4	1/2	4	1

HELIX ANGLE 21° - 38°

20-10 Series Drywall Bit

HSS CM DW

Spiral flute tools designed to make cut outs in drywall. Used in manufactured housing and on site construction.



20-10 Series Single Flute - High Speed Steel Drywall Bit Product Offering

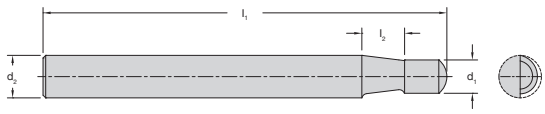
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
20-10	2600051	3/16	1	1/4	3 1/4	1
20-11	2600052	1/8	3/4	1/8	2 1/2	1
20-15	2600054	1/8	1	1/8	2 1/2	1

HELIX ANGLE 30° - 41°

27-00 Series Laminate Trim

SC 0° LW

Designed to trim counter tops. The pilot bears on the finished surface and acts as a guide to trim flush or with a bevel.



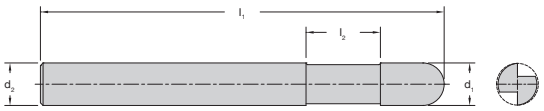
27-00 Series Single Flute - Solid Carbide Laminate Trim Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Style	Flutes
27-00	2600055	1/4	1/4	1/4	1 1/2	Flush	1
27-01	2600056	1/4	1/4	1/4	1 1/2	7° Bevel	1
27-03	2600057	1/4	3/8	1/4	2	Flush	1

27-50 Series Laminate Trim

SC 0° LW

Tools with a pilot designed to give a satin smooth finish when trimming laminate counter tops.



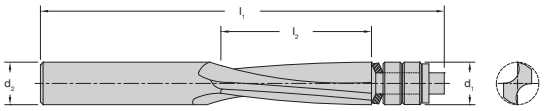
27-50 Series Two Flute - Solid Carbide Laminate Trim Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Style	Flutes
27-50	2600058	1/4	7/16	1/4	1 5/8	Flush	2

28-20 Series Double-Bearing Plastic Trim

SC SP HP

Spirals designed to trim stacked sheets of plastic in hand-fed applications. They use a double bearing guide to ensure smooth cutting action around a template.



28-20 Series Solid Carbide Double-Bearing Plastic Trim Product Offering

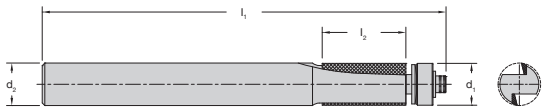
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
28-20	2600059	1/4	3/4	1/4	3	2
28-25	2600060	1/2	1 1/8	1/2	4	2

REPLACEMENT BEARING KITS FOR SERIES 28-20 *Solid Carbide Double Bearing Plastic Trim Tool Kits*	
28-89	KIT for 28-20 Tool
28-88	KIT for 28-25 Tool

28-50 Series Flush Trim

CT | 0° | SW | HW | CW | LW | SP

Designed to provide a smooth finished edge on dense, abrasive and laminated materials. A ball bearing guide assists free cutting action. Excellent for hand-fed applications.



28-50 Series Carbide Tipped Flush Trim Product Offering

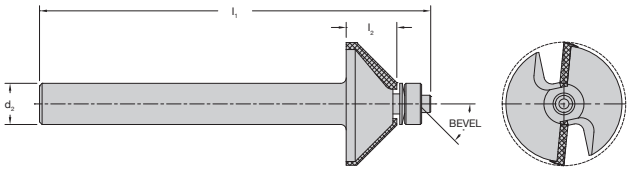
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
28-55	2600065	1/4	1	1/4	2 1/2	2
28-51	2600062	3/8	1/2	1/4	2 1/4	2
28-50	2600061	3/8	1	1/4	2 3/4	2
28-53	2600063	1/2	1/2	1/4	2	2
28-57	2600066	1/2	1	1/4	2 3/4	3
28-54	2600064	1/2	1	1/2	3 1/4	2
28-63	2600068	1/2	1 1/2	1/2	4 1/4	2
28-64	2600069	1/2	2	1/2	4 1/4	2

REPLACEMENT BEARING KITS FOR SERIES 28-50 *Solid Carbide Double Bearing Plastic Trim Tool Kits*	
28-80	KIT for 1/4" Cutting Dia
28-79	KIT for 3/8" Cutting Dia
28-78	KIT for 1/2" Cutting Dia

29-50 Series Chamfer

CT | 0° | SW | HW | CW

Provides a beveled or decorative edge on finished parts.

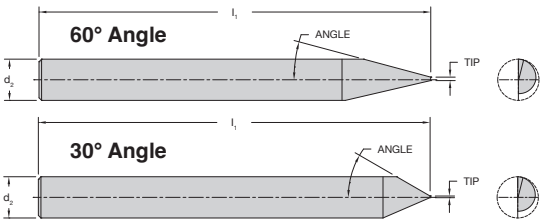


29-50 Series Two Flute Carbide Tipped Chamfer Product Offering

Part Number	SAP Number	Bevel	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
29-51	2600075	45°	1/2	1/4	2	2
29-52	2600076	45°	1/2	1/2	2 1/2	2
29-53	2600077	25°	3/8	1/4	1 7/8	2

37-00 & 37-20 Series Engraving Tools

SC | 0° | SW | HW | SP | HP | A | SSP



The half round engraving tools are offered with a wide range of tip sizes and angles to accommodate many engraving styles.

37-00 Series Single Flute - Solid Carbide Engraving Tools Product Offering

Part Number	SAP Number	TIP	Angle	Shank Diameter d_2	Overall Length l_1	Flutes
37-01	6600281	0.005	60°	1/4	2	1
37-03	9110996	0.010	60°	1/4	2	1
37-05	2600463	0.020	60°	1/4	2	1
37-07	2600464	0.030	60°	1/4	2	1
37-09	2600465	0.040	60°	1/4	2	1
37-11	2600466	0.060	60°	1/4	2	1
37-15	2600467	0.090	60°	1/4	2	1
37-19	2600468	60 Degree Kit				

37-00 Series Single Flute - Solid Carbide Engraving Tools Product Offering - Metric

Part Number	SAP Number	TIP (mm)	Angle	Shank Diameter d_2	Overall Length l_1	Flutes
37-05M	9125222	0.5	60°	6	50	1
37-07M	9125223	0.76	60°	6	50	1
37-09M	9125224	1	60°	6	50	1

37-20 Series Single Flute - Solid Carbide Engraving Tools Product Offering

Part Number	SAP Number	TIP	Angle	Shank Diameter d_2	Overall Length l_1	Flutes
37-21	6600289	0.005	30°	1/4	2	1
37-23	9110997	0.010	30°	1/4	2	1
37-25	9110998	0.020	30°	1/4	2	1
37-27	9111000	0.030	30°	1/4	2	1
37-29	9111001	0.040	30°	1/4	2	1
37-31	9111002	0.060	30°	1/4	2	1
37-35	9111003	0.090	30°	1/4	2	1
37-39	2600469	30 Degree Kit				

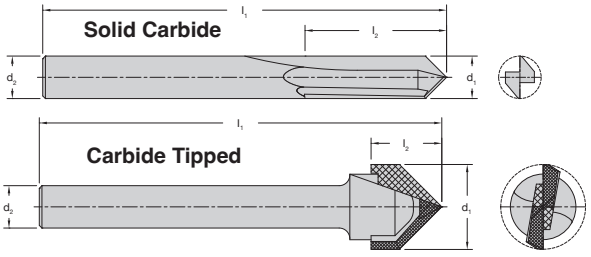
37-20 Series Single Flute - Solid Carbide Engraving Tools Product Offering - Metric

Part Number	SAP Number	TIP (mm)	Angle	Shank Diameter d_2	Overall Length l_1	Flutes
37-25M	9125225	0.5	30°	6	50	1
37-27M	9125226	0.76	30°	6	50	1
37-29M	9125227	1	30°	6	50	1

37-50 & 37-60 Series V Bottom

SC CT 0° SW HW CW SP HP SSP LW

Designed for V grooving or beveling 90°.



37-50 Series Two Flute - V Bottom Solid Carbide Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
37-50	2600470	3/16	5/8	1/4	2	2
37-51	2829119	1/4	3/4	1/4	2	2
37-52	2600471	3/8	3/4	3/8	2 1/2	2

HELIX ANGLE 3° - 5° Sheer

37-60 Series Two Flute - V Bottom Carbide Tipped Product Offering

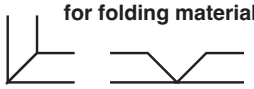
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
37-61	2600472	1/2	13/32	1/4	1 25/32	2
37-62	2600473	3/4	1/2	1/2	2 1/8	2
37-64	2657675	1	27/32	1/2	2 27/32	2

37-70 Series Folding Tool

CT 0° A

Designed for cutting aluminum/plastic sandwich materials with 90° angle and flat bottom.

90° angle and .090 flat for folding material.



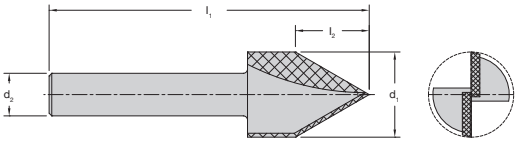
37-70 Series Two Flute - V Bottom Carbide Tipped Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
37-71	2600475	1/2	3/8	1/4	2	2
37-72	2600476	1/2	3/8	1/2	2	2

37-80 Series Lettering Bits

CT | 0° | SW | HW | CW

Designed for V grooving or beveling edges of parts. The tools are designed to cut a wide variety of wood products and produce a clean edge.



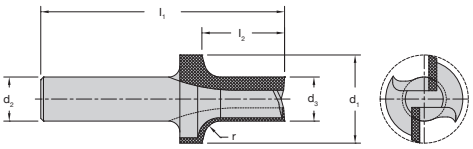
37-80 Series Two Flute - Carbide Tipped Lettering Bits Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	ANGLE	Flutes
37-82	2600477	1	0.856	1/2	3 1/2	60°	2
37-87	2600478	1 1/2	0.750	1/2	3	90°	2
37-92	7100382	2	0.577	1/2	3	120°	2
37-97	2600479	2	0.363	1/2	2 5/8	140°	2

40-50 Series Round & Rout

CT | 0° | SW | HW | CW | SP | HP | SSP

Designed to put a radius on the edge and dress the stock. They will provide a smooth finish.



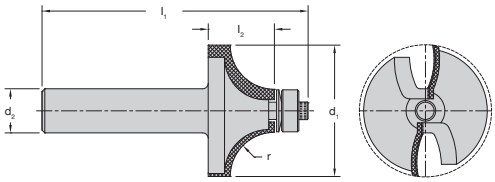
40-50 Series Two Flute - Carbide Tipped Lettering Bits Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Sm Cutting Diameter d_3	LOC l_2	Shank Diameter d_2	Overall Length l_1	Radius r	Material Thickness	Flutes
40-50	2600537	1	1/2	.938	1/2	3 3/16	3/16	3/4	2
40-52	2600539	1 1/8	1/2	.937	1/2	3 3/16	1/4	3/4	2
40-54	2600541	1 3/8	1/2	.938	1/2	3 3/16	3/8	3/4	2
40-55	2600542	1 3/8	1/2	1.437	1/2	3 11/16	3/8	1 3/8	2

42-00 Series Corner Round

CT | 0° | SW | HW | CW | SSP

Quarter round profile tools feature up shear geometry for better finishes.



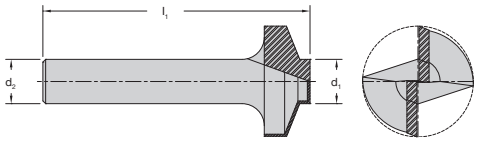
42-00 Series Two Flute - Carbide Tipped Corner Round Product Offering

Part Number	SAP Number	Radius r	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
42-10	2600564	1/8	3/4	3/8	1/4	2 1/8	2
42-03	2600558	5/32	13/16	15/32	1/4	2 3/32	2
42-01	2600552	3/16	7/8	1/2	1/4	2	2
42-02	2600557	1/4	1	7/16	1/4	1 29/32	2
42-04	2600559	5/16	1 1/8	9/16	1/4	2 1/4	2
42-05	2600560	3/8	1 1/4	5/8	1/4	2 1/32	2
42-06	2600561	1/2	1 1/2	3/4	1/4	2 5/32	2
42-07	2600562	1/2	1 1/2	3/4	1/2	2 11/16	2
42-08	2600563	3/4	2	1 1/32	1/2	3	2

47-00 Series MDF Panel Tools

CT | 0° | CW

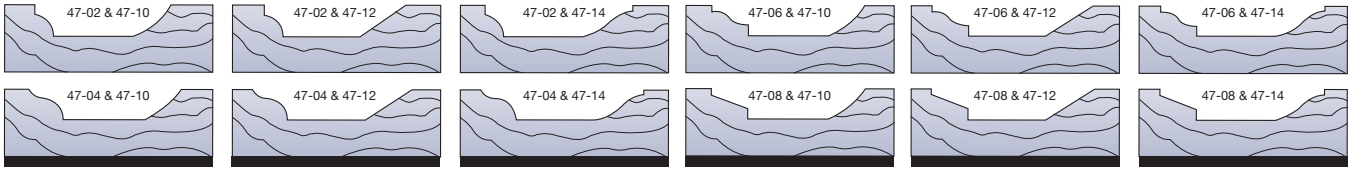
These cutters can create 12 cabinet combinations by combining different stile and panel cutters to get the desired shape in MDF material.



47-00 Series Two Flute - Carbide Tipped MDF Panel Tools Product Offering

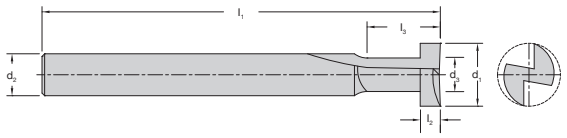
Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1	Description	Flutes
47-02	2600565	7/8	1/2	2-1/2	Bead Profile - Stile Bits	2
47-04	2600566	1-1/4	1/2	2-1/2	Traditional Profile - Stile Bits	2
47-06	2600567	1-1/4	1/2	2-1/2	Ogee Profile - Stile Bits	2
47-08	2600568	1-1/4	1/2	2-1/2	Straight Profile - Stile Bits	2
47-10	2600569	1-1/2	1/2	2-1/2	Cove Profile - Panel Bits	2
47-12	2600570	1-1/2	1/2	2-1/2	Straight Profile - Panel Bits	2
47-14	2600571	1-1/2	1/2	2-1/2	Ogee Profile - Panel Bits	2

TOOL COMBINATIONS



90-00 Series T Slot Cutter

SC | 0° | SW | HW | CW



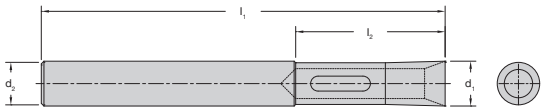
Designed to bore a hole and rout a T shape slot for plaques and frames to provide for built in wall mounting capabilities.

90-00 Series Two Flute T Slot Cutter Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	LOC l_3	Cutting Diameter d_3	Shank Diameter d_2	Overall Length l_1	Flutes
90-06	2601586	3/8	0.120	7/16	0.200	1/4	1 5/8	2

29-000 Series Hollow Core Cutters

HSS | HC



This specialized cutter is designed to vertically cut the honeycomb. cells producing a clean, flag free edge. The core material will remain attached at the bottom and can be removed using one of our valve style honeycomb cutters. This product along with our 31-100 or 30-000 series tools is an effective combination to create pockets in honeycomb core and get a perfectly clean edge.

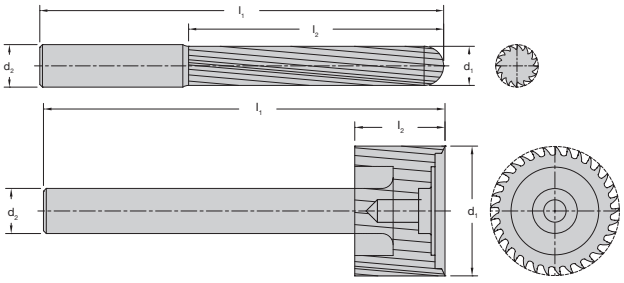
29-000 Series HSS Hollow Core Cutters Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
29-003	6602603	1/4	1 1/2	1/4	3 3/4	-
29-006	7088767	3/8	1 7/8	3/8	3 3/4	-
29-009	6602605	1/2	2 7/8	1/2	5	-
29-012	6602606	5/8	2 7/8	5/8	5	-
29-015	6602607	3/4	2 7/8	3/4	5	-

29-050 Series Diamond Grit Hogger

HC DIA grit

Diamond grit hoggers are used on abrasive cores (graphite, phenolic, or fiberglass) in order to achieve long tool life. The tools are available in a Ballnose version and as a traditional hogger capable of holding honeycomb blades. A 35% weight reduction has been designed into the larger diameter tools resulting in better performance on 3 or 5 axis machines.



Note: 30% - 50% max radial engagement.
Note: Cutting blades sold separately.

29-050 Series Diamond Grit Hogger Product Offering **Ballnose**

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
29-053	7053962	1/4	1 1/4	1/4	4
29-058	7053963	3/8	2 1/2	1/2	4
29-063	7053964	1/2	3	1/2	5
29-068	7053965	3/4	3	1/2	5
29-074	7053966	1	2	3/4	4

29-050 Series Diamond Grit Hogger Product Offering **Ballnose** - Metric

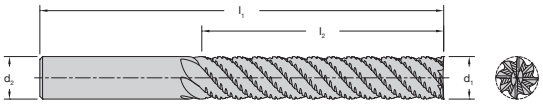
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
29-054	7053967	6	32	6	100
29-056	7053968	10	60	10	120
29-061	7053969	12	75	12	120
29-065	7053970	20	75	20	120

Honeycomb Hogger						Cutting Blade Options							Spare Parts	
Part Number	SAP Number	Cutting Diameter d_1	Hogger Depth	SHK DIA d_2	OAL l_1	Blade Diameter	HSS	HSS w/Teeth	Solid Carbide	Solid Carbide w/Teeth	Diamond Plated	HSS Saw	Adapter Ring	Screw
29-052	7054036	1/4 (6.35mm)	1 1/4	1/4	4	-	-	-	-	-	-	-	-	-
29-057	7054037	.345 (8.76mm)	2 1/2	1/2	4	3/8 (9.52mm)	30-016	30-316	-	-	-	-	-	HRD51646
29-062	7054038	.470 (11.94mm)	3	1/2	5	1/2 (12.7mm)	30-017	30-317	-	-	-	-	-	HRD51646
29-067	7054039	.720 (18.28mm)	3	1/2	5	3/4 (19.05mm)	-	-	30-015	30-318	-	-	-	30-011-2
29-072	7054040	.970 (24.63mm)	1	1/2	3	1 (25.4mm)	-	-	30-012	30-313	30-113	30-213	-	30-011-2
29-073	7054041	.970 (24.63mm)	2	3/4	5	1 (25.4mm)	-	-	30-012	30-313	30-113	30-213	-	30-011-2
29-078	7054042	1.470 (37.33mm)	1	1/2	3	1 1/2 (38.10mm)	-	-	30-014	30-314	30-114	30-214	30-020-3	30-020-4
29-079	7054043	1.470 (37.33mm)	2	3/4	5	1 1/2 (38.10mm)	-	-	30-014	30-314	30-114	30-214	30-020-3	30-020-4
29-083	7054044	1.742 (44.24mm)	1	1/2	3	1.772 (45mm)	-	-	30-026	30-326	30-1261	30-226[1]	30-020-3	30-020-4
29-084	7054045	1.742 (44.24mm)	2	3/4	5	1.772 (45mm)	-	-	30-026	30-326	30-1261	30-226[1]	30-020-3	30-020-4
29-088	7054046	1.970 (50.03mm)	1	5/8	3	2 (50.8mm)	-	-	30-022	30-322	30-122	30-222	30-020-3	30-020-4
29-089	7054047	1.970 (50.03mm)	2	3/4	5	2 (50.8mm)	-	-	30-022	30-322	30-122	30-222	30-020-3	30-020-4
29-093	7054048	2.450 (62.23mm)	1	5/8	3	2.480 (63mm)	-	-	30-036	30-336	30-136	30-236	30-030-3	30-030-4
29-095	7054049	2.970 (75.43mm)	1	3/4	3	3 (76.20mm)	-	-	30-032	30-332	30-132	30-232	30-030-3	30-030-4
29-096	7054050	2.970 (75.43mm)	1	3/4	4	3 (76.20mm)	-	-	30-032	30-332	30-132	30-232	30-030-3	30-030-4
29-098	7054051	3.970(100.83mm)	1	3/4	3	4 (101.6mm)	-	-	30-042	30-342	30-142	30-242	30-040-3	30-040-4
29-099	7054052	3.970 (100.83mm)	1	3/4	4	4 (101.6mm)	-	-	30-042	30-342	30-142	30-242	30-040-3	30-040-4

1 = 50mm diameter honeycomb blade

29-100/29-100B Series Hogger

ZRN SC HC



Designed to be a versatile tool and cut most honeycomb core materials. The solid carbide body offers long tool life while the proven hogger geometry shreds the core and evacuates chips. The long flute length allows for deep pocket applications and can also be used to surface large areas. Hoggers are coated with ZRN.

29-100 Series Solid Carbide Honeycomb Hogger Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
29-110	7053973	1/4 (6.35mm)	1 1/4	1/4	4
29-115	7053974	3/8 (9.52mm)	2	3/8	4
29-125	7053975	1/2 (12.7mm)	3	1/2	6
29-130	7053976	1/2 (12.7mm)	4 1/2	1/2	6 1/2
29-140	7053977	3/4 (19.05mm)	3	3/4	6
29-145	7053978	3/4 (19.05mm)	4 1/2	3/4	6 1/2

29-100B Series Solid Carbide Honeycomb Hogger **Ballnose** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
29-130B	2605282	1/2 (12.7mm)	4 1/2	1/2	6 1/2
29-140B	2609003	3/4 (19.05mm)	3	3/4	6
29-145B	2609004	3/4 (19.05mm)	4 1/2	3/4	6 1/2

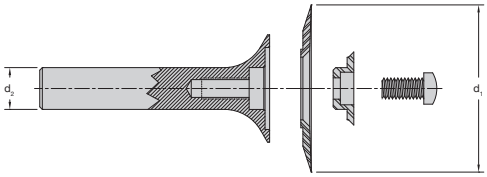
*B = Ballnose

29-100 Series Solid Carbide Honeycomb Hogger Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
29-120	7053971	12 (.472")	60	12	150
29-135	7053972	16 (.629")	80	16	150

30-000 Series Replaceable Ring Type Cutter

HSS HC



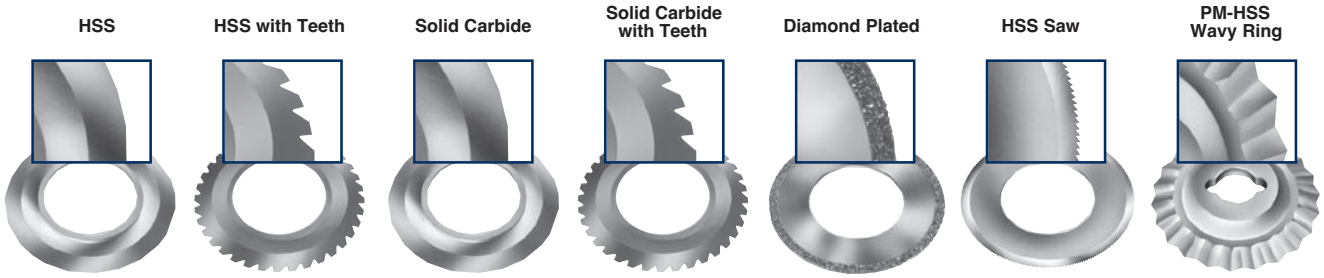
These tools are for contouring, carving and chamfering cuts of .25" or less. The unique patented holding system prevents the solid carbide blades from coming out of the holder if it is fractured.

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 LMT Onsrud making them very economical to use.

The HSS saw and diamond plated blades are disposable, offering the convenience of a constant diameter. **Note:** Cutting blades sold separately

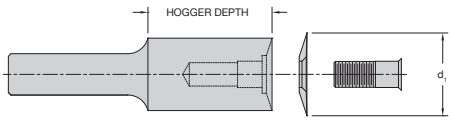
Shank Assembly				Cutting Blade Options				Spare Parts	
Part Number	SAP Number	Blade Diameter	Shank Diameter d_2	Solid Carbide	Solid Carbide w/Teeth	Diamond Plated	HSS Saw	Adapter Ring	Screw
30-011	7054066	1" (25.4mm)	1/2	30-012	30-313	30-112	30-213	-	30-011-2
30-021	7054067	2" (50.8mm)	1/2	30-022	30-322	30-122	30-222	30-020-3	30-020-4
30-031	6600418	3" (76.2mm)	1/2	30-032	30-332	30-132	30-232	30-030-3	30-030-4
30-041	6600421	4" (101.6mm)	1/2	30-042	30-342	30-142	30-242	30-040-3	30-040-4
Shank Assembly - Metric				Cutting Blade Options - Metric				Spare Parts	
Part Number	SAP Number	Blade Diameter	Shank Diameter d_2	Solid Carbide	Solid Carbide w/Teeth	Diamond Plated	HSS Saw	Adapter Ring	Screw
30-010	7054070	25	12	30-052	-	30-115	30-215	-	30-011-2
30-013	7054071	45	12	30-026	30-326	30-126	30-226	30-020-3	30-020-4
30-023	7054072	63	12	30-036	30-336	30-136	30-236	30-030-3	30-030-4

Cutting Blades for Cutters and Hoggers



30-300 Series Integral Shank Hogger Cutter

HSS HC



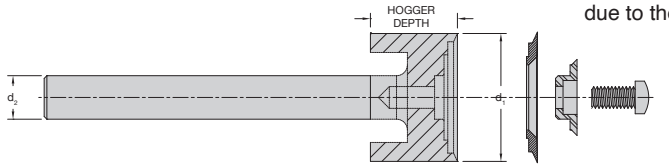
The spiral hogger geometry ground integral to the shank allows for faster feed rates and deeper cuts than any previous cutter. The availability of several different blades makes this cutter suitable for most core types. The hogger design also imparts less force as it evacuates and shreds scrap.
Note: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

Honeycomb Hogger						Cutting Blade Options					Spare Parts	
Part Number	SAP Number	Cutting Diameter d_1	Hogger Depth	SHK DIA d_2	OAL l_1	Blade Diameter	Solid Carbide	Solid Carbide w/Teeth	Diamond Plated	HSS Saw	Adapter Ring	Screw
30-310	7092835	7/8 (22.22mm)	1 1/2	1/2	3 1/2	1 (25.4mm)	30-012	30-313	30-113	30-213	-	30-011-2
30-315	6600437	1 1/4 (31.75mm)	1 1/2	1/2	3 1/2	1 1/2 (38.1mm)	30-014	30-314	30-114	30-214	30-020-3	30-020-4
30-321	6600438	1 3/4 (44.45mm)	1 1/2	1/2	3 1/2	2 (50.8mm)	30-022	30-322	30-122	30-222	30-020-3	30-020-4
30-331	6600441	2 3/4 (69.85mm)	1	1/2	3 1/2	3 (76.2mm)	30-032	30-332	30-132	30-232	30-030-3	30-030-4
30-341	6600442	3 3/4 (95.25mm)	1	3/4	3 1/2	4 (101.6mm)	30-042	30-342	30-142	30-242	30-040-3	30-040-4

See Page 27 for Images of Cutting Blades

30-700 Series Reduced Weight Cutter

HSS HC



35% weight reduction has been designed into the larger diameter tools resulting in better performance on 3 or 5 axis machines. Part lifting and flagging have also been reduced due to the new tooth and flute design.

Note: Cutting blades sold separately.

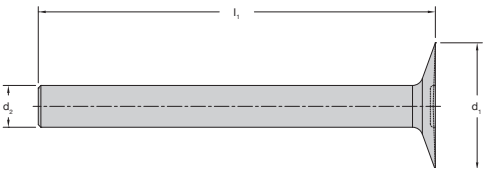
Honeycomb Hogger						Cutting Blade Options							Spare Parts	
Part Number	SAP Number	Cutting Diameter d_1	Hogger Depth	SHK DIA d_2	OAL l_1	Blade Diameter	HSS	HSS w/Teeth	Solid Carbide	Solid Carbide w/Teeth	Diamond Plated	HSS Saw	Adapter Ring	Screw
30-703	7054053	.345 (8.76mm)	1	1/2	3	3/8 (9.52mm)	30-016	30-316	-	-	-	-	-	HRD51646
30-705	7054054	.470 (11.93mm)	1	1/2	3	1/2 (12.7mm)	30-017	30-317	-	-	-	-	-	HRD51646
30-707	7054055	.720 (18.28mm)	1	1/2	3	3/4 (19.05mm)	-	-	30-015	30-318	-	-	-	30-011-2
30-710	7054056	.970 (24.63mm)	1	1/2	3	1 (25.4mm)	-	-	30-012	30-313	30-113	30-213	-	30-011-2
30-715	7054057	1.470 (37.33mm)	1	1/2	3	1 1/2 (38.10mm)	-	-	30-014	30-314	30-114	30-214	30-020-3	30-020-4
30-720	7054058	1.742 (44.24mm)	1	1/2	3	1.772 (45mm)	-	-	30-026	30-326	30-126[1]	30-126[1]	30-020-3	30-020-4
30-725	7054059	1.970 (50.03mm)	1	5/8	3	2 (50.8mm)	-	-	30-022	30-322	30-122	30-222	30-020-3	30-020-4
30-730	7054060	2.450 (62.23mm)	1	5/8	3	2.480 (63mm)	-	-	30-036	30-336	30-136	30-236	30-030-3	30-030-4
30-735	7054061	2.970 (75.43mm)	1	3/4	3	3 (76.20mm)	-	-	30-032	30-332	30-132	30-232	30-030-3	30-030-4
30-740	7054062	3.970 (100.83mm)	1	3/4	3	4 (101.6mm)	-	-	30-042	30-342	30-142	30-242	30-040-3	30-040-4

1 = 50mm diameter Honeycomb blade

See Page 27 for Images of Cutting Blades

31-000 Series Cutter

HSS HC



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.

31-000 Series High Speed Steel Cutter Product Offering

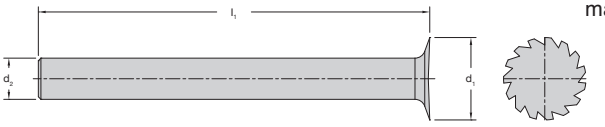
Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1
31-010	6600444	1/2	1/4	2 1/16
31-015	6600445	3/4	1/4	2 3/32
31-020	6600446	1	1/4	2 1/8
31-025	6600447	1 1/2	1/2	2 1/4
31-030	6600448	2	1/2	2 3/4
31-040	6600449	3	1/2	2 15/16

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

31-100 Series Cutter With Teeth

HSS TiCN HC



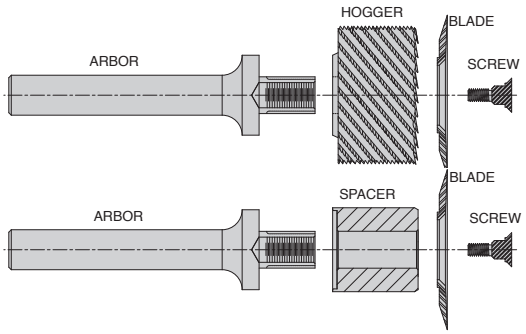
Small diameter honeycomb cutters were designed to offer the flexibility of cutting small slots or pockets in honeycomb core. The tools are versatile and can be used on CNC machines or hand held machines for field or maintenance type repairs.

31-100 Series High Speed Steel Honeycomb Cutter With Teeth Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1
31-102TCN	6602608	3/8	1/4	3
31-104TCN	6602609	1/2	1/4	3
31-106TCN	6602610	5/8	1/4	3
31-108TCN	6602611	3/4	1/4	3

32-200 Series Three Piece Hogger

ZRN HC



Designed with aggressive hogger geometry. Both the hogger and blade with teeth have a fine tooth grind pattern resulting in increased feed rates and improved part finish. All hoggers and blades are coated with a ZRN coating for increase in tool life. All hogger assemblies require a shank, a hogger, and a blade. This design also allows the tool to be used without the hogger by replacing the hogger with a spacer.

Note: Hoggers, Arbors and Cutting Blades Sold Separately.

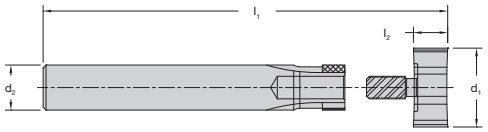
Honeycomb Hogger				Arbor				Cutting Blade Options			Spare Parts	
Part Number	SAP Number	Cutting Diameter d_1	Hogger Depth	Part Number	SAP Number	Shank DIA d_2	OAL l_1	Blade Diameter	Sollid Carbide	Solid Carbide w/Teeth	Spacer	Retaining Screw
32-210	7092829	0.94” (23.88mm)	1” (25.4mm)	32-221	7092839	3/8”	4”	1” (25.4mm)	32-412	32-512	32-221-3	32-221-4
32-225	7092828	1.94” (49.28mm)	1” (25.4mm)	32-231	7092840	1/2”	4”	2” (50.8mm)	32-422	32-522	32-231-3	32-231-4
				32-241	2991640	5/8”	4”					
				32-251	2659937	12	100					
32-235	2991639	2.94” (74.68mm)	1” (25.4mm)	32-231	7092840	1/2”	4”	3” (76.2mm)	32-432	32-532	32-231-3	32-231-4
				32-241	2991640	5/8”	4”					
				32-251	2659937	12	100					
32-220	2605363	1.72” (43.69mm)	1” (25.4mm)	32-231	7092840	1/2”	4”	1.77” (45mm)	32-426	32-526	32-231-3	32-231-4
				32-241	2991640	5/8”	4”					
				32-251	2659937	12	100					
32-230	7092853	2.42” (61.47mm)	1” (25.4mm)	32-231	7092840	1/2”	4”	2.48” (63mm)	32-436	32-536	32-231-3	32-231-4
				32-241	2991640	5/8”	4”					
				32-251	2659937	12	100					

32-201 - Wrench for 32-200 Tools (for Shank Diameters 1/2” & 5/8”)
32-202 - Wrench for 32-200 Tools (for Shank Diameters 3/8”)
32-205 - Keystock Replacement

See Page 27 for Images of Cutting Blades

NEW 34-000 Series Aircraft Panel Tools

SC PCD HC

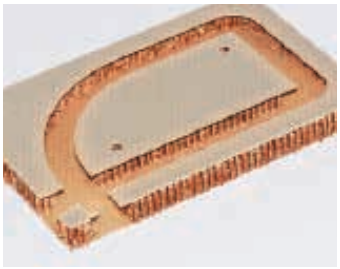


This modular tool is designed to produce slots in composite panels so potting compound can be applied to strengthen the edge. This tool consists of a PCD arbor which accepts a solid carbide under cutting tool to be screwed into it.

34-000 Series Solid Carbide Aircraft Panel Tools Product Offering

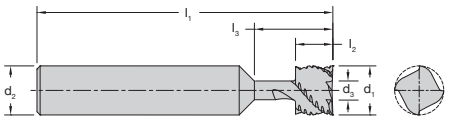
Part Number Uncoated	SAP Number Uncoated	Part Number ZRN	SAP Number ZRN	Part Number DLC	SAP Number DLC	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Description
34-006	2658059	-	-	-	-	1/2	-	1/2	PCD Tipped Arbor
34-007	2658060	-	-	-	-	1/2	-	12 mm	PCD Tipped Arbor
34-060*	2658061	34-061*	2658062	34-062*	2658063	7/8	0.130	-	Solid Carbide Head
34-063*	2658064	34-064*	2658065	34-065*	2658066	7/8	0.250	-	Solid Carbide Head
34-066	2658067	34-067	2658068	34-068	2658069	7/8	0.380	-	Solid Carbide Head
34-069	2658070	34-070	2658071	34-071	2658072	7/8	0.420	-	Solid Carbide Head
34-072	2658073	34-073	2658074	34-074	2658075	7/8	0.460	-	Solid Carbide Head
34-075	2658076	34-076	2658077	34-077	2658078	7/8	0.500	-	Solid Carbide Head
34-078	2658079	34-079	2658080	34-080	2658081	7/8	0.630	-	Solid Carbide Head
34-081	2658082	34-082	2658083	34-083	2658084	7/8	0.670	-	Solid Carbide Head
34-084	2658085	34-085	2658086	34-086	2658087	7/8	0.900	-	Solid Carbide Head

* Plunge point not available



34-100 Series Potted Fastener Tools

SC ZRN HC



The tool was designed to eliminate the inconsistencies in producing the holes in aircraft interior panels to mount potted, glued in, fasteners. This tool for composite panels will plunge and shred the HCC. In aluminum panels an entry hole is required but the HCC shred is clean and effective. Coated for increased tool life.

Hole for Fastener Produced with 34-100 Series

Potted Fastener

34-100 Series Potted Fastener Tools Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Neck Diameter d_3	Neck Length l_3	Overall Length l_1
34-107	2605623	0.453	0.13	1/2	0.18	0.80	3
34-109	2605624	0.453	0.25	1/2	0.18	0.80	3
34-111	2605625	0.453	0.38	1/2	0.18	0.80	3
34-113	2605626	0.453	0.50	1/2	0.18	0.80	3
34-115	2605627	0.500	0.13	1/2	0.19	0.80	3
34-117	2605628	0.500	0.25	1/2	0.19	0.80	3
34-119	2605629	0.500	0.38	1/2	0.19	0.80	3
34-121	2605630	0.500	0.50	1/2	0.19	0.80	3
34-123	2605631	0.563	0.13	1/2	0.22	0.80	3
34-125	2605632	0.563	0.25	1/2	0.22	0.80	3
34-127	2605633	0.563	0.38	1/2	0.22	0.80	3
34-129	2605634	0.563	0.50	1/2	0.22	0.80	3
34-131	2605635	0.630	0.13	5/8	0.25	0.80	3
34-133	2605636	0.630	0.25	5/8	0.25	0.80	3
34-135	2605637	0.630	0.38	5/8	0.25	0.80	3
34-137	2605638	0.630	0.50	5/8	0.25	0.80	3

34-100 Series Potted Fastener Tools Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Neck Diameter	Neck Length	Overall Length l_1
34-106	2605639	11.51	3.30	12	4.57	20.32	76
34-108	2605640	11.51	6.35	12	4.57	20.32	76
34-110	2605641	11.51	9.65	12	4.57	20.32	76
34-112	2605642	11.51	12.70	12	4.57	20.32	76
34-114	2605643	12.70	3.30	12	4.83	20.32	76
34-116	2605644	12.70	6.35	12	4.83	20.32	76
34-118	2605645	12.70	9.65	12	4.83	20.32	76
34-120	2605646	12.70	12.70	12	4.83	20.32	76
34-122	2605647	14.29	3.30	12	5.59	20.32	76
34-124	2605648	14.29	6.35	12	5.59	20.32	76
34-126	2605649	14.29	9.65	12	5.59	20.32	76
34-128	2605650	14.29	12.70	12	5.59	20.32	76
34-130	2605651	16	3.30	16	6.35	20.32	76
34-132	2605652	16	6.35	16	6.35	20.32	76
34-134	2605653	16	9.65	16	6.35	20.32	76
34-136	2605654	16	12.70	16	6.35	20.32	76

34-100 Series Potted Fastener Tools Product Offering Technical Data

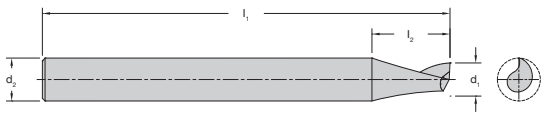
RPM	Plunge Feed Rate	Feed Rate
10,000	40 IPM	80 IPM

Note:
Must PRE-DRILL for Aluminum

40-000 Series Upcut Spiral

HSS SW HW A

Designed for routing applications where speed and chip removal are primary considerations. They are also recommended when grooving, slotting or blind routing.



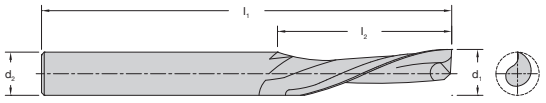
40-000 Series Single Flute - High Speed Steel **Upcut** Spiral Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
40-001	2600480	1/8	3/8	1/4	2 5/8	1
40-003	2600481	3/16	5/8	1/4	2 7/8	1
40-005	2600483	1/4	5/8	1/4	2 3/4	1
40-009	2600486	1/4	3/4	1/2	3 1/4	1
40-021	2600492	5/16	3/4	1/2	3 1/4	1
40-023	2600494	5/16	1	1/2	3 1/2	1
40-025	2600496	21/64	3/4	1/2	3 1/4	1
40-033	2600501	3/8	1	1/2	3 1/2	1

40-000 Series Downcut Spiral

HSS SW HW A

Designed for through cut routing operations where speed is the primary concern and fixturing is such that both chips and material are better off forced down



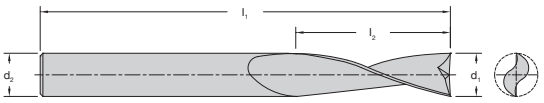
40-000 Series Single Flute - High Speed Steel **Downcut** Spiral Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
40-008	2600485	1/4	3/4	1/4	2 3/4	1
40-012	2600489	1/4	1	1/4	3	1

40-100 Series Upcut Spiral

HSS SW HW A

Provides a smoother finish when grooving, slotting or blind routing than do single flute tools. Recommended when fixturing requires upward chip removal.



40-000 Series Single Flute - High Speed Steel **Upcut** Spiral Product Offering

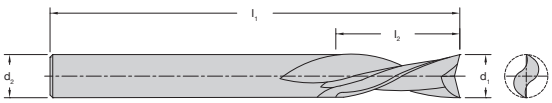
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
40-101	2600506	1/8	3/8	1/4	2 5/8	2
40-103	2600508	3/16	5/8	1/4	2 7/8	2
40-153	2600535	7/32	7/8	1/4	3	2
40-105	2600510	1/4	5/8	1/4	2 3/4	2
40-107	2600512	1/4	3/4	1/4	2 3/4	2
40-109	2600514	1/4	3/4	1/2	3 1/4	2
40-111*	2600516	1/4	1	1/4	3	2
40-121	2600521	5/16	3/4	1/2	3 1/4	2
40-117	2600520	5/16	3/4	3/8	3	2
40-115	2600518	5/16	1	5/16	3	2
40-123	2600523	5/16	1	1/2	3 1/2	2
40-131*	2600525	3/8	1	3/8	3	2
40-133	2600526	3/8	1	1/2	3 1/2	2
40-135	2600528	3/8	1 1/4	1/2	3 3/4	2
40-137	2600529	1/2	1 1/4	1/2	3 1/4	2
40-139	2600531	1/2	1 1/2	1/2	3 1/2	2
40-141	2600533	3/4	1 1/4	1/2	3 1/4	2

* These tools are designed and toleranced for air routers with guide bushings.

40-100 Series Downcut Spiral

HSS SW HW A

Provides a smoother finish than single flute in trimming and sizing. Recommended when chip flow should be directed down to protect the finish on the top of the material being cut.



40-100 Series Two Flute - High Speed Steel **Downcut** Spiral Product Offering

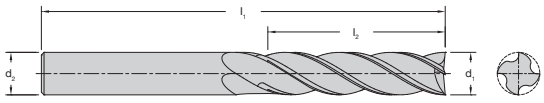
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
40-102	2600507	1/8	5/16	1/4	2 5/8	2
40-104	2600509	3/16	5/8	1/4	2 7/8	2
40-106	2600511	1/4	5/8	1/4	2 3/4	2
40-108	2600513	1/4	3/4	1/4	2 3/4	2
40-110	2600515	1/4	3/4	1/2	3 1/4	2
40-112*	2600517	1/4	1	1/4	3	2
40-158*	2600536	1/4	1	1/4	3 1/4	2
40-122	2600522	5/16	3/4	1/2	3 1/4	2
40-116	2600519	5/16	1	5/16	3	2
40-124	2600524	5/16	1	1/2	3 1/2	2
40-134	2600527	3/8	1	1/2	3 1/2	2
40-138	2600530	1/2	1 1/4	1/2	3 1/4	2
40-140	2600532	1/2	1 1/2	1/2	3 1/2	2
40-142	2600534	3/4	1 1/4	1/2	3 1/4	2

* These tools are designed and toleranced for air routers with guide bushings.

40-550 Series Upcut Spiral

HSS FP

Designed to cut thick foam with upward chipflow.



40-550 Series Four Flute - High Speed Steel **Upcut** Spiral For Foam Product Offering

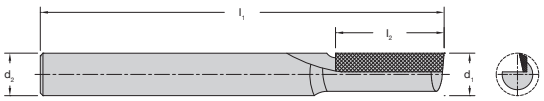
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
40-562	2600543	1/2	3 5/8	1/2	6	4
40-564	2600544	1/2	4 1/8	1/2	6 1/2	4

HELIX ANGLE ≈ 25°

48-000 Series Straight

CT | 0° | HW | CW | LW | FP

Designed for general use where faster feed rates, free cutting action and long tool life are essential.



48-000 Series Single Flute - Carbide Tipped **Straight** Product Offering

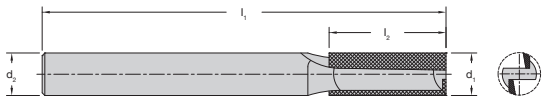
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
48-005	2600574	1/4	7/8	1/4	2 3/8	1
48-007	2600575	1/4	1	1/4	2 3/8	1
48-079*	2600593	1/4	1	1/4	3 1/4	1
48-056	2600587	3/8	1 1/4	1/2	2 3/4	1
48-069	2600590	1/2	1 1/2	1/2	3	1

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

48-000 Series Straight

CT | 0° | HW | CW | LW | FP

Designed for general usage where superior balance and vibration free cutting provides a smoother finish along with long tool life.



48-000 Series Two Flute - Carbide Tipped **Straight** Product Offering

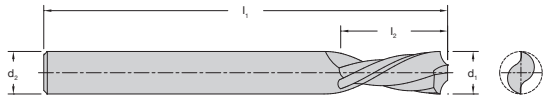
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
48-008+	2600576	1/8	5/16	1/4	2	2
48-004	2600573	1/4	5/8	1/4	2 1/8	2
48-006	9195992	1/4	7/8	1/4	2 3/8	2
48-018	2600584	1/4	7/8	1/2	2 1/2	2
48-106	2600599	1/4	1	1/4	2 3/8	2
48-179*	2600601	1/4	1	1/4	3 1/4	2
48-010	2600577	5/16	1	1/4	2 1/2	2
48-012	2600578	3/8	3/4	1/4	2 1/4	2
48-036*	2600585	3/8	1	3/8	2 1/2	2
48-057	2600588	3/8	1	1/2	2 1/2	2
48-058*	2600589	3/8	1 1/4	3/8	3	2
48-158	2600600	3/8	1 1/4	1/2	2 3/4	2
48-014	2600580	1/2	3/4	1/4	2 1/8	2
48-072	2600591	1/2	1	1/2	2 1/2	2
48-076	2600592	1/2	1 1/4	1/2	2 3/4	2
48-080	2600594	1/2	1 1/2	1/2	3	2
48-081	1069760	1/2	2	1/2	4	2
48-183	2600602	1/2	2 1/2	1/2	4 1/2	2
48-015	2600581	5/8	1	1/4	2 1/4	2
48-086	2600595	5/8	1 1/4	1/2	2 3/4	2
48-016	2600582	3/4	1	1/4	2 1/4	2
48-088	2600596	3/4	1 1/4	1/2	3	2
48-215	2600604	3/4	2	3/4	4	2
48-096	2600597	7/8	1 1/4	1/2	2 3/4	2
48-100	2600598	1	1 1/4	1/2	2 3/4	2

+ Solid Carbide

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

49-000 Series Downcut

HSS A



These double flute downcuts with a drill type point were developed initially as “Aircraft Throwaway” tools. They have many uses in trimming and routing primarily with hand held routers.

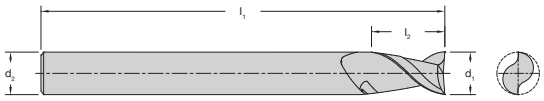
49-000 Series Two Flute - High Speed Steel **Downcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
49-005	2600614	1/4	9/16	1/4	2 1/2	2
49-001	2600612	1/4	9/16	1/4	2 3/4	2
49-007	2600615	1/4	9/16	1/4	3 1/4	2
49-003	2600613	3/8	3/4	3/8	2 1/2	2

These tools are designed and toleranced for Air Routers with guide brushings. + .000 - .006.
HELIX ANGLE ≈ 24°

52-000 Series Upcut Spiral

SC A SSP



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.

52-000 Series Two Flute - Solid Carbide **Upcut** Spiral Product Offering

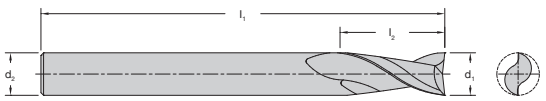
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-040	2600616	1/8	1/2	1/4	2	2
52-050	2600617	5/32	9/16	1/4	2	2
52-060	2600618	3/16	5/8	1/4	2	2
52-080	2600619	1/4	3/4	1/4	2 1/2	2
52-100	2600621	5/16	13/16	3/8	2 1/2	2
52-120	2600622	3/8	7/8	3/8	2 1/2	2
52-160	2600623	1/2	1	1/2	3	2

HELIX ANGLE ≈ 30°

52-200 Series Upcut Spiral Wood Rout

SC SW HW CW SP

Designed for routing where upward chip removal, tool rigidity, long life and high quality finish is desired.



52-200 Series Two Flute - Solid Carbide **Upcut** Spiral Wood Rout Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-244	6600994	1/8	1/2	1/8	2	2
52-240	2600624	1/8	1/2	1/4	2	2
52-250	2600626	5/32	5/8	1/4	2	2
52-260	2600627	3/16	3/4	1/4	2	2
52-261	2600629	3/16	3/4	1/4	2 1/2	2
52-280	7119586	1/4	7/8	1/4	2 1/2	2
52-285	6601011	1/4	1	1/4	2 1/2	2
52-287	2600634	1/4	1 1/8	1/4	3	2
52-300	2600636	5/16	1 1/8	5/16	3	2
52-310	2600637	5/16	1 1/8	1/2	3	2
52-310L	2600638	5/16	1 1/8	1/2	3	2
52-318*	2600639	3/8	1	3/8	3	2
52-320	2600640	3/8	1 1/8	3/8	3	2
52-325	7100385	3/8	1 1/4	3/8	3	2
52-330	2600642	3/8	1 1/4	1/2	3	2
52-340	2600643	7/16	1	1/2	3	2
52-360	6601027	1/2	1 1/8	1/2	3	2
52-362	2600644	1/2	1 1/4	1/2	3 1/2	2
52-365	2600645	1/2	1 5/8	1/2	3 1/2	2
52-365L	2600646	1/2	1 5/8	1/2	3 1/2	2
52-367	2600647	1/2	2 1/8	1/2	4	2
52-385	2600650	5/8	2 1/8	5/8	4	2
52-395	2600653	3/4	2 1/8	3/4	4	2

HELIX ANGLE ≈ 30°

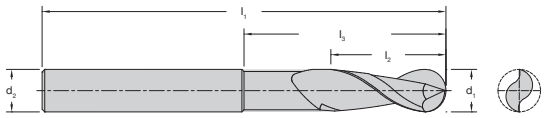
*Special Point (Improved Bottom Finish)

L = Left Hand Rotation

52-200B/BL Series Upcut Spiral Ballnose

SC | SW | HW | CW | SP | HP | SSP | A

Designed for carving and modeling operations. Their improved tip geometry gives a superior cut compared to most ballnose endmills.



52-200B Series Two Flute - Solid Carbide **Upcut** Spiral Ballnose Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-235B	7053996	1/16	1/4	1/8	2	2
52-244B	7053997	1/8	1/2	1/8	2	2
52-240B	7053998	1/8	1/2	1/4	2	2
52-260B	7053999	3/16	3/4	1/4	2	2
52-280B	7054000	1/4	7/8	1/4	2 1/2	2
52-320B	7054001	3/8	1 1/8	3/8	3	2
52-360B	7054002	1/2	1 1/8	1/2	3	2
52-386B	7054003	5/8	2 1/4	5/8	4	2
52-397B	7054004	3/4	2 1/2	3/4	5	2

52-200BL Series Two Flute - Solid Carbide **Upcut** Spiral Ballnose - Extended Length Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Extended Reach Length	Shank Diameter d_2	Overall Length l_1	Flutes
52-235BL	7054005	1/16	1/4	-	1/8	3	2
52-244BL	7054006	1/8	1/2	1 5/8	1/8	3	2
52-240BL	7054007	1/8	1/2	1 5/8	1/4	3	2
52-260BL	7054008	3/16	3/4	1 5/8	1/4	3	2
52-280BL	7054009	1/4	1	2 5/8	1/4	4	2
52-320BL	7054010	3/8	1 1/4	2 5/8	3/8	4	2
52-360BL	7054011	1/2	1 1/2	3 5/8	1/2	5	2
52-386BL	7054012	5/8	2 1/2	3 5/8	5/8	5	2
52-397BL	7054013	3/4	3	4 5/8	3/4	6	2

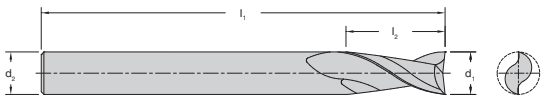
52-200B Series Two Flute - Solid Carbide **Upcut** Spiral Ballnose Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-240BM	7053992	3	12	6	50	2
52-280BM	7053993	6	22	6	64	2
52-320BM	7053994	10	29	10	76	2
52-360BM	7053995	12	29	12	76	2

52-400 Series Upcut Spiral Wood Rout

SC SW HW CW SP

Designed for routing where upward chip removal, tool rigidity, long life and high quality finish is desired.



52-400 Series Two Flute - Solid Carbide **Upcut** Spiral Rout Product Offering - Metric

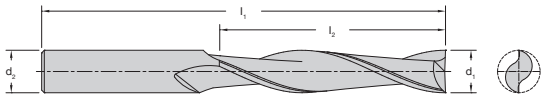
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-410	6601047	4	16	6	64	2
52-411	7100395	5	20	6	64	2
52-412	2600655	6	25	6	64	2
52-414	2600656	8	25	8	64	2
52-416	2600657	10	35	10	76	2
52-418	2600658	12	35	12	76	2

HELIX ANGLE ≈ 30°

52-550 Series Upcut Foam Cutters

SC FP

Foam cutters for thick material with upward chip flow.



52-550 Series Two Flute - Solid Carbide **Upcut** Foam Cutters Product Offering

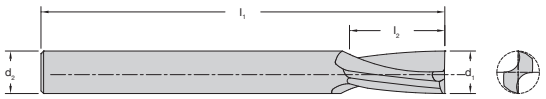
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-554	2600659	1/8	1 1/8	1/4	2 1/2	2
52-558	2600660	3/16	1 1/8	3/16	3	2
52-560	7097449	3/16	1 5/8	3/16	4	2
52-564	2600661	1/4	2 1/4	1/4	4	2
52-570	2600662	5/16	3 1/8	5/16	6	2
52-574	7097477	3/8	3 1/2	3/8	6	2

HELIX ANGLE ≈ 25°

52-600 Series Upcut Sprial O Flute

SC SP HP SSP

Low helix geometry designed to cut soft and hard plastic with a smooth finish and upward chip flow.



52-600 Series Two Flute - Solid Carbide **Upcut** Spiral O Flute Product Offering

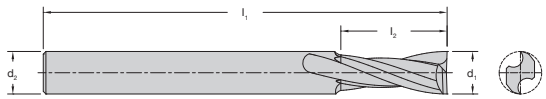
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-622	2600663	1/4	3/8	1/4	2 1/2	2
52-624	2600664	1/4	3/4	1/4	2 1/2	2
52-638	2600665	3/8	1	3/8	3	2
52-650	2600666	1/2	1 1/8	1/2	3 1/2	2
52-652	2600667	1/2	1 5/8	1/2	3 1/2	2
52-655	2600668	1/2	2 1/8	1/2	4 1/2	2
52-660	2600669	5/8	2 1/8	5/8	5	2
52-664	2600670	3/4	3 1/8	3/4	6	2

HELIX ANGLE ≈ 11°

52-700 Series Upcut Spiral O Flute

SC SP SSP FP SW HW

High helix geometry designed to cut soft plastic with a smooth finish and upward chip flow. Special point geometry for improved bottom finish.



52-700 Series Two Flute - Solid Carbide **Upcut** Spiral O Flute Product Offering

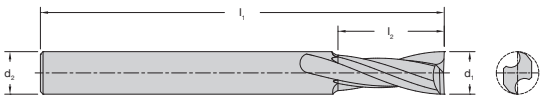
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-703	7053931	1/8	1/2	1/4	2	2
52-707	7053932	1/4	7/8	1/4	3	2
52-708	7053933	3/16	3/8	3/16	2 1/2	2
52-700	7053934	1/4	1 1/4	1/4	3	2
52-709	7053935	3/8	1	3/8	3	2
52-710	7053936	3/16	5/8	1/4	2 1/2	2
52-701	7053937	3/8	1 1/2	3/8	4	2
52-702	7053938	1/2	1 1/4	1/2	4	2
52-704	7053939	1/2	1 3/4	1/2	4	2
52-706	7053940	1/2	2 1/8	1/2	4	2
52-712	7053941	5/8	1 3/4	5/8	5	2
52-714	7053942	5/8	2 1/4	5/8	5	2
52-726	7053943	3/4	1 3/4	3/4	5	2
52-724	7053944	3/4	2 1/2	3/4	5	2
52-728	7053945	3/4	4	3/4	6 1/2	2
52-734	7053946	1	4	1	6 1/2	2

HELIX ANGLE ≈ 22°

52-700 Series Upcut Spiral O Flute *continued*

SC | SP | SSP | FP | SW | HW

High helix geometry designed to cut soft plastic with a smooth finish and upward chip flow. Special point geometry for improved bottom finish.



52-700 Series Two Flute - Solid Carbide **Upcut** Spiral O Flute Product Offering - Metric

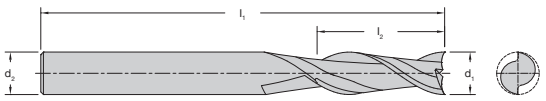
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-738	2659939	6	25	6	71	2
52-742	7053925	12	35	12	100	2
52-744	6601084	12	45	12	100	2
52-746	7053927	12	55	12	100	2
52-752	6601086	16	45	16	120	2
52-754	7053929	16	55	16	120	2
52-764	6601088	20	65	20	125	2

HELIX ANGLE ≈ 22°

52-900 Series Upcut Extreme Heavy Duty

SC | SW | HW | CW

Developed for demanding applications where upward chip removal, tool rigidity and long life are essential to success.



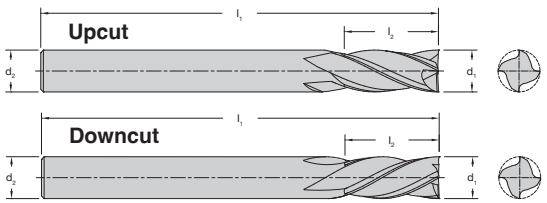
52-900 Series Two Flute - Solid Carbide **Upcut** Extreme Heavy Duty Standard Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
52-910	2600671	1/4	7/8	1/4	2 1/2	2
52-914	2600672	1/4	1 1/4	1/4	3	2
52-923	2600673	3/8	1 1/8	3/8	3	2
52-936	2600674	1/2	1 1/4	1/2	3	2

HELIX ANGLE ≈ 30°

54-200 Series Spiral Glass-Reinforced Plastic

SC | Fet2 | CP



Three and four flute tools for machining glass-reinforced plastic. Geometry has been optimized to shear the glass fibers while creating a chip which removes heat from the cut to avoid melting of the material. Tools are coated to withstand the abrasive characteristics inherent to Glass Reinforced Plastic (GRP).

54-200 Series Solid Carbide Spiral for Glass-Reinforced Plastic **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
54-205	2605283	1/8	1/2	1/4	2 1/2	3
54-210	2605285	3/16	5/8	1/4	2 1/2	3
54-220	2605287	1/4	3/4	1/4	2 1/2	4
54-230	2605289	3/8	1 1/8	3/8	3	4
54-240	2605291	1/2	1 1/8	1/2	3 1/2	4

54-200 Series Solid Carbide Spiral for Glass-Reinforced Plastic **Upcut** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
54-260	7069569	6	19	6	76	4
54-266	2608180	8	22	8	76	4
54-270	7069571	10	25	10	76	4
54-276	7100377	12	25	12	76	4

54-200 Series Solid Carbide Spiral for Glass-Reinforced Plastic **Downcut** Product Offering

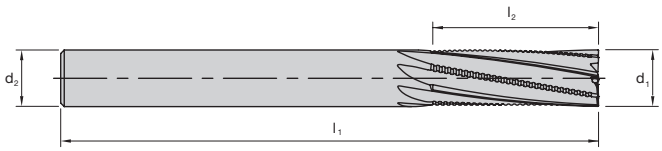
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
54-206	2605284	1/8	1/2	1/4	2 1/2	3
54-211	2605286	3/16	5/8	1/4	2 1/2	3
54-221	2605288	1/4	3/4	1/4	2 1/2	4
54-231	2605290	3/8	1 1/8	3/8	3	4
54-241	2605292	1/2	1 1/8	1/2	3 1/2	4

54-200 Series Solid Carbide Spiral for Glass-Reinforced Plastic **Downcut** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
54-261	2608178	6	19	6	76	4
54-267	2608181	8	22	8	76	4
54-271	2608182	10	25	10	76	4
54-277	2608183	12	25	12	76	4

54-775 Series Solid Carbide Low-Helix Rougher-Finisher Upcut

SC | Fet2 | CP



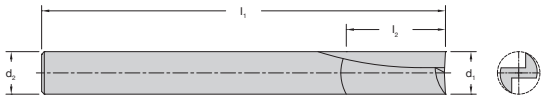
54-775 Series Solid Carbide Low-Helix Rougher-Finisher **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes z
54-790	2655455	1/8	1/4	1/8	2	4
54-791	2659889	1/8	5/8	1/8	2 1/4	4
54-792	2655456	3/16	9/16	3/16	2	4
54-793	2659890	3/16	1	3/16	3	4
54-776	2655457	1/4	1/2	1/4	3	4
54-778	2655458	1/4	3/4	1/4	3	4
54-779	2659891	1/4	1 1/4	1/4	3	4
54-780	2655459	3/8	3/4	3/8	3	6
54-782	2655460	3/8	1 1/8	3/8	3	6
54-781	2659892	3/8	1 1/2	3/8	4	6
54-783	2655492	1/2	1 1/8	1/2	3	6
54-784	2655461	1/2	1 1/8	1/2	3	8
54-785	2655498	1/2	1 5/8	1/2	4	6
54-786	2655462	1/2	1 5/8	1/2	4	8
54-787	2659893	1/2	2 1/8	1/2	4	6
54-788	2659894	1/2	2 1/8	1/2	4	8

56-000 Series Straight

SC | 0° | HP | CP

Designed to rout composite plastic.



56-000 Series Two Flute - Solid Carbide **Straight** Product Offering

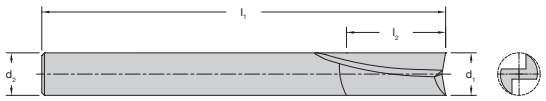
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
56-040	2600687	1/8	1/2	1/4	2	2
56-060	2600688	3/16	5/8	1/4	2	2
56-080	2600692	1/4	3/4	1/4	2 1/2	2
56-084*	2600695	1/4	3/4	1/4	3 1/4	2
56-100	2600697	5/16	13/16	3/8	2 1/2	2
56-160	2600702	1/2	1	1/2	3	2

* These tools are designed and toleranced for air routers with guide bushings.

56-000P Series Straight

SC | 0° | HP | CP | SSP | FP

Designed specifically to rout harder, more rigid plastics.



56-000P Series Two Flute - Solid Carbide **Straight** Product Offering

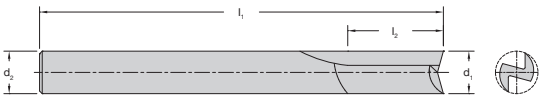
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
56-041	9111004	1/8	1/4	1/4	2	2
56-061	2600689	3/16	3/8	1/4	2	2
56-062	7054015	3/16	5/8	1/4	2	2
56-062L	2600690	3/16	5/8	1/4	2	2
56-063*	2600691	3/16	5/8	1/4	4	2
56-081	2600693	1/4	3/8	1/4	2 1/2	2
56-082	7054016	1/4	3/4	1/4	2 1/2	2
56-082L	2600694	1/4	3/4	1/4	2 1/2	2
56-086*	2600696	1/4	1 1/4	1/4	4	2
56-121	2600698	3/8	5/8	3/8	2 1/2	2
56-122	2600699	3/8	7/8	3/8	2 1/2	2
56-122L	2600700	3/8	7/8	3/8	2 1/2	2
56-124*	2600701	3/8	1 5/8	3/8	6	2
56-162	7054018	1/2	1	1/2	3	2
56-162L	2600703	1/2	1	1/2	3	2
56-164*	2600704	1/2	2 1/8	1/2	6	2

* These tools are designed and toleranced for air routers with guide bushings.
L = Left Hand Rotation

56-200 Series Straight Wood Rout

SC | 0° | SW | CW | HW

Provides a superior finish in a variety of wood materials and optimum cutter life.



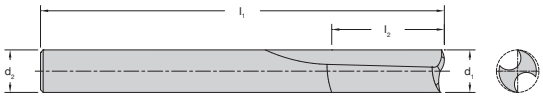
56-200 Series Two Flute - Solid Carbide **Straight** Wood Rout Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
56-240	7119585	1/8	1/2	1/4	2	2
56-250	2600706	5/32	5/8	1/4	2	2
56-260	2600707	3/16	3/4	1/4	2	2
56-270	2600708	7/32	3/4	1/4	2 1/2	2
56-280	2600709	1/4	7/8	1/4	2 1/2	2
56-285	2600710	1/4	1	1/4	2 1/2	2
56-287	2600711	1/4	1 1/8	1/4	3	2
56-300	2600712	5/16	1 1/8	5/16	3	2
56-310	2600713	5/16	1 1/8	1/2	3	2
56-320	2600714	3/8	1 1/8	3/8	3	2
56-330	2600715	3/8	1 1/4	1/2	3	2
56-360	2865670	1/2	1 1/8	1/2	3	2
56-365	2600716	1/2	1 5/8	1/2	3 1/2	2
56-390	2600717	3/4	1 5/8	3/4	4	2

56-430 Series Straight O Flute

SC | 0° | SP | HP

Designed with free cutting O flute geometry along with a double flute design for smooth finish.



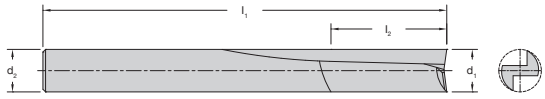
56-430 Series Two Flute - Solid Carbide **Straight** O Flute Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
56-430	7053954	4	16	6	64	2
56-431	7053955	5	20	6	64	2
56-432	7053956	6	25	6	64	2
56-434	7053597	8	25	8	76	2
56-436	2349850	10	35	10	88	2
56-438	2420107	12	35	12	88	2
56-440	2659938	12	50	12	150	2

56-450 Series Straight

SC | 0° | HP | CP | SSP

Designed specifically to rout harder, more rigid plastics.



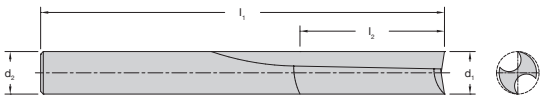
56-450 Series Two Flute - Solid Carbide **Straight** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
56-450	2420101	4	16	6	64	2
56-451	2420102	5	20	6	64	2
56-452	7053949	6	25	6	64	2
56-454	2420104	8	25	8	76	2
56-456	2420105	10	35	10	88	2
56-458	7053952	12	35	12	88	2

56-600 Series O Flute Straight

SC | 0° | HP | SP

Designed with free cutting O flute geometry along with a double flute design for smooth finish.



56-600 Series Two Flute - Solid Carbide O Flute Straight Product Offering

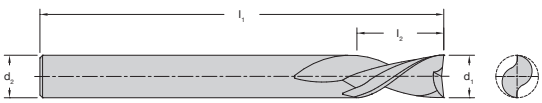
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
56-610	7054019	1/8	5/16	1/4	2	2
56-612	2600718	1/8	1/2	1/4	2	2
56-614	7054020	1/8	5/8	1/4	4	2
56-616	2600719	3/16	3/8	1/4	2	2
56-618	2600720	3/16	5/8	1/4	2	2
56-620	7054021	3/16	1	1/4	4	2
56-624	2600721	1/4	3/8	1/4	2 1/2	2
56-625	7054022	1/4	1	1/4	2 1/2	2
56-625L	2600722	1/4	1	1/4	2 1/2	2
56-626	2600723	1/4	1	1/4	3 1/4	2
56-628	2600724	1/4	1 1/4	1/4	4	2
56-638	7054023	3/8	7/8	3/8	2 1/2	2
56-639	2600725	3/8	1	3/8	4	2
56-650	7054024	1/2	1	1/2	3	2
56-652	2600726	1/2	1	1/2	4	2
56-654	2600727	1/2	1 3/4	1/2	4	2
56-655	2600728	1/2	2 1/8	1/2	6	2

L = Left Hand Rotation

57-000 Series Downcut Spiral

SC | CP | A

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.



57-000 Series Two Flute - Solid Carbide **Downcut** Spiral Product Offering

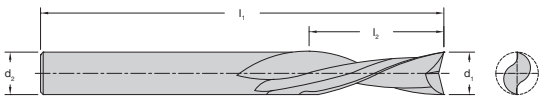
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
57-040	2600729	1/8	1/2	1/4	2	2
57-060	2600730	3/16	5/8	1/4	2	2
57-080	2600731	1/4	3/4	1/4	2 1/2	2
57-120	2600733	3/8	7/8	3/8	2 1/2	2
57-160	2600734	1/2	1	1/2	3	2

HELIX ANGLE ≈ 30°

57-200 Series Downcut Spiral Wood Rout

SC SW CW HW

Designed for routing where downward chip removal, tool rigidity, long life, and high quality finish is desired.



57-200 Series Two Flute - Solid Carbide **Downcut** Spiral Wood Rout

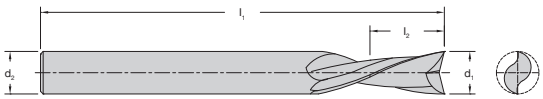
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
57-244	2600737	1/8	1/2	1/8	2	2
57-240	2600735	1/8	1/2	1/4	2	2
57-240L	2600736	1/8	1/2	1/4	2	2
57-251	2600739	5/32	1/2	1/4	2 1/2	2
57-250	2600738	5/32	5/8	1/4	2	2
57-260	2600740	3/16	3/4	1/4	2	2
57-261	2600742	3/16	3/4	1/4	2 1/2	2
57-280	2600745	1/4	7/8	1/4	2 1/2	2
57-285	2600746	1/4	1	1/4	2 1/2	2
57-285L	2600747	1/4	1	1/4	2 1/2	2
57-287	2600748	1/4	1 1/8	1/4	3	2
57-290	7118859	9/32	1	5/16	2 1/2	2
57-300	2600750	5/16	1 1/8	5/16	3	2
57-310	2600751	5/16	1 1/8	1/2	3	2
57-310L	2600752	5/16	1 1/8	1/2	3	2
57-318*	2600753	3/8	1	3/8	3	2
57-320	2600754	3/8	1 1/8	3/8	3	2
57-325	2600755	3/8	1 1/4	3/8	3	2
57-330	2600757	3/8	1 1/4	1/2	3	2
57-340	2600758	7/16	1	1/2	3	2
57-360	2600759	1/2	1 1/8	1/2	3	2
57-362	2600760	1/2	1 1/4	1/2	3 1/2	2
57-365	2600761	1/2	1 5/8	1/2	3 1/2	2
57-365L	2600762	1/2	1 5/8	1/2	3 1/2	2
57-367	2600764	1/2	2 1/8	1/2	4	2
57-370	2600765	17/32	1 1/8	1/2	3	2
57-380	2600766	5/8	1 5/8	5/8	3 1/2	2
57-385	2600767	5/8	2 1/8	5/8	4	2
57-390	2600769	3/4	1 5/8	3/4	4	2
57-395	2600770	3/4	2 1/8	3/4	5	2
57-395L	2600771	3/4	2 1/8	3/4	5	2

HELIX ANGLE ≈ 30°
*Special Point (Improved Bottom Finish)
L = Left Hand Rotation

57-200MD Series Marathon Downcut Wood Rout

SC MAR SW HW CW LW

The longest running downcut in the industry due to advancements in geometry and the addition of a unique Onsrud coating.



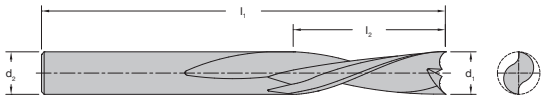
57-200MD Series Two Flute - Marathon Wood Rout **Downcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
57-278MD	2605293	1/4	3/8	1/4	2 1/2	2
57-279MD	2605294	1/4	5/8	1/4	2 1/2	2
57-317MD	2605295	3/8	7/8	3/8	3	2
57-359MD	2605296	1/2	7/8	1/2	3	2

57-400 Series Downcut Spiral Wood Rout

SC SW HW CW

Designed for routing where downward chip removal, tool rigidity, long life, and high quality finish is desired.



57-400 Series Two Flute - Solid Carbide **Downcut** Spiral Wood Rout Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
57-408	2659940	3	18	3	64	2
57-409	2659941	4	18	4	64	2
57-410	9088167	4	16	6	64	2
57-411	9094240	5	20	6	64	2
57-412	6601260	6	25	6	64	2
57-414	9094242	8	25	8	64	2
57-416	9098526	10	35	10	76	2

HELIX ANGLE ≈ 30°

57-600 Series Downcut Spiral O Flute

SC HP SSP SP

Designed to cut plastic with a smooth finish and downward chip flow.

57-600 Series Two Flute - Solid Carbide **Downcut** Spiral O Flute Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
57-623	2600772	1/4	3/8	1/4	2 1/2	2
57-625	2600773	1/4	3/4	1/4	2 1/2	2
57-637	2600774	3/8	1	3/8	3	2
57-651	2600775	1/2	1 1/8	1/2	3 1/2	2

57-600 Series Two Flute - Solid Carbide **Downcut** Spiral O Flute Product Offering - Metric

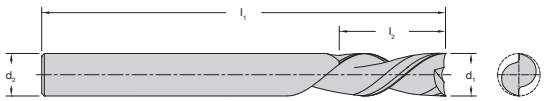
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
57-627	2991538	6	25	6	64	2
57-639	2349843	8	25	8	76	2

HELIX ANGLE ≈ 10-11°

57-900 Series Downcut Extreme Heavy Duty

SC SW HW CW

Designed for routing where extreme loads are placed upon the cutting tools and when extra part hold down is required.



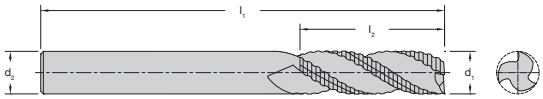
57-900 Series Two Flute - Solid Carbide **Downcut** Extreme Heavy Duty Standard Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
57-910	2600776	1/4	7/8	1/4	2 1/2	2
57-921	2600777	3/8	7/8	3/8	3	2
57-923	2600778	3/8	1 1/8	3/8	3	2
57-924	2600779	3/8	1 1/4	3/8	3	2
57-936	2600780	1/2	1 1/4	1/2	3	2
57-940	2600781	1/2	1 5/8	1/2	3 1/2	2

HELIX ANGLE ≈ 30°

60-000 Series High Helix Hogger

SC SW HW SP CW HP



Designed with unique scalloped cutting edge design for extremely fast machining and roughing. Faster chip removal with upcuts. Better hold down with downcuts

60-000 Series Three Flute - Solid Carbide High Helix Hogger **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-001	2600787	3/8	1 1/8	3/8	3 1/2	3
60-005	2600789	1/2	1 1/8	1/2	3 1/2	3
60-007	2600791	1/2	1 5/8	1/2	4	3
60-011	2600794	5/8	2 1/8	5/8	5	3
60-017	2600796	3/4	1 5/8	3/4	4	3
60-019	2600798	3/4	2 1/8	3/4	5	3

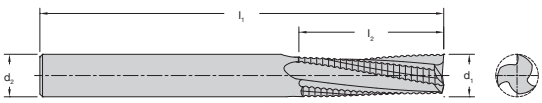
60-000 Series Three Flute - Solid Carbide High Helix Hogger **Downcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-002	2600788	3/8	1 1/8	3/8	3 1/2	3
60-006	2600790	1/2	1 1/8	1/2	3 1/2	3
60-008	2600792	1/2	1 5/8	1/2	4	3
60-012	2600795	5/8	2 1/8	5/8	5	3
60-018	2600797	3/4	1 5/8	3/4	4	3
60-020	2600799	3/4	2 1/8	3/4	5	3

HELIX ANGLE ≈ 30°

60-000 Series Low Helix Hogger

SC SW HW SP CW HP



Designed with unique scalloped cutting geometry which provides extremely fast roughing, lower horsepower requirements, longer tool life, and reduced chipping in solid wood materials.

60-000 Series Three Flute - Solid Carbide Low Helix Hogger **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-037	2600800	3/8	1 1/8	3/8	3 1/2	3
60-053	2600804	1/2	1 1/8	1/2	3 1/2	3
60-051	2600802	1/2	1 5/8	1/2	4	3
60-061	2600806	5/8	2 1/8	5/8	5	3
60-073	2600810	3/4	1 5/8	3/4	4	3
60-071	2600808	3/4	2 1/8	3/4	5	3

60-000 Series Three Flute - Solid Carbide Low Helix Hogger **Downcut** Product Offering

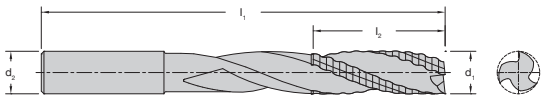
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-038	2600801	3/8	1 1/8	3/8	3 1/2	3
60-054	2600805	1/2	1 1/8	1/2	3 1/2	3
60-052	2600803	1/2	1 5/8	1/2	4	3
60-074	2600811	3/4	1 5/8	3/4	5	3
60-072	2600809	3/4	2 1/8	3/4	5	3

HELIX ANGLE ≈ 10°

60-090 Series Upcut Lock Mortise

SC SW HW CW

The scalloped upcut cutting edge design and extra spinback provide fast material removal in deep cuts for horizontal and vertical lock mortise routing.



60-090 Series Three Flute - Solid Carbide **Upcut** Lock Mortise Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Max DOC (in)	Shank Diameter d_2	Overall Length l_1	Flutes
60-090	2600812	5/8	2	4 1/2	5/8	6 1/2	3

60-090 Series Three Flute - Solid Carbide **Upcut** Lock Mortise Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Max DOC (mm)	Shank Diameter d_2	Overall Length l_1	Flutes
60-091	2600813	16	50	114	16	170	3

HELIX ANGLE ≈ 30°

60-100PLR Series Polaris Compression Spiral

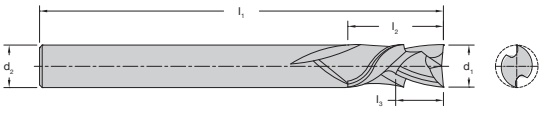
SC PLR CW SW HW LW

The 2016 Challengers' Award WINNER 50 years

The Polaris Compression Series has enhanced tooling geometry, which improves the cut quality, while achieving maximum productivity. Superior coating adhesion and performance is achieved through a pre-coating process that ensures durability and maximum tool life.

Features and Benefits

- Advanced design geometry.
- Improved cut quality.
- Reduced top and bottom layer delamination.
- Superior coating process.
- Increased tooling longevity.



60-100PLR Series Two Flute Polaris Compression Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-123PLR*	2640545	3/8	7/8	0.188	3/8	3	2
60-163PLR*	2640546	1/2	7/8	0.200	1/2	3	2
60-169PLR	2640547	1/2	1 1/8	0.562	1/2	3	2
60-173PLR*	2647961	1/2	1 3/8	0.200	1/2	3 1/2	2

*MORTISE COMPRESSION

60-100PLR Series Three Flute Polaris Compression Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-126PLR*	2647960	3/8	7/8	0.200	3/8	3	3
60-177PLR*	2649796	1/2	1 3/8	0.200	1/2	3 1/2	3

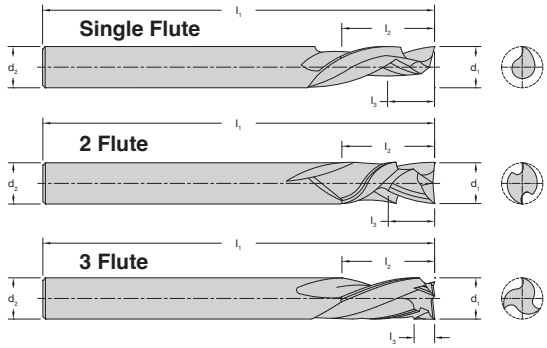
*MORTISE COMPRESSION

60-100PLR Series Polaris Compression Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-152PLR	2647045	6	22	4	6	64	1
60-153PLR	2647046	8	22	4	8	64	2
60-155PLR	2647047	10	22	4	10	76	2
60-156PLR	2647048	12	28	6	12	76	2

60-100MC Series Marathon Compression Spiral

SC MAR CW SW HW LW



The LMT Onsrud Marathon is one of the longest running compression tools in the industry due to innovations in cutting tool geometry and the addition of a unique LMT Onsrud coating. The coating is formulated to protect the cutting edge from the high temperatures generated when routing laminated and composite wood products.

Features and Benefits

- Progressive cutting edge geometry.
- Unique LMT Onsrud coating.
- Superior tool life and performance.
- Increased edge protection.

60-100MC Series Single Flute Marathon Compression Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-111MC*	2647951	1/4	7/8	0.175	1/4	2 1/2	1
60-120MC*	2647953	3/8	1 1/8	0.200	3/8	3	1
60-162MC	2647955	1/2	1 1/8	0.594	1/2	3	1

*MORTISE COMPRESSION

60-100MC Series Two Flute Marathon Compression Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-113MC*	2647952	1/4	7/8	0.188	1/4	2 1/2	2
60-123MC*	2600826	3/8	7/8	0.200	3/8	3	2
60-124MC	2605302	3/8	1 1/8	0.406	3/8	3	2
60-127LMC*	2647954	3/8	1 1/8	0.200	3/8	3	2
60-163MC*	2600850	1/2	7/8	0.200	1/2	3	2
60-169MC	2600860	1/2	1 1/8	0.562	1/2	3	2
60-171MC	2600864	1/2	1 3/8	0.625	1/2	3 1/2	2
60-173MC*	2600871	1/2	1 3/8	0.200	1/2	3 1/2	2
60-173LMC*	2647957	1/2	1 3/8	0.200	1/2	3 1/2	2
60-172MC	2605304	1/2	1 5/8	0.750	1/2	4	2
60-172LMC	2647956	1/2	1 5/8	0.750	1/2	4	2

L = Left Hand

*MORTISE COMPRESSION

60-100MC Series Three Flute Marathon Compression Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-126MC*	2600834	3/8	7/8	0.200	3/8	3	3
60-176MC*	2647959	1/2	7/8	0.200	1/2	3	3
60-177MC*	2600876	1/2	1 3/8	0.200	1/2	3 1/2	3
60-175MC	2647958	1/2	1 5/8	0.750	1/2	3 1/2	3

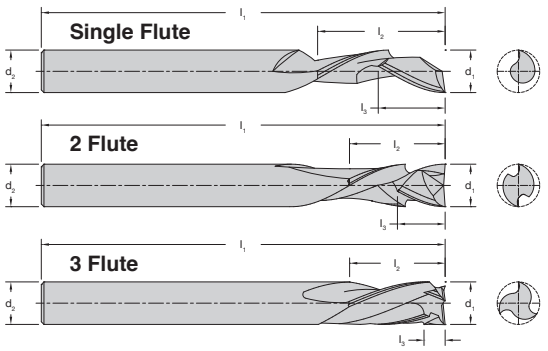
*MORTISE COMPRESSION

60-100MC Series Marathon Compression Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-152MC	2605691	6	22	4	6	64	1
60-143MC	2659942	6	28	4	6	64	2
60-153MC	2605692	8	22	4	8	64	2
60-144MC	2659943	8	28	4	8	64	2
60-155MC	2605693	10	22	4	10	76	2
60-145MC	2659944	10	30	4	10	76	2
60-156MC	2605694	12	28	6	12	76	2
60-146MC	2659945	12	35	6	12	76	2

60-100MW Series Max Life Compression Spiral

SC | CW | SW | HW | LW



Designed for maximum life when cutting in highwear applications. Unique geometries and carbides improve the wear characteristics of the tool under abrasive applications with superior part finish. Mortise compressions are designed with short upcut to allow mortise cut with downcut action.

60-100MW Series Single Flute - Solid Carbide Max Life Compression Spiral Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-102MW	2605298	1/8	3/8	.205	1/4	2 1/2	1
60-106MW	2605299	3/16	5/8	.300	1/4	2 1/2	1
60-111MW*	2605300	1/4	7/8	.175	1/4	2 1/2	1
60-120MW*	2600822	3/8	1 1/8	.200	3/8	3	1
60-167MW*	2600857	1/2	1 1/8	.200	1/2	3	1

*MORTISE COMPRESSION

60-100MW Series Two Flute - Solid Carbide Max Life Compression Spiral Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-113MW*	2605301	1/4	7/8	.188	1/4	2 1/2	2
60-123MW*	2600827	3/8	7/8	.188	3/8	3	2
60-124MW	2600831	3/8	1 1/8	.406	3/8	3	2
60-127MW*	2600838	3/8	1 1/8	.188	3/8	3	2
60-163MW*	2600851	1/2	7/8	.200	1/2	3	2
60-169MW	2600861	1/2	1 1/8	.562	1/2	3	2
60-171MW	2600865	1/2	1 3/8	.625	1/2	3 1/2	2
60-172MW	2600868	1/2	1 5/8	.750	1/2	4	2
60-173MW*	2600872	1/2	1 3/8	.200	1/2	3 1/2	2
60-181MW	2600877	1/2	2 1/8	1	1/2	5	2
60-186MW	2605307	5/8	2 1/4	4	5/8	5	2
60-196MW	2600884	3/4	1 7/8	.750	3/4	4	2
60-194MW	2600881	3/4	2 1/4	1	3/4	5	2

*MORTISE COMPRESSION

60-100MW Series Three Flute - Solid Carbide Max Life Compression Spiral Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-125MW	2605303	3/8	1 1/8	.500	3/8	3	3
60-126MW*	2600835	3/8	7/8	.200	3/8	3	3
60-176MW*	2605305	1/2	7/8	.200	1/2	3	3
60-177MW*	2605306	1/2	1 3/8	.200	1/2	3 1/2	3

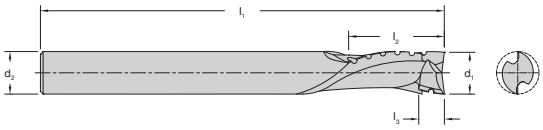
*MORTISE COMPRESSION

60-100MW Series Single & Two Flute - Solid Carbide Max Life Compression Spiral Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-152MW	2605687	6	22	4	6	64	1
60-143MW	2659946	6	28	4	6	64	2
60-153MW	2605688	8	22	4	8	64	2
60-155MW	2605689	10	22	4	10	76	2
60-145MW	2659947	10	30	4	10	76	2
60-156MW	2605690	12	28	6	12	76	2

60-100C Series Chipbreaker/Finisher Compression Spiral

SC CW SW HW LW



Designed to give the optimum edge finish of the compression spiral bits along with the increased feed rates of the chipbreaker/finisher design.

60-100C Series Two Flute - Solid Carbide Chipbreaker/Finisher Compression Spiral Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-123C*	2600824	3/8	7/8	.188	3/8	3	2
60-124C	2600829	3/8	1 1/8	.406	3/8	3	2
60-163C*	2826196	1/2	7/8	.200	1/2	3	2
60-169C	2600859	1/2	1 1/8	.562	1/2	3	2
60-172C	2865668	1/2	1 5/8	.750	1/2	4	2

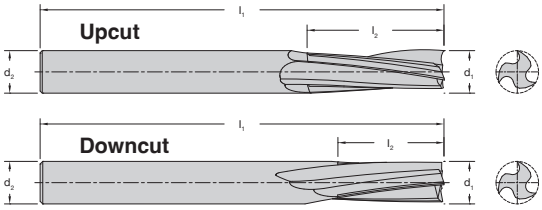
HELIX ANGLE ≈ 30°

*MORTISE COMPRESSION

60-200 Series Low Helix Finisher

SC SW HW CW HP SSP

Designed for perfect balance and ultra smooth finish over a wide speed range.



60-200 Series Three Flute - Solid Carbide Low Helix Finisher **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-239	7088755	1/4	3/8	1/4	3	3
60-241	7100389	1/4	7/8	1/4	3	3
60-243	7088756	3/8	5/8	3/8	3	3
60-245	2600889	3/8	1 1/8	3/8	3	3
60-249	7088757	1/2	1 1/8	1/2	3 1/2	3
60-253	6601431	1/2	1 5/8	1/2	4	3
60-251	2865347	1/2	2 1/8	1/2	4 1/2	3
60-269	2600893	3/4	1 5/8	3/4	4	3
60-271	2600895	3/4	2 1/8	3/4	5	3
60-277	2600897	3/4	3 1/8	3/4	6	3

60-200 Series Three Flute - Solid Carbide Low Helix Finisher **Downcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-240	6601420	1/4	3/8	1/4	3	3
60-242	7100391	1/4	7/8	1/4	3	3
60-244	2600888	3/8	5/8	3/8	3	3
60-246	2600890	3/8	1 1/8	3/8	3	3
60-250	2600891	1/2	1 1/8	1/2	3 1/2	3
60-254	6601432	1/2	1 5/8	1/2	4	3
60-252	2600892	1/2	2 1/8	1/2	4 1/2	3
60-270	2600894	3/4	1 5/8	3/4	5	3
60-272	2600896	3/4	2 1/8	3/4	5	3
60-278	2600898	3/4	3 1/8	3/4	6	3

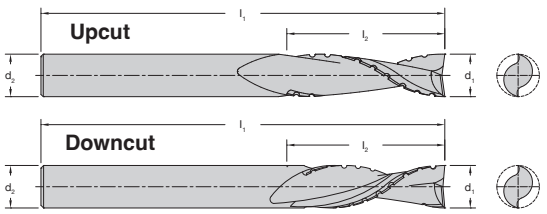
60-200 Series Three Flute - Solid Carbide Low Helix Finisher **Upcut** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-471	2349864	8	25	8	76	3
60-473	2349865	10	35	10	76	3
60-475	2349866	12	35	12	88	3

HELIX ANGLE ≈ 10°

60-300 Series Chipbreaker Finisher

SC SW HW CW



For faster feed rates than a conventional two flute with a smooth finish

60-300 Series Two Flute - Solid Carbide Chipbreaker Finisher **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-307	2600899	3/8	1 1/8	3/8	3	2
60-311	2600901	1/2	1 1/8	1/2	3	2
60-313	2600903	1/2	1 5/8	1/2	3 1/2	2
60-317	2865666	1/2	1 7/8	1/2	3 1/2	2
60-315	2600905	1/2	2 1/8	1/2	4	2
60-321	2600908	5/8	2 1/8	5/8	4	2
60-325	2600910	3/4	2 1/8	3/4	4	2

60-300 Series Two Flute - Solid Carbide Chipbreaker Finisher **Downcut** Product Offering

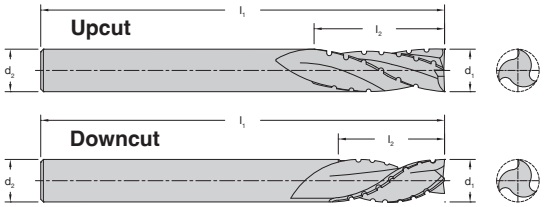
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-308	2600900	3/8	1 1/8	3/8	3	2
60-312	2600902	1/2	1 1/8	1/2	3	2
60-314	2600904	1/2	1 5/8	1/2	3 1/2	2
60-318	2600907	1/2	1 7/8	1/2	3 1/2	2
60-316	2600906	1/2	2 1/8	1/2	4	2
60-322	2600909	5/8	2 1/8	5/8	4	2
60-326	2600911	3/4	2 1/8	3/4	4	2

HELIX ANGLE ≈ 30°

60-350 Series Chipbreaker Finisher

SC SW HW CW

For additional balance at fast feed rates with a smooth finish



60-350 Series Three Flute - Solid Carbide Chipbreaker Finisher **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-337	2600912	3/8	1 1/8	3/8	3	3
60-351	2600915	1/2	1 1/8	1/2	3	3
60-353	2600917	1/2	1 5/8	1/2	3 1/2	3
60-361	2600920	5/8	1 5/8	5/8	4	3
60-371	2600922	3/4	1 5/8	3/4	4	3
60-375	2600925	3/4	3 1/8	3/4	6	3

60-350 Series Three Flute - Solid Carbide Chipbreaker Finisher **Downcut** Product Offering

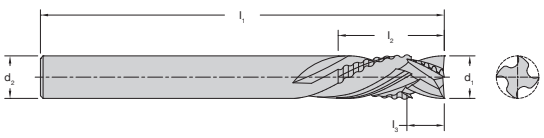
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-338	2600913	3/8	1 1/8	3/8	3	3
60-350	2600914	1/2	1 1/8	1/2	3	3
60-354	2600918	1/2	1 3/8	1/2	3 1/2	3
60-352	2600916	1/2	1 5/8	1/2	3 1/2	3
60-360	2600919	5/8	1 5/8	5/8	4	3
60-370	2600921	3/4	1 5/8	3/4	4	3
60-372	2600923	3/4	2 1/4	3/4	5	3
60-374	2600924	3/4	3 1/8	3/4	6	3

HELIX ANGLE ≈ 30°

60-600 Series High Velocity Compression Spiral

SC SW HW CW LW

Combine a roughing and finishing cut in one tool for rapid feed rates with a good finish.



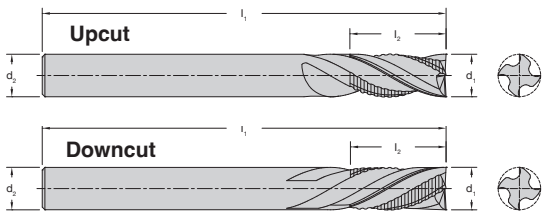
60-600 Series Four Flute - Solid Carbide High Velocity Compression Spiral Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
60-669	2600940	1/2	1 1/8	.500	1/2	3	4
60-671	2600941	1/2	1 3/8	.500	1/2	3 1/2	4

HELIX ANGLE ≈ 30°

60-700 Series High Velocity Spiral

SC SW HW CW



Combine a roughing and finishing cut with upcut cutting action in one tool for rapid feed rates with a good finish.

60-700 Series Four Flute - Solid Carbide High Velocity Spiral **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-711	2600945	1/2	1 1/8	1/2	3 1/2	4
60-715	2600947	1/2	1 5/8	1/2	4	4
60-719	2600949	1/2	2 1/8	1/2	4 1/2	4
60-731	2600952	3/4	2 1/8	3/4	5	4

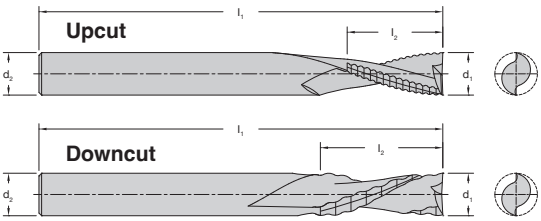
60-700 Series Four Flute - Solid Carbide High Velocity Spiral **Downcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-710	2600944	1/2	1 1/8	1/2	3 1/2	4
60-714	2600946	1/2	1 5/8	1/2	4	4
60-718	2600948	1/2	2 1/8	1/2	4 1/2	4
60-720	2600950	5/8	2 1/8	5/8	5	4

HELIX ANGLE ≈ 30°

60-800 Series Rougher

SC SW HW CW



Designed for use when faster feed rates cannot be achieved, or on low horsepower machines.

60-800 Series Two Flute - Solid Carbide Rougher **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-815	2600953	3/8	1 3/8	3/8	3 1/2	2
60-825	2600955	1/2	1 3/8	1/2	3 1/2	2
60-829	2865667	1/2	1 7/8	1/2	4	2
60-841	2600958	5/8	2 5/8	5/8	5	2
60-847	2600960	3/4	2 7/8	3/4	6	2

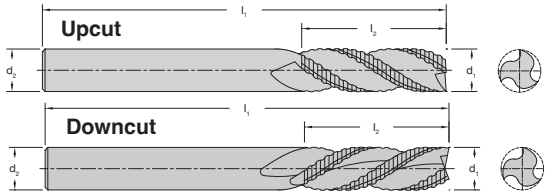
60-800 Series Two Flute - Solid Carbide Rougher **Downcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-816	2600954	3/8	1 3/8	3/8	3 1/2	2
60-826	2600956	1/2	1 3/8	1/2	3 1/2	2
60-830	2600957	1/2	1 7/8	1/2	4	2
60-842	2600959	5/8	2 5/8	5/8	5	2
60-848	2600961	3/4	2 7/8	3/4	6	2

HELIX ANGLE ≈ 20°

60-900 Series Extreme Heavy Duty Hogger

SC SW HW CW SP HP



Designed for heavy material removal operations where the cutter is subject to excessive cutting forces and finish is not a primary concern.

60-900 Series Three Flute - Solid Carbide Extreme Heavy Duty Hogger **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-901	2600962	3/8	1 1/8	3/8	3	3
60-905	2600964	1/2	1 1/8	1/2	3	3
60-907	2600966	1/2	1 5/8	1/2	3 1/2	3
60-909	2600968	1/2	2 1/8	1/2	4	3
60-915	2600970	3/4	2 1/8	3/4	5	3

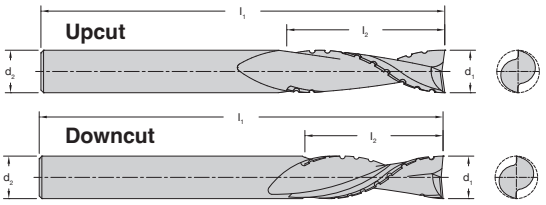
60-900 Series Three Flute - Solid Carbide Extreme Heavy Duty Hogger **Downcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-902	2600963	3/8	1 1/8	3/8	3	3
60-906	2600965	1/2	1 1/8	1/2	3	3
60-908	2600967	1/2	1 5/8	1/2	3 1/2	3
60-910	2600969	1/2	2 1/8	1/2	4	3
60-916	2600971	3/4	2 1/8	3/4	5	3

HELIX ANGLE ≈ 30°

60-950 Series Extreme Heavy Duty Chipbreaker/Finisher

SC SW HW CW



Designed to be fed very fast while withstanding excessive cutting forces and at the same time leaving a smooth finish.

60-950 Series Two Flute - Solid Carbide Extreme Heavy Duty Chipbreaker/Finisher **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-951	2600973	3/8	1 1/8	3/8	3	2
60-955	2600975	1/2	1 1/8	1/2	3	2
60-957	2600977	1/2	1 5/8	1/2	3 1/2	2
60-959	2600979	1/2	2 1/8	1/2	4	2
60-965	2600980	3/4	2 1/8	3/4	5	2

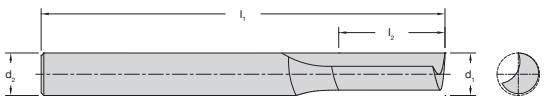
60-950 Series Two Flute - Solid Carbide Extreme Heavy Duty Chipbreaker/Finisher **Downcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
60-950	2600972	3/8	1 1/8	3/8	3	2
60-954	2600974	1/2	1 1/8	1/2	3	2
60-956	2600976	1/2	1 5/8	1/2	3 1/2	2
60-958	2600978	1/2	2 1/8	1/2	4	2

HELIX ANGLE ≈ 30°

61-000 Series Straight

SC | 0° | SW | A



Designed to combine the fast free cutting of O flute geometry with the tool life available from solid carbide particularly in small diameters.

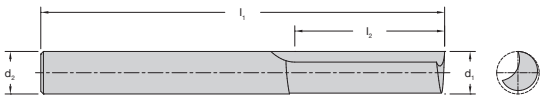
61-000 Series **Straight** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
61-040	7059727	1/8	1/2	1/4	2	1
61-050	7059726	5/32	9/16	1/4	2	1
61-060	7100398	3/16	5/8	1/4	2	1
61-070	2600989	7/32	5/8	1/4	2 1/2	1
61-080	7100399	1/4	3/4	1/4	2 1/2	1
61-090	2600996	9/32	3/4	3/8	2 1/2	1
61-100	2600997	5/16	13/16	3/8	2 1/2	1
61-120	2600998	3/8	7/8	3/8	2 1/2	1
61-140	2601001	7/16	1	1/2	3	1
61-160	2601002	1/2	1	1/2	3	1

61-000P Series Straight

SC | 0° | SP | HP

Designed to combine the fast free cutting of O flute geometry with the tool life available from solid carbide particularly in small diameters.



61-000P Series Single Flute - Solid Carbide **Straight** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
61-041	7100338	1/8	5/16	1/4	2	1
61-044	2600982	1/8	1/2	1/8	2	1
61-042	7054025	1/8	1/2	1/4	2	1
61-042L	2600981	1/8	1/2	1/4	2	1
61-045	2600983	1/8	5/8	1/8	3	1
61-043	7054026	1/8	5/8	1/4	4	1
61-052	2600984	5/32	9/16	1/4	2	1
61-061	2600985	3/16	3/8	1/4	2	1
61-064	2600988	3/16	5/8	3/16	2 1/2	1
61-062	7054027	3/16	5/8	1/4	2	1
61-062L	2600986	3/16	5/8	1/4	2	1
61-063*	2600987	3/16	1	1/4	4	1
61-072	2600990	7/32	5/8	1/4	2 1/2	1
61-081	2600991	1/4	3/8	1/4	2 1/2	1
61-082	7054028	1/4	3/4	1/4	2 1/2	1
61-082L	2600992	1/4	3/4	1/4	2 1/2	1
61-083*	2600993	1/4	3/4	1/4	3 1/4	1
61-083L*	2600994	1/4	3/4	1/4	3 1/4	1
61-085*	2600995	1/4	1	1/4	3 1/4	1
61-084*	7054029	1/4	1 1/4	1/4	4	1
61-121	2600999	3/8	5/8	3/8	2 1/2	1
61-122	7054030	3/8	7/8	3/8	2 1/2	1
61-123*	2601000	3/8	1 5/8	3/8	6	1
61-162	2601003	1/2	1	1/2	3	1
61-164	2601004	1/2	1 5/8	1/2	4	1
61-166	2601005	1/2	2 1/8	1/2	6	1

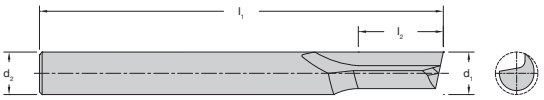
* These tools are designed and toleranced for air routers with guide bushings.

L = Left hand rotation

61-200 Series Straight Wood Rout

SC 0° SW HW CW

Designed to enhance operations where the benefits of spiral action are not needed. The single flute provides fast, free cutting with optimum cutter life.



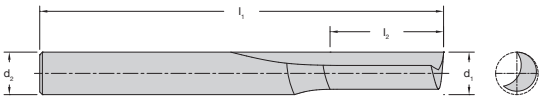
61-200 Series Single Flute - Solid Carbide **Straight** Wood Rout Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
61-240	2601006	1/8	1/2	1/4	2	1
61-280	2601007	1/4	7/8	1/4	2-1/2	1
61-285	2601008	1/4	1	1/4	2-1/2	1
61-320	2601009	3/8	1-1/8	3/8	3	1

61-400 Series Straight

SC 0° SP HP

Designed to combine the fast free cutting of O flute geometry with the tool life available from solid carbide particularly in small diameters.

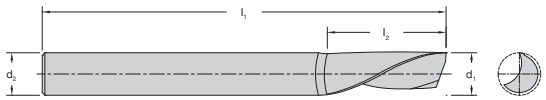


61-400 Series Single Flute - Solid Carbide **Straight** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
61-408	2659948	3	12	3	64	1
61-409	2659949	4	16	4	64	1
61-410	2349877	4	16	6	64	1
61-411	7054032	5	20	6	64	1
61-412	2349879	6	25	6	64	1
61-414	7054034	8	25	8	64	1
61-418	7054035	12	35	12	88	1

62-600 Series Downcut Spiral O Flute

SC A



High speed cutters for machining aluminum sheet material. These tools are optimized for use on high-speed CNC mills, high speed machining centers and CNC routers.

62-600 Series Singe Flute - Solid Carbide Sprial O Flute **Downcut** Product Offering

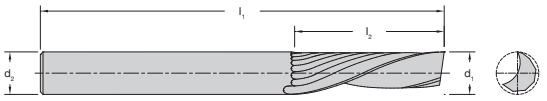
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
62-602	2601010	1/16	1/4	1/8	1 1/2	1
62-604	2601011	1/8	1/4	1/8	1 1/2	1
62-606	2601012	1/8	1/4	1/4	2	1
62-610	2601013	1/8	1/2	1/4	2	1
62-614	2601015	3/16	3/8	1/4	2	1
62-620	2601017	1/4	3/8	1/4	2	1
62-622	2601018	1/4	3/4	1/4	2 1/2	1
62-624	2601019	1/4	1 1/4	1/4	3	1
62-630	2601022	5/16	3/4	1/2	3	1
62-625	2601020	3/8	3/4	3/8	3	1
62-631	2601023	1/2	1 1/8	1/2	3 1/2	1

HELIX ANGLE ≈ 22°

62-700/62-750/62-800/62-850 Series Downcut Spiral O Flute

SC | **62-700** HP SSP | **62-750** SP HP SSP

62-800 HP SSP | **62-850** SP HP SSP



(HP) Designed to provide a smooth finish in hard plastics with downward chip removal.(SP) Designe to provide a smooth finish in soft plastic with downward chip removal.

62-700/62-750 Series Single Flute - Solid Carbide **Downcut** Spiral O Flute Product Offering

Hard Plastic		Soft Plastic						
Part Number	SAP Number	Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
62-713*	2601025	62-763*	2601035	1/8	1/2	1/8	2	1
62-712*	2601024	62-762*	2601034	1/8	1/2	1/4	2	1
62-715*	2601026	–	-	5/32	9/16	1/4	2	1
62-719*	2601028	62-769*	2601037	3/16	5/8	3/16	2	1
62-718	2601027	62-768	2601036	3/16	5/8	1/4	2	1
62-725	2601029	62-775	2601038	1/4	3/4	1/4	2-1/2	1
62-726	2601030	62-776	2601039	1/4	1-1/4	1/4	3	1
62-727*	2601031	–	-	1/4	1-1/2	1/4	3	1
62-733	2601032	62-783	2601040	3/8	1-1/8	3/8	3	1
62-740	2601033	62-790	2601041	1/2	1-5/8	1/2	3-1/2	1

*Tool balanced by design to run at spindle speeds up to 60,000 RPM

62-800/62-850 Series Single Flute - Solid Carbide **Downcut** Spiral O Flute Product Offering - Metric

Hard Plastic		Soft Plastic						
Part Number	SAP Number	Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
62-801	2659950	-	-	1	4	3	30	1
62-803	2659951	-	-	2	8	3	38	1
62-810	2349887	-	-	3	8	3	50	1
-	-	62-854	2349932	2	8	6	63	1
62-816*	7100379	62-866*	2349938	3	12	6	64	1
62-820	2349892	-	-	4	12	4	64	1
62-824*	2349894	62-874*	2349942	4	20	6	64	1
62-830	2349897	62-880	2349945	5	16	6	64	1
62-840	2349902	–	-	6	30	6	76	1
62-842*	2349903	–	-	6	38	6	76	1
62-844	2349904	–	-	8	25	8	64	1
62-846	2349905	62-896	2349953	8	38	8	76	1
62-848	2349906	-	-	10	30	10	76	1

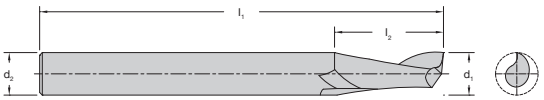
HELIX ANGLE ≈ 21°

*Tool balanced by design to run at spindle speeds up to 60,000 RPM

63-200 Series Upcut Spiral Wood Rout

SC SW HW CW

Designed for routing where aggressive upward chip removal is necessary in hand-fed or CNC applications. Tool rigidity, long life, and high quality finish are characteristic of these tools.



63-200 Series Single Flute - Solid Carbide **Upcut** Spiral Wood Rout Product Offering

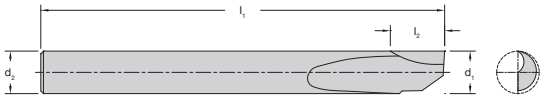
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
63-240	2601048	1/8	1/2	1/4	2	1
63-280	2601049	1/4	7/8	1/4	2 1/2	1

HELIX ANGLE ≈ 30°

63-400 Series Upcut for Soft Aluminum

SC ZRN A

These tools are specially designed to cut soft grades of aluminum and create a good edge finish. The improved cutting geometry properly forms and evacuates the chips preventing chip rewelding.



63-400 Series Single Flute - Solid Carbide **Upcut** for Soft Aluminum Coated Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Coating	Flutes
63-420	2824132	3/16	1/4	1/4	2	ZRN	1
63-430	2601051	1/4	1/4	1/4	2	ZRN	1

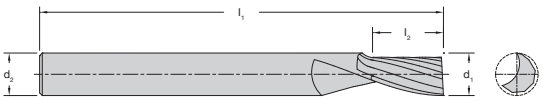
63-400 Series Single Flute - Solid Carbide **Upcut** for Soft Aluminum Coated Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Coating	Flutes
63-450	2825773	5	6	6	64	ZRN	1
63-460	2824133	6	6	6	64	ZRN	1

Cutting Parameters			
Part Number	SAP Number	RPM	Feed Rate
63-420	2824132	13,250	100 IPM
63-430	2601051	10,000	80 IPM
63-450	2825773	13,250	100 IPM
63-460	2824133	10,000	80 IPM

63-500 Series Upcut Spiral O Flute for Acrylic

SC SP HP



These tools are designed to cut acrylics and achieve long tool life. Our unique cutting geometry produces a smooth edge finish regardless if it is cast or extruded acrylic.

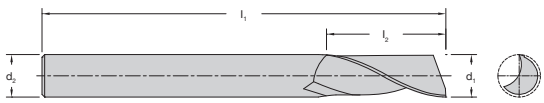
63-500 Series Single Flute - Solid Carbide **Upcut** Spiral O Flute for Acrylic Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
63-505*	2601052	1/16	1/4	1/4	2	1
63-510	2601053	1/8	1/4	1/4	2	1
63-515*	2601054	1/8	1/2	1/4	2	1
63-520*	2601055	3/16	5/8	1/4	2	1
63-525	2601056	1/4	3/8	1/4	2 1/2	1
63-530	2601057	1/4	3/4	1/4	2 1/2	1
63-535	2601058	3/8	1 1/8	3/8	3	1

*Tool balanced by design to run at spindle speeds up to 60,000 RPM

63-600 Series Upcut Spiral O Flute

SC A



High speed cutters for machining aluminum sheet and block material. These tools are optimized for use on high-speed CNC mills, high speed machining centers and CNC routers.

63-600 Series Single Flute - Solid Carbide **Upcut** Spiral O Flute Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
63-602*	2601059	1/16	1/4	1/8	1 1/2	1
63-603*	6601776	3/32	1/4	1/8	2	1
63-604*	2601060	1/8	1/4	1/8	1 1/2	1
63-606*	2601061	1/8	1/4	1/4	2	1
63-610*	2601062	1/8	1/2	1/4	2	1
63-611*	2601063	5/32	5/16	3/16	2	1
63-612*	2601064	3/16	3/8	3/16	1 1/2	1
63-614*	2601065	3/16	3/8	1/4	2	1
63-618*	2601066	3/16	5/8	1/4	2	1
63-620	2601068	1/4	3/8	1/4	2	1
63-622	6601787	1/4	3/4	1/4	2 1/2	1
63-624	2601069	1/4	1 1/4	1/4	3	1
63-629	2601074	5/16	9/16	5/16	2 1/2	1
63-630	2601075	5/16	3/4	1/2	3	1
63-634	2601078	21/64	3/4	1/2	3	1
63-625	2601070	3/8	3/4	3/8	3	1
63-626	2601071	3/8	1 1/8	3/8	3	1
63-627	2601072	3/8	1 3/8	3/8	3 1/2	1
63-631	2601076	1/2	1 1/8	1/2	3 1/2	1
63-632	2601077	1/2	1 3/8	1/2	3 1/2	1

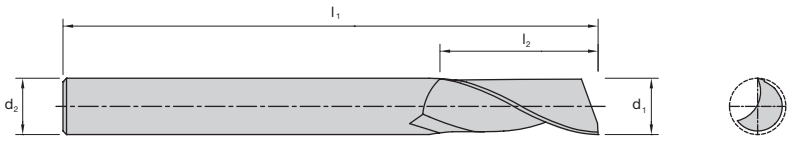
HELIX ANGLE ≈ 22°

*Tool balanced by design to run at spindle speeds up to 60,000 RPM

63-600 ONX Series Upcut Spiral O Flute

SC ONX A

LMT Onsrud expands its popular series for aluminum sheet. The 63-600 ONX Series is an enhanced version of the current O flute design with the addition of the ONX coating. The ONX coating extends tool life over uncoated tools.



63-600 ONX Series **Upcut** Spiral O Flute Product Offering

Part Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
63-602ONX*	1/16	1/4	1/8	1 1/2	1
63-604ONX*	1/8	1/4	1/8	1 1/2	1
63-606ONX*	1/8	1/4	1/4	2	1
63-610ONX*	1/8	1/2	1/4	2	1
63-612ONX*	3/16	3/8	3/16	1 1/2	1
63-614ONX*	3/16	3/8	1/4	2	1
63-618ONX*	3/16	5/8	1/4	2	1
63-620ONX	1/4	3/8	1/4	2	1
63-622ONX	1/4	3/4	1/4	2 1/2	1
63-624ONX	1/4	1 1/4	1/4	3	1
63-629ONX	5/16	9/16	5/16	2 1/2	1
63-630ONX	5/16	3/4	1/2	3	1
63-625ONX	3/8	3/4	3/8	3	1
63-626ONX	3/8	1 1/8	3/8	3	1
63-627ONX	3/8	1 3/8	3/8	3 1/2	1

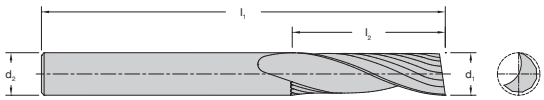
*Tool balanced by design to run at spindle speeds up to 60,000 RPM

63-700/63-750/63-800/63-850 Series Upcut Spiral O Flute

SC | **63-700** HP SSP | **63-750** SP HP SSP

63-800 HP SSP | **63-850** SP HP SSP

(HP) Designed to provide a smooth finish in hard plastics with upward chip removal. (SP) Designed to provide a smooth finish in soft plastic with upward chip removal.



63-700/63-750 Series Single Flute - Solid Carbide **Upcut** Spiral O Flute Product Offering

Hard Plastic		Soft Plastic						
Part Number	SAP Number	Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
63-701*	2601081	63-751*	2601106	1/16	1/4	1/8	2	1
63-700*	2601080	63-750*	2601105	1/16	1/4	1/4	2	1
63-706*	2601082	-	-	1/8	5/8	1/4	2 1/2	1
63-707*	2601083	-	-	1/8	3/4	1/4	2 1/2	1
63-711*	2601085	63-761*	2601107	1/8	1/4	1/8	2	1
63-710*	2601084	63-760*	6601830	1/8	1/4	1/4	2	1
63-713*	2601086	63-763*	2601108	1/8	1/2	1/8	2	1
63-712*	6601807	63-762*	6601832	1/8	1/2	1/4	2	1
63-743*[2]	9111005	63-793*[2]	2601122	1/8	1/2	1/4	2	1
63-715*	2601087	-	-	5/32	9/16	1/4	2	1
63-716*	2601088	63-766*	2601109	3/16	3/8	3/16	2	1
63-717*	2601089	63-767*	2601110	3/16	3/8	1/4	2	1
63-719*	2601091	63-769*	2601112	3/16	5/8	3/16	2	1
63-718*	2601090	63-768*	2601111	3/16	5/8	1/4	2	1
63-720	2601092	-	-	7/32	3/4	1/4	2 1/2	1
63-724	2601093	63-774	2601113	1/4	3/8	1/4	2	1
63-744[2]	2601102	63-794[2]	2601123	1/4	3/4	1/4	2 1/2	1
63-725	2601094	63-775	2601114	1/4	3/4	1/4	2 1/2	1
63-726	2601095	63-776	2601115	1/4	1 1/4	1/4	3	1
63-727*	2601096	63-777	2601116	1/4	1 1/2	1/4	3	1
63-730	2601097	63-780	2601117	3/8	5/8	3/8	2 1/2	1
63-731	2601098	63-781	2601118	3/8	3/4	3/8	3	1
63-733	2601099	63-783	2601119	3/8	1 1/8	3/8	3	1
63-735	2601100	63-785	2601120	3/8	1 5/8	3/8	3 1/2	1
63-745[2]	2601103	63-795[2]	2601124	3/8	1 5/8	3/8	3 1/2	1
63-740	2601101	63-790	2601121	1/2	1 5/8	1/2	3 1/2	1
63-746[2]	2601104	63-796[2]	2601125	1/2	1 5/8	1/2	3 1/2	1

HELIX ANGLE ≈ 21°

*Tool balanced by design to run at spindle speeds up to 60,000 RPM

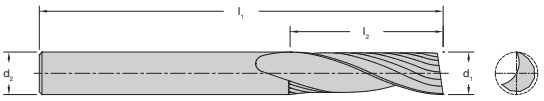
[2] Special Point for Improved Bottom Finish

63-700/63-750/63-800/63-850 Series Upcut Spiral O Flute

SC | **63-700** HP SSP | **63-750** SP HP SSP

63-800 HP SSP | **63-850** SP HP SSP

(HP) Designed to provide a smooth finish in hard plastics with upward chip removal. (SP) Designed to provide a smooth finish in soft plastic with upward chip removal.



63-800/63-850 Series Single Flute - Solid Carbide **Upcut** Spiral O Flute Product Offering - Metric

Hard Plastic		Soft Plastic						
Part Number	SAP Number	Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
63-802	2349907	-	-	2	8	2	50	1
63-804*	2349908	63-854*	2349956	2	8	6	64	1
63-806	2349909	-	-	2.5	8	2.5	50	1
63-808*	2349910	-	-	2.5	8	6	64	1
63-810*	2349911	63-860*	2349959	3	8	3	50	1
63-812*	2349912	63-862*	2349960	3	8	6	64	1
63-814*	7092708	63-864*	2349961	3	12	3	64	1
63-816*	2349914	63-866*	2349962	3	12	6	64	1
63-818*	2349915	-	-	4	8	4	64	1
63-820*	2349916	63-870*	2349964	4	12	4	64	1
63-822*	2349917	-	-	4	20	4	64	1
63-824*	2349918	63-874*	2349966	4	20	6	64	1
63-826*	2349919	-	-	4	30	4	64	1
63-828	2349920	63-878*	2349968	5	16	5	64	1
63-830	2349921	63-880	2349969	5	16	6	64	1
63-832*	2349922	-	-	5	30	5	64	1
63-834	2349923	-	-	6	8	6	64	1
63-836	7092719	63-886	2349972	6	12	6	64	1
63-838	2349925	63-888	2349973	6	20	6	64	1
63-840	7100388	-	-	6	30	6	76	1
63-842*	2349927	63-892*	2349975	6	38	6	76	1
63-844	7088739	63-894	2349976	8	25	8	64	1
63-846	2349929	63-896	7100378	8	38	8	76	1
63-848	2349930	63-898	7095442	10	30	10	76	1
63-849	6601876	-	-	10	35	10	76	1
63-847	6601874	63-897	2601126	12	38	12	76	1

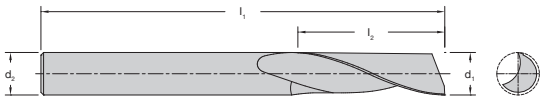
HELIX ANGLE ≈ 21°

*Tool balanced by design to run at spindle speeds up to 60,000 RPM

63-900 Series Upcut Spiral O Flute

SC A

High speed cutters for machining aluminum sheet and block material. These tools are optimized for use on high-speed CNC mills, high speed machining centers and CNC routers



63-900 Series Single Flute - Solid Carbide **Upcut** Spiral O Flute Product Offering - Metric

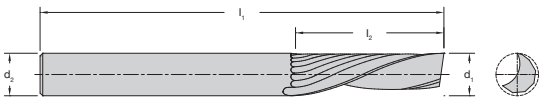
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
63-904	7068609	2	6	6	64	1
63-908	2349752	2.5	6	6	64	1
63-912	2349754	3	8	6	64	1
63-916	2349756	3	12	6	64	1
63-918	2349757	4	8	4	64	1
63-924	2349760	4	20	6	64	1
63-930	2349763	5	16	6	64	1
63-934	2349765	6	8	6	64	1
63-938	2349767	6	20	6	64	1
63-944	7092834	8	25	8	64	1
63-946	2349771	8	38	8	76	1
63-948	2349772	10	30	10	76	1

HELIX ANGLE ≈ 22°

64-000 Series Downcut Series Spiral Super O

SC SW HW HP SP SSP A CW

The polished flute allows for razor sharp cutting edge and easy chip evacuation. The tool is available in a down cut spiral for improved part holding.



64-000 Series Single Flute - Solid Carbide **Downcut** Spiral O Flute Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
64-000*	2601127	1/16	1/4	1/8	2	1
64-012*	2601128	1/8	1/2	1/4	2	1
64-016*	2601129	3/16	3/8	3/16	2	1
64-018	2601130	3/16	5/8	1/4	2	1
64-024	2601131	1/4	3/8	1/4	2	1
64-025	2601132	1/4	3/4	1/4	2	1
64-026	2601133	1/4	1 1/4	1/4	3	1
64-031	2601134	3/8	3/4	3/8	3	1
64-033	2601135	3/8	1 1/8	3/8	3	1

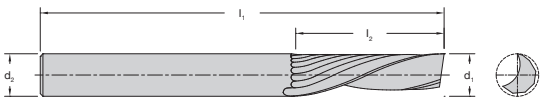
HELIX ANGLE ≈ 21°

*Tool balanced by design to run at spindle speeds up to 60,000 RPM

64-000 Series Downcut Series Spiral Super O

SC SW HW HP SP SSP A CW

The polished flute allows for razor sharp cutting edge and easy chip evacuation. The tool is available in a down cut spiral for improved part holding.



64-000 Series Single Flute - Solid Carbide **Downcut** Spiral O Flute Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
64-002M	2659952	1	4	3	35	1
64-004M	2659953	2	8	3	35	1
64-010M	2659954	3	12	3	50	1
64-012M	9125264	3	12	6	50	1
64-017M	2659955	4	12	4	50	1
64-026M	9125350	6	32	6	76	1
64-031M	2659956	10	35	10	76	1

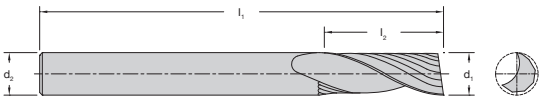
HELIX ANGLE ≈ 21°

*Tool balanced by design to run at spindle speeds up to 60,000 RPM

65-000 Series Upcut Spiral Super O

SC SW HW HP SP SSP A CW

The polished flute allows for razor sharp cutting edge and easy chip evacuation. The tool is available in a upcut spiral for improved chip evacuation.



65-000 Series Single Flute - Solid Carbide **Upcut** Spiral O Flute Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
65-000*	2601136	1/16	1/4	1/8	2	1
65-010*	6601938	1/8	1/4	1/4	2	1
65-013*	2601137	1/8	1/2	1/8	2	1
65-012*	6601939	1/8	1/2	1/4	2	1
65-019*	2601139	3/16	5/8	3/16	2	1
65-018*	2601138	3/16	5/8	1/4	2	1
65-020*	2601140	3/16	1 1/4	1/4	3	1
65-021*	2601141	3/16	7/8	1/4	2 1/2	1
65-023	6601944	1/4	5/8	1/4	2	1
65-025	2601142	1/4	7/8	1/4	2 1/2	1
65-026	2601143	1/4	1 1/4	1/4	3	1
65-027*	2601144	1/4	1 1/2	1/4	3	1
65-033	2601145	3/8	1 1/8	3/8	3	1

HELIX ANGLE ≈ 21°

65-000 Series Upcut Spiral Super O *continued*

65-000 Series Single Flute - Solid Carbide **Upcut** Spiral O Flute Product Offering - Metric

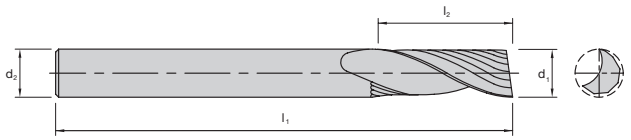
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
65-000M	9125266	2	6	3	50	1
65-002M	2659957	1	4	3	35	1
65-010M	2659958	3	12	3	50	1
65-017M	2659959	4	12	4	50	1
65-018M	9125267	5	16	6	64	1
65-023M	7068618	6	16	6	64	1
65-027M	2659960	6	25	6	76	1
65-033M	9125269	10	29	10	76	1

HELIX ANGLE ≈ 22°

*Tool balanced by design to run at spindle speeds up to 60,000 RPM

65-100 Series Tapered O Flute

SC SP



The 65-100 series core geometry strengthens the tool in cut resulting in slotting depths up to 8x diameter of tool.

Features and Benefits

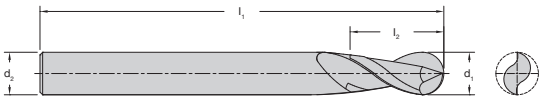
- Polished flute for easy chip evacuation.
- Specialized core geometry to increase strength along the cutting edge.
- Up to 8 times diameter roughing and finishing depths.

65-100 Series Single Flut - Solid Carbide **Upcut** Tapered O FluteProduct Offering

Part Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes z
65-101	3/16	9/16	3/16	2	1
65-103	3/16	15/16	3/16	3	1
65-105	3/16	1 5/16	3/16	3	1
65-107	1/4	3/4	1/4	2 1/2	1
65-109	1/4	1 1/2	1/4	3	1
65-111	1/4	2	1/4	3 1/2	1
65-113	3/8	3/4	3/8	3	1
65-115	3/8	1 7/8	3/8	3 1/2	1
65-117	3/8	2 5/8	3/8	4 1/2	1

65-200B/65-300B Series High Finish Ballnose

SC SP



The tool's unique geometry, specially designedpoint, and highly polished primary clearance and flute gives the tool the ability to attain a surface finish of 28 Ra in mechanical plastic.

65-200B Series Two Flute - High Finish Ballnose for Plastics Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
65-205B	7053983	1/16	1/4	1/8	2	2
65-210B	7053984	1/8	1/2	1/8	2 1/2	2
65-215B	7053985	3/16	1/2	1/4	2 1/2	2
65-220B	7053986	1/4	1/2	1/4	2 1/2	2
65-225B	7053987	1/4	1 1/8	1/4	3	2
65-235B	7053988	5/16	1/2	5/16	3	2
65-240B	7053989	5/16	1 1/8	5/16	3	2
65-250B	7053990	3/8	1 1/8	3/8	3	2
65-260B	7053991	1/2	1 1/8	1/2	3	2

65-200B Series Two Flute - High Finish Ballnose for Plastics Product Offering - Metric

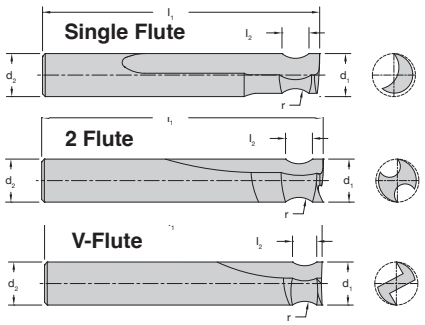
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
65-280B	7053979	3	12	3	64	2
65-285B	7053980	6	20	6	76	2
65-290B	7053981	8	25	8	76	2
65-295B	7053982	10	30	10	76	2

65-300B Series Four Flute - High Finish Ballnose for Plastics Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
65-310B	2605311	1/4	1/2	1/4	3	4
65-315B	2605312	5/16	1/2	5/16	3	4
65-320B	2605313	3/8	5/8	3/8	3	4
65-325B	2605314	1/2	3/4	1/2	3	4

66-000 Series Edge Rounding

SC | 0° | HP | SP | SSP



Designed for routing the edge of sheets or parts. They come in both single and double flute.

66-000 Series Single Flute Straight O-Flute Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Opening	Radius r	Small Flute LGTH	Tip To RAD	Plastic Size	Flutes
66-082	2601146	1/4	3/8	1/4	2 1/2	5/32	1/8	.195	1/16	1/8	1
66-083	2601147	1/4	3/8	1/4	2 1/2	7/32	3/16	.180	1/16	3/16	1
66-084	2601148	1/4	3/8	1/4	2 1/2	9/32	1/4	.163	1/16	1/4	1

66-000 Series Single Flute Spiral O-Flute Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Opening	Radius r	Small Flute LGTH	Tip To RAD	Plastic Size	Flutes
66-085	2601149	1/4	3/8	1/4	2 1/2	5/32	1/8	.195	1/16	1/8	1
66-086	2601150	1/4	3/8	1/4	2 1/2	7/32	3/16	.180	1/16	3/16	1
66-087	2601151	1/4	3/8	1/4	2 1/2	9/32	1/4	.163	1/16	1/4	1

HELIX ANGLE ≈ 22°

66-000 Series Two Flute Straight O-Flute Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Opening	Radius r	Small Flute LGTH	Tip To RAD	Plastic Size	Flutes
66-092	2601152	1/4	3/8	1/4	2 1/2	5/32	1/8	.195	1/16	1/8	2
66-093	2601153	1/4	3/8	1/4	2 1/2	7/32	3/16	.180	1/16	3/16	2
66-094	2601154	1/4	3/8	1/4	2 1/2	9/32	1/4	.163	1/16	1/4	2

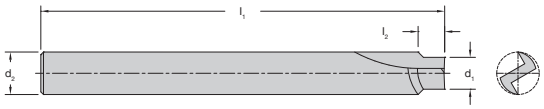
66-000 Series Two Flute Straight V-Flute Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Opening	Radius r	Small Flute LGTH	Tip To RAD	Plastic Size	Flutes
66-120	2601155	3/8	3/8	3/8	2 1/2	5/32	1/8	.320	1/16	1/8	2
66-121	2601156	3/8	3/8	3/8	2 1/2	7/32	3/16	.305	1/16	3/16	2
66-122	2601157	3/8	3/8	3/8	2 1/2	9/32	1/4	.288	1/16	1/4	2
66-123	2601158	3/8	1/2	3/8	2 1/2	13/32	3/8	.255	1/16	3/8	2
66-160	2601159	1/2	3/8	1/2	3	5/32	1/8	.445	1/16	1/8	2
66-161	2601160	1/2	3/8	1/2	3	7/32	3/16	.430	1/16	3/16	2
66-162	2601161	1/2	3/8	1/2	3	9/32	1/4	.413	1/16	1/4	2
66-163	2601162	1/2	5/8	1/2	3	17/32	1/2	.347	1/16	1/2	2

66-200 Series Rout and Chamfer

SC | 0° | SP | HP

Designed to provide up to a 1/16” top face chamfer and a finished side edge on plastic sheets or parts.



66-200 Series Two Flute - Solid Carbide Rout and Chamfer Product Offering

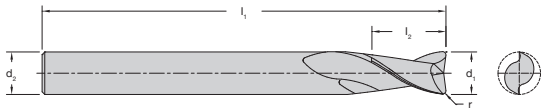
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Material Thickness	Flutes
66-200	2601163	1/4	3/16	3/8	2 1/4	1/8	2
66-204	2601164	1/4	1/4	3/8	2 1/4	3/16	2
66-210	2601165	3/8	5/16	1/2	3	1/4	2

HELIX ANGLE ≈ 0°

66-300 Series Upcut Bottom Surfacing

SC | SP | HP | A

Designed for pocketing applications where the bottom of the pocket must be smooth.



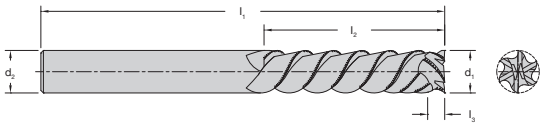
66-300 Series Two Flute - Solid Carbide **Upcut** Bottom Surfacing Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Corner Radius t	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-308	2991682	1/8	.020	1/4	1/4	2	2
66-309	2601166	1/8	.002	1/4	1/4	2	2
66-314	2601167	1/4	.030	3/8	1/4	2	2
66-315	2601168	1/4	.002	3/8	1/4	2	2
66-320	2601169	3/8	.030	5/8	3/8	2 1/2	2
66-321	2601170	3/8	.002	5/8	3/8	2 1/2	2
66-326	2601171	1/2	.030	7/8	1/2	3	2
66-327	2601172	1/2	.002	7/8	1/2	3	2
66-328	2601173	3/4	.040	1 1/8	3/4	4	2

HELIX ANGLE ≈ 30°

66-400 Series Compression

SC ZRN HC



Designed for routing Falcon Board®, BioBoard™, Reboard® similar materials used for graphic display boards. Single pass solution when machining Aluminum and Paper Based (Nomex®) sandwich panels.

66-400 Series Solid Carbide Honeycomb Compression Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
66-405	2639229	3/8	1 1/8	0.250	3/8	3	6
66-410	2639230	1/2	1 1/8	0.300	1/2	3	6
66-415	2639231	1/2	2 1/8	0.300	1/2	4	6

CUTTING PARAMETERS HONEYCOMB CORE AND SANDWICH PANEL

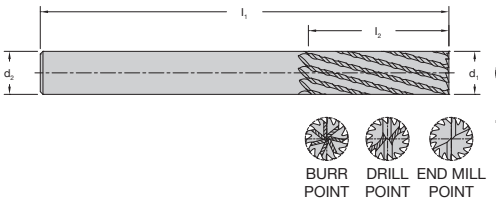
Aluminum Facings w/Aluminum Core	
RPM	Feed Rate
18,000	90-120 IPM

Fiberglass Facings w/Paper Core (Nomex®)	
RPM	Feed Rate
12,000-15,000	90-120 IPM

Cardboard Honeycomb	
RPM	Feed Rate
20,000	60 IPM

66-500 Series DFC Multi-Flute Composite Router

SC DFC CP



BURR POINT DRILL POINT END MILL POINT

Designed to put you in control, 66-500 Series DFC Multi-Flute Composite Routers give you options at the spindle to deliver results that are as efficient as they are precise. Use the 66-500 Series for roughing or finishing on carbon fiber laminates.

Features and Benefits

- Multiple flutes eliminate vibration and control tool engagement.
- Chisel tooth design creates a compression effect to prevent delamination and fiber breakout.
- Enhanced diamond film coating (DFC) for increased tool life.

Available in three point styles

- Burr end for ramping and helical interpolation.
- End mill point for plunging and helical interpolation.
- Drill point for drilling.

66-500 Series DFC Multi-Flute Composite Router Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes	Point Style
66-501	2643590	1/8	1/4	1/8	2	6	Burr
66-502	2643591	1/8	1/4	1/8	2	6	End Mill
66-505	2643592	1/8	1/2	1/8	2	6	Burr
66-506	2643593	1/8	1/2	1/8	2	6	End Mill
66-507	2643594	1/8	1/2	1/8	2	6	Drill
66-509	2643595	3/16	3/8	3/16	2	8	Burr
66-510	2643596	3/16	3/8	3/16	2	8	End Mill
66-513	2643597	3/16	3/4	3/16	2 1/2	8	Burr
66-514	2643598	3/16	3/4	3/16	2 1/2	8	End Mill
66-515	2643599	3/16	3/4	3/16	2 1/2	8	Drill
66-517	2643600	1/4	1/2	1/4	2 1/2	10	Burr
66-518	2643601	1/4	1/2	1/4	2 1/2	10	End Mill
66-521	2643602	1/4	3/4	1/4	2 1/2	10	Burr
66-522	2643603	1/4	3/4	1/4	2 1/2	10	End Mill
66-525	2643604	1/4	1	1/4	3	10	Burr
66-526	2643605	1/4	1	1/4	3	10	End Mill
66-527	2643606	1/4	1	1/4	3	10	Drill
66-529	2643607	1/4	1 1/4	1/4	4	10	Burr
66-530	2643608	1/4	1 1/4	1/4	4	10	End Mill
66-533	2643609	3/8	3/4	3/8	2 1/2	12	Burr
66-534	2643610	3/8	3/4	3/8	2 1/2	12	End Mill
66-537	2643611	3/8	1 1/8	3/8	3	12	Burr
66-538	2643612	3/8	1 1/8	3/8	3	12	End Mill
66-539	2643613	3/8	1 1/8	3/8	3	12	Drill
66-541	2643614	3/8	1 1/4	3/8	3	12	Burr
66-542	2643615	3/8	1 1/4	3/8	3	12	End Mill
66-545	2643616	3/8	1 1/2	3/8	4	12	Burr
66-546	2643617	3/8	1 1/2	3/8	4	12	End Mill
66-549	2643618	1/2	1	1/2	3	14	Burr
66-550	2643619	1/2	1	1/2	3	14	End Mill
66-551	2643620	1/2	1	1/2	3	14	Drill
66-553	2643621	1/2	1 1/2	1/2	4	14	Burr
66-554	2643622	1/2	1 1/2	1/2	4	14	End Mill
66-557	2643623	1/2	2	1/2	4	14	Burr
66-558	2643624	1/2	2	1/2	4	14	End Mill

66-500 Series DFC Multi-Flute Composite Router *continued*

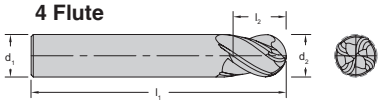
66-500 Series DFC Multi-Flute Composite Router Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes	Point Style
66-570	2643784	3	8	6	50	6	End Mill
66-572	2643785	3	8	6	50	6	Drill
66-574	2643786	4	11	6	50	6	End Mill
66-576	2643787	4	11	6	50	6	Drill
66-578	2643788	5	13	6	50	8	End Mill
66-580	2643789	5	13	6	50	8	Drill
66-582	2643790	6	13	6	50	10	End Mill
66-584	2643791	6	13	6	50	10	Drill
66-586	2643792	8	19	8	63	12	End Mill
66-588	2643793	8	19	8	63	12	Drill
66-590	2643794	10	22	10	72	12	End Mill
66-592	2643795	10	22	10	72	12	Drill
66-594	2643796	12	26	12	83	14	End Mill
66-596	2643797	12	26	12	83	14	Drill

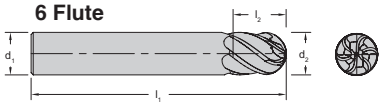
66-600 Series DFC Ballnose

SC DFC CP

4 Flute



6 Flute



The 66-600 Series produces excellent edge quality and finish in composite materials when finishing contoured surfaces while allowing for profiling and slotting with the same tool. LMT Onsrud's design cuts quieter and faster than typical two flute PCD tools in composites like carbon fiber while still providing high tool life due to the diamond film coating.

Features and Benefits

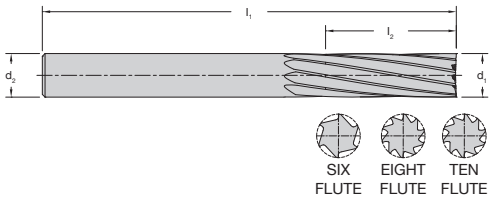
- Upcut helix design moves dust away from the cutting edge and prevents re-adhesion.
- Proprietary edge geometry delivers superior edge quality and finishes.
- Enhanced diamond film coating (DFC) for increased tool life.

66-600 Series DFC Ballnose Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-605	2659923	1/8	3/16	1/8	2	4
66-607	2659924	1/8	3/8	1/4	2 1/2	4
66-609	2659925	1/4	3/8	1/4	2 1/2	4
66-611	2659926	1/4	3/4	1/4	2 1/2	4
66-613	2659927	3/8	9/16	3/8	2 1/2	4
66-615	2659928	3/8	1 1/8	3/8	3	4
66-617	2659929	1/2	3/4	1/2	3	6
66-619	2659930	1/2	1	1/2	4	6
66-621	2659931	1/2	1 1/2	1/2	4	6

66-700 Series DFC Low-Helix Finisher Upcut

SC DFC CP



66-700 Series Low-Helix Finishers produce superior edge quality and finish in carbon fiber materials at high feed rates. LMT Onsrud's multi-flute design cuts quieter and faster than typical two or three-flute PCD tools in carbon fiber. The 66-700 Series tools are DFC coated.

Features and Benefits

- Upcut helix design moves dust away from the cutting edge and prevents re-adhesion.
- Proprietary edge geometry delivers superior edge quality and finishes.
- Enhanced diamond film coating (DFC) for increased tool life.

66-700 Series-DFC Low-Helix Finisher **Upcut** Product Offering

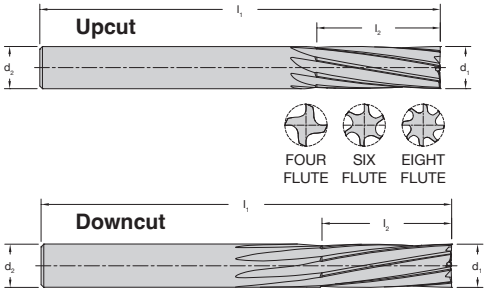
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-705	2605681	1/4	3/4	1/4	3 1/2	6
66-710	2605682	3/8	1 1/8	3/8	4	8
66-715	2605683	1/2	1 1/2	1/2	4	10

66-700 Series-DFC Low-Helix Finisher **Upcut** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-720	2644511	6	20	6	90	6
66-725	2605684	8	25	8	100	8
66-730	2605685	10	30	10	100	8
66-735	2605686	12	40	12	100	10

66-750 Series DFC Low-Helix Cutter

SC DFC CP



The 66-750 Series DFC Low-Helix Cutter is the low-helix cutter LMT Onsrud developed specifically for tight-tolerance applications with carbon fiber laminates. Achieve clean, precise cuts while reducing the risk of delamination.

Features and Benefits

- Unique tool geometry allows for use in both heavy profiling and finishing operations.
- Low-Helix and optimized rake angles cleanly shear composite fibers to prevent delamination.
- Finisher with superior edge quality and ensures ideal wear characteristics.
- Enhanced diamond film coating (DFC) to protect cutting edges for increased tool life.

66-750 Series-DFC Low-Helix Cutter **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-751	2643734	1/4	1/2	1/4	3	4
66-753	2643735	1/4	3/4	1/4	3	4
66-755	2643736	3/8	3/4	3/8	3	6
66-757	2643737	3/8	1 1/8	3/8	3	6
66-759	2643738	1/2	1	1/2	3	8
66-761	2643739	1/2	1 1/2	1/2	4	8

66-750 Series-DFC Low-Helix Cutter **Upcut** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-766	2643740	6	20	6	90	4
66-768	2643741	8	25	8	100	6
66-770	2643742	10	30	10	100	6
66-772	2643743	12	38	12	100	8

66-750 Series-Solid Carbide DFC Low-Helix Cutter **Downcut** Product Offering

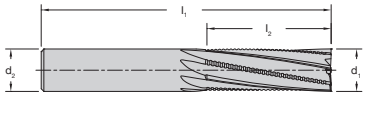
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-752	2649829	1/4	1/2	1/4	3	4
66-754	2649830	1/4	3/4	1/4	3	4
66-756	2649831	3/8	3/4	3/8	3	6
66-758	2649832	3/8	1 1/8	3/8	3	6
66-760	2649833	1/2	1	1/2	3 1/2	8
66-762	2649834	1/2	1 1/2	1/2	4	8

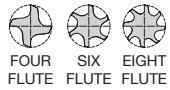
66-750 Series-Solid Carbide DFC Low-Helix Cutter **Downcut** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-767	2649835	6	20	6	90	4
66-769	2649836	8	25	8	100	6
66-771	2649837	10	30	10	100	6
66-773	2649838	12	38	12	100	8

66-775 Series DFC Low Helix Rougher Finisher Upcut

SC DFC CP





Tool is designed as a combination roughing and finishing tool in one. The rouging profile reduces cutting forces and the geometry of the finishing flutes cleanly shear fibers leaving a smooth edge on the work piece material. Diamond coated (DFC) for increased tool life.

66-775 Series DFC Low Helix Rougher Finisher **Upcut** Product Offering

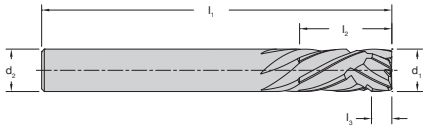
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-776	2643744	1/4	1/2	1/4	3	4
66-778	2643745	1/4	3/4	1/4	3	4
66-780	2643746	3/8	3/4	3/8	3	6
66-782	2643747	3/8	1 1/8	3/8	3	6
66-784	2643748	1/2	1	1/2	3	8
66-786	2643749	1/2	1 1/2	1/2	4	8

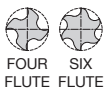
66-775 Series DFC Low Helix Rougher Finisher **Upcut** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
66-791	2643750	6	20	6	90	4
66-793	2643751	8	25	8	100	6
66-795	2643752	10	30	10	100	6
66-797	2643753	12	38	12	100	8

66-800 Series DFC Compression

SC DFC CP





New redesigned compression router with optimized geometry to eliminate delamination and fiber pullout. Compression design allows for better surface workpiece finishes. Enhanced diamond coating (DFC) to protect cutting edges for increased tool life.

66-800 Series DFC Compression Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
66-802	2643754	1/4	3/4	0.250	1/4	2 1/2	4
66-812	2643755	3/8	1	0.375	3/8	3	4
66-814	2643756	3/8	1	0.340	3/8	3	6
66-822	2643757	1/2	1	0.450	1/2	3	4
66-824	2643758	1/2	1	0.450	1/2	3	6
66-826	2643759	1/2	1 1/2	0.450	1/2	4	4
66-828	2643760	1/2	1 1/2	0.450	1/2	4	6

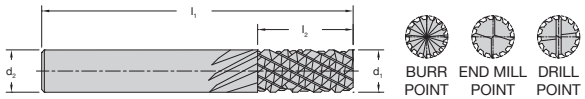
66-800 Series DFC Compression Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC l_3	Shank Diameter d_2	Overall Length l_1	Flutes
66-852	2643761	6	20	7.75	6	90	4
66-858	2643762	8	25	8.00	8	100	4
66-864	2643763	10	25	8.50	10	100	6
66-870	2643764	12	25	9.00	12	100	6

66-900 Series High Performace Composite Router

SC ESG CP

The High Performance Composite Router is designed for more efficient routing of composite materials, in both hand-fed and in CNC applications. Coated for increased tool life.



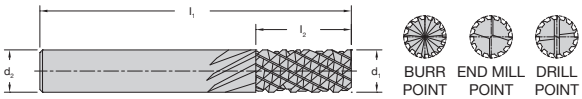
66-900 Series High Performance Composite Router Product Offering

Part Number	SAP Number	Point Style	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
66-901ALTIN	7053834	No	1/8	1/2	1/8	1 1/2
66-902ALTIN	7053835	BURR	1/8	1/2	1/8	1 1/2
66-903ALTIN	7053836	Endmill	1/8	1/2	1/8	1 1/2
66-904ALTIN	7053837	Drill	1/8	1/2	1/8	1 1/2
66-905ALTIN	7053838	No	3/16	5/8	1/4	2
66-906ALTIN	7053839	BURR	3/16	5/8	1/4	2
66-907ALTIN	7053840	Endmill	3/16	5/8	1/4	2
66-908ALTIN	7053841	Drill	3/16	5/8	1/4	2
66-909ALTIN	7053842	No	1/4	1	1/4	3
66-910ALTIN	7053843	BURR	1/4	1	1/4	3
66-911ALTIN	7053844	Endmill	1/4	1	1/4	3
66-912ALTIN	7053845	Drill	1/4	1	1/4	3
66-913ALTIN	7053846	No	1/4	1 1/2	1/4	3 1/2
66-914ALTIN	7053847	BURR	1/4	1 1/2	1/4	3 1/2
66-915ALTIN	7053848	Endmill	1/4	1 1/2	1/4	3 1/2
66-916ALTIN	7053849	Drill	1/4	1 1/2	1/4	3 1/2
66-917ALTIN	7053850	No	1/4	2 1/8	1/4	4
66-918ALTIN	7053851	BURR	1/4	2 1/8	1/4	4
66-919ALTIN	7053852	Endmill	1/4	2 1/8	1/4	4
66-920ALTIN	7053853	Drill	1/4	2 1/8	1/4	4
66-921ALTIN	7053854	No	3/8	1	3/8	3
66-922ALTIN	7053855	BURR	3/8	1	3/8	3
66-923ALTIN	7053856	Endmill	3/8	1	3/8	3
66-924ALTIN	7053857	Drill	3/8	1	3/8	3
66-925ALTIN	7053858	No	3/8	1 5/8	3/8	3 1/2
66-926ALTIN	7053859	BURR	3/8	1 5/8	3/8	3 1/2
66-927ALTIN	7053860	Endmill	3/8	1 5/8	3/8	3 1/2
66-928ALTIN	7053861	Drill	3/8	1 5/8	3/8	3 1/2
66-929ALTIN	7053862	No	3/8	2 1/8	3/8	4
66-930ALTIN	7053863	BURR	3/8	2 1/8	3/8	4
66-931ALTIN	7053864	Endmill	3/8	2 1/8	3/8	4
66-932ALTIN	7053865	Drill	3/8	2 1/8	3/8	4
66-933ALTIN	7053866	No	1/2	1 1/8	1/2	3
66-934ALTIN	7053867	BURR	1/2	1 1/8	1/2	3
66-935ALTIN	7053868	Endmill	1/2	1 1/8	1/2	3
66-936ALTIN	7053869	Drill	1/2	1 1/8	1/2	3
66-937ALTIN	7053870	No	1/2	1 5/8	1/2	4
66-938ALTIN	7053871	BURR	1/2	1 5/8	1/2	4
66-939ALTIN	7053872	Endmill	1/2	1 5/8	1/2	4
66-940ALTIN	7053873	Drill	1/2	1 5/8	1/2	4

66-900 Series High Performace Composite Router

SC ESG CP

The High Performance Composite Router is designed for more efficient routing of composite materials, in both hand-fed and in CNC applications. Coated for increased tool life.



66-900 Series High Performance Composite Router Product Offering

Part Number	SAP Number	Point Style	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
66-941ALTIN	7053874	No	1/2	2 1/8	1/2	4
66-942ALTIN	7053875	BURR	1/2	2 1/8	1/2	4
66-943ALTIN	7053876	Endmill	1/2	2 1/8	1/2	4
66-944ALTIN	7053877	Drill	1/2	2 1/8	1/2	4
66-945ALTIN	7053878	No	1/2	3 1/8	1/2	5
66-946ALTIN	7053879	BURR	1/2	3 1/8	1/2	5
66-947ALTIN	7053880	Endmill	1/2	3 1/8	1/2	5
66-948ALTIN	7053881	Drill	1/2	3 1/8	1/2	5
66-949ALTIN	7053882	No	1/2	4 1/8	1/2	6
66-950ALTIN	7053883	BURR	1/2	4 1/8	1/2	6
66-951ALTIN	7053884	Endmill	1/2	4 1/8	1/2	6
66-952ALTIN	7053885	Drill	1/2	4 1/8	1/2	6

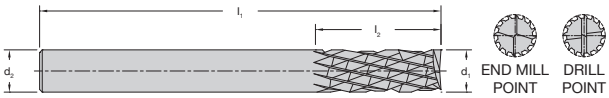
66-900 Series High Performance Composite Router Product Offering - Metric

Part Number	SAP Number	Point Syyle	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
66-971ALTIN	7053814	No	4mm	16mm	6mm	50mm
66-972ALTIN	7053815	BURR	4mm	16mm	6mm	50mm
66-973ALTIN	7053816	Endmill	4mm	16mm	6mm	50mm
66-974ALTIN	7053817	Drill	4mm	16mm	6mm	50mm
66-975ALTIN	7053818	No	6mm	19mm	6mm	75mm
66-976ALTIN	7053819	BURR	6mm	19mm	6mm	75mm
66-977ALTIN	7053820	Endmill	6mm	19mm	6mm	75mm
66-978ALTIN	7053821	Drill	6mm	19mm	6mm	75mm
66-979ALTIN	7053822	No	6mm	25mm	6mm	75mm
66-980ALTIN	7053823	BURR	6mm	25mm	6mm	75mm
66-981ALTIN	7051442	Endmill	6mm	25mm	6mm	75mm
66-982ALTIN	7053371	Drill	6mm	25mm	6mm	75mm
66-983ALTIN	7053824	No	8mm	25mm	8mm	63mm
66-984ALTIN	7053825	BURR	8mm	25mm	8mm	63mm
66-985ALTIN	7050939	Endmill	8mm	25mm	8mm	63mm
66-986ALTIN	7050489	Drill	8mm	25mm	8mm	63mm
66-987ALTIN	7053826	No	10mm	25mm	10mm	75mm
66-988ALTIN	7053827	BURR	10mm	25mm	10mm	75mm
66-989ALTIN	7050950	Endmill	10mm	25mm	10mm	75mm
66-990ALTIN	7053829	Drill	10mm	25mm	10mm	75mm
66-991ALTIN	7053830	No	12mm	25mm	12mm	75mm
66-992ALTIN	7053831	BURR	12mm	25mm	12mm	75mm
66-993ALTIN	7053832	Endmill	12mm	25mm	12mm	75mm
66-994ALTIN	7053833	Drill	12mm	25mm	12mm	75mm

67-000 Series Fiberglass Router

SC CP

Designed as fiberglass routers. Their upcut/downcut diamond design effectively shears fibrous materials.



67-000 Series Solid Carbide Fiberglass Router Medium Burr W/**End Mill Point** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
67-003	7053806	1/8	1	1/8	2
67-010	2991445	1/4	3/4	1/4	2 1/2
67-011	7053807	1/4	1 1/8	1/4	3
67-012	2601175	1/4	1 1/4	1/4	3
67-014	2601176	1/4	1 1/2	1/4	3
67-017	6602011	1/4	2 1/8	1/4	4
67-030	6602019	3/8	7/8	3/8	2 1/2
67-023	7053808	3/8	1 5/8	3/8	3
67-027	2601180	3/8	2 1/8	3/8	4
67-031	7053809	1/2	1 1/8	1/2	3
67-033	2601184	1/2	1 5/8	1/2	4
67-037	7053810	1/2	2 1/8	1/2	4
67-039	2601187	1/2	3 1/8	1/2	5
67-065	2601188	3/4	4 1/8	3/4	6

67-000 Series Solid Carbide Fiberglass Router Medium Burr W/**End Mill Point** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
67-096	2605695	3	12	3	52
67-097	2637263	4	16	4	64
67-098	2637264	6	19	6	76
67-099	2637265	6	25	6	76
67-101	2637266	8	25	8	76
67-102	2637267	10	25	10	76
67-103	2637268	12	25	12	76

67-000 Series Solid Carbide Fiberglass Router Fine Burr W/**Drill Point** Product Offering

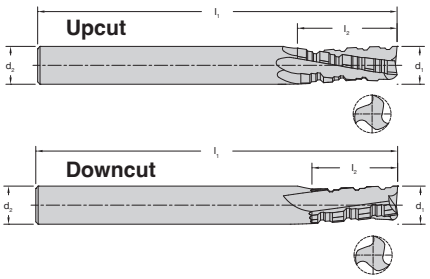
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
67-080	7053811	1/4	3/4	1/4	2 1/2
67-120	7053812	3/8	7/8	3/8	2 1/2
67-160	7053813	1/2	1	1/2	3

67-000 Series Solid Carbide Fiberglass Router Fine Burr W/**Drill Point** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
67-090	7053800	4	16	6	50
67-091	2349714	6	19	6	76
67-092	7053802	6	25	6	76
67-093	7053803	8	25	8	76
67-094	7053804	10	25	10	76
67-095	7053805	12	25	12	76

67-200 Series Phenolic Cutter Upcut & Downcut

SC DLC CP



Phenolic materials, an organic resin based material, are used in various industrial applications due to their high strength, corrosion resistance, and insulation properties. Routing this material proves challenging due to its dense nature and high resin makeup, which reduces tool life.

The three flute, chipbreaker design allows for easy cutting, while providing better finishes and reduced noise levels. Diamond-Like-Carbon (DLC) coating option provides addition wear resistance and improved tool life for longer production runs.

Features and Benefits

- Three flute geometry
- Chipbreaker design reduces lateral tool stress
- Diamond-Like-Carbon (DLC) coating offered
- Greater feed rates
- Smooth part finish
- Reduced noise level during operation

67-200 Series Solid Carbide Three Flute Phenolic Cutter **Upcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Neck Length	Flutes	Coating
67-205	7053890	3/8	7/8	3/8	3	-	3	-
67-211	7053891	1/2	1 1/8	1/2	3	-	3	-
67-217	2649878	1/2	5/8	1/2	4	1 5/8	3	-
67-215	7053892	1/2	2 1/8	1/2	4	-	3	-
67-219	2649880	3/4	1 1/8	3/4	5	2 1/8	3	-
67-229	2649882	3/4	1 1/8	3/4	6	3 1/8	3	-
67-255	2649884	3/8	7/8	3/8	3	-	3	DLC
67-261	2649886	1/2	1 1/8	1/2	3 1/2	-	3	DLC
67-265	2649888	1/2	2 1/8	1/2	4 1/2	-	3	DLC
67-267	2649890	1/2	5/8	1/2	4	1 5/8	3	DLC
67-269	2649892	3/4	1 1/8	3/4	5	2 1/8	3	DLC
67-271	2649894	3/4	1 1/8	3/4	6	3 1/8	3	DLC

67-200 Series Solid Carbide Three Flute Phenolic Cutter **Downcut** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Neck Length	Flutes	Coating
67-206	7053893	3/8	7/8	3/8	3	-	3	-
67-212	7053894	1/2	1 1/8	1/2	3 1/2	-	3	-
67-218	2649879	1/2	5/8	1/2	4	1 5/8	3	-
67-216	7053895	1/2	2 1/8	1/2	4 1/2	-	3	-
67-220	2649881	3/4	1 1/8	3/4	5	2 1/8	3	-
67-231	2649883	3/4	1 1/8	3/4	6	3 1/8	3	-
67-260	2649885	3/8	7/8	3/8	3	-	3	DLC
67-262	2649887	1/2	1 1/8	1/2	3 1/2	-	3	DLC
67-266	2649889	1/2	2 1/8	1/2	4 1/2	-	3	DLC
67-268	2649891	1/2	5/8	1/2	4	1 5/8	3	DLC
67-270	2649893	3/4	1 1/8	3/4	5	2 1/8	3	DLC
67-272	2649895	3/4	1 1/8	3/4	6	3 1/8	3	DLC

67-200 Series Solid Carbide Three Flute Phenolic Cutter **Upcut** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Neck Length	Flutes	Coating
67-207	2606149	10	22	10	75	-	3	-
67-209	2606151	12	28	12	75	-	3	-
67-273	2649896	10	22	10	75	-	3	DLC
67-275	2649898	12	28	12	75	-	3	DLC

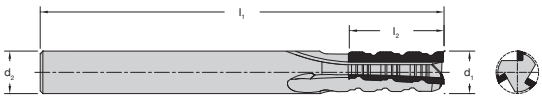
67-200 Series Solid Carbide Three Flute Phenolic Cutter **Downcut** Poduct Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Neck Length	Flutes	Coating
67-208	2606150	10	22	10	75	-	3	-
67-210	2606152	12	28	12	75	-	3	-
67-274	2649897	10	22	10	75	-	3	DLC
67-276	2649899	12	28	12	75	-	3	DLC

HELIX ANGLE ≈ 10°

67-220 Series PCD Progressive Chipbreaker

PCD 0° CP



Provides superior chip control and increased tool life when cutting dense and abrasive materials. The new chipbreaker incorporates a unique geometry with a PCD cutting edge to support a wide range of feed rates and depth of cut combinations while extending the life of the tool. This is accomplished by utilizing a distinct Hi-Low asymmetrical chipbreaker profile which reduces vibration and chatter, caused by harmonic imbalance, resulting in improved surface finishes, while reducing noise levels and wear on the tool.

67-220 Series Three Flute - PCD Progressive Chipbreaker for Composites Product Offering

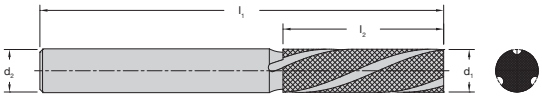
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-221	2605316	3/8	3/8	3/8	3	3
67-225	2605317	1/2	5/8	1/2	3	3
67-227	2605318	1/2	1 1/8	1/2	3 1/2	3

67-220 Series Three Flute - PCD Progressive Chipbreaker for Composites Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-230	7092827	10	12	10	76	3
67-233	2606153	12	20	12	100	3

67-250 Series Downcut Diamond Grit Tool

DIA grit CP



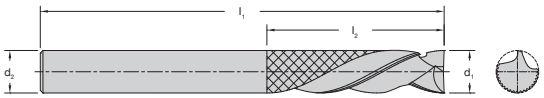
67-250 Series Three Flute **Downcut** Diamond Grit Too Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-254	7086516	1/4	1 1/8	1/4	3	3
67-256	2601202	1/4	1 3/8	1/4	3	3
67-258	7086515	3/8	1 3/8	3/8	3	3

67-400 Series Un-Ruffer™ PATENTED

SC CP

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



67-400 Series Solid Carbide Un-Ruffer™ PATENTED Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-423	2823366	1/4	3/4	1/4	2	2
67-426	2601209	1/4	1	1/4	2 1/2	2
67-428	2601210	1/4	1	1/4	3	2
67-435	2601211	3/8	1	3/8	3	2
67-445	2601212	1/2	1	1/2	3	2

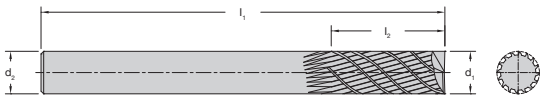
67-400 Series Solid Carbide Un-Ruffer™ PATENTED Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-426M	9125285	6	25	6	64	2
67-435M	9125286	10	25	10	76	2
67-445M	9125287	12	25	12	76	2

67-500 Series CG Tool

SC CP

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



67-500 Series Solid Carbide CG Tool Carbon Graphite Product Offering

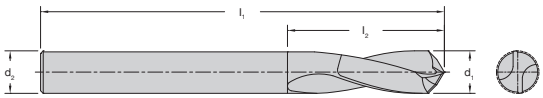
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
67-505	2601213	1/8	1/2	1/8	2
67-508	7059725	3/16	5/8	3/16	2
67-511	2601214	1/4	3/4	1/4	3
67-514	2823364	1/4	1 1/2	1/4	3
67-520	7092847	3/8	1 1/8	3/8	3 1/2
67-523	7092848	1/2	1 1/8	1/2	3 1/2
67-526	7088741	1/2	2 1/8	1/2	4

67-500 Series Solid Carbide CG Tool Carbon Graphite Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1
67-511M	9125282	6	20	6	76
67-520M	7088777	10	29	10	76
67-523M	7088778	12	29	12	88

67-800 Series 8 Facet Drill

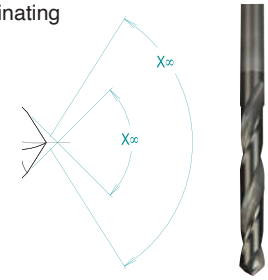
SC CP SP HP



Designed to reduce cutting forces and eliminating delamination when exiting the material.

What is an 8 Facet Drill?

An 8 facet drill consists of 4 cutting edges with 2 facets per cutting edge. These facets consist of the lip relief and the lip clearance angle.



Fractional Drills

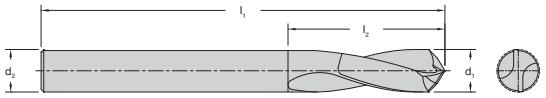
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-807	7054127	1/8 (0.1250)	1 1/4	0.125	2 1/4	2
67-808	7054128	9/64 (0.1406)	1 3/8	0.140	2 1/2	2
67-809	7054129	5/32 (0.1563)	1 3/8	0.156	2 1/2	2
67-810	7054130	11/64 (0.1719)	1 5/8	0.172	2 3/4	2
67-811	7054131	3/16 (0.1875)	1 5/8	0.188	2 3/4	2
67-812	7054132	13/64 (0.2013)	1 3/4	0.203	3	2
67-813	7054133	7/32 (0.2188)	1 3/4	0.219	3	2
67-814	7054134	15/64 (0.2344)	2	0.234	3 1/4	2
67-815	7054135	1/4 (0.2500)	2	0.250	3 1/4	2
67-816	7054136	17/64 (0.2656)	2 1/8	0.266	3 1/2	2
67-817	7054137	9/32 (0.2813)	2 1/8	0.281	3 1/2	2
67-818	7054138	19/64 (0.2969)	2 3/8	0.297	3 3/4	2
67-819	7054139	5/16 (0.3125)	2 3/8	0.313	3 3/4	2
67-820	7054140	21/64 (0.3281)	2 1/2	0.328	4	2
67-821	7054141	11/32 (0.3438)	2 1/2	0.344	4	2
67-822	7054142	23/64 (0.3594)	2 1/2	0.359	4	2
67-823	7054143	3/8 (0.3750)	2 3/4	0.375	4 1/4	2
67-824	7054144	25/64 (0.3906)	2 7/8	0.391	4 1/2	2
67-825	7054145	13/32 (0.4063)	2 7/8	0.406	4 1/2	2
67-826	7054146	27/64 (0.4219)	2 7/8	0.422	4 1/2	2
67-827	7054147	7/16 (0.4375)	2 7/8	0.438	4 1/2	2
67-828	7054148	29/64 (0.4531)	3	0.453	4 3/4	2
67-829	7054149	15/32 (0.4688)	3	0.469	4 3/4	2
67-830	7054150	31/64 (0.4844)	3	0.484	4 3/4	2
67-831	7054151	1/2 (0.5000)	3	0.500	4 3/4	2

Letter Drills

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-850	2601219	A (0.2340)	2	0.234	3 1/4	2
67-851	2601220	B (0.2380)	2	0.238	3 1/4	2
67-852	2601221	C (0.2420)	2	0.242	3 1/4	2
67-853	2601222	D (0.2460)	2	0.246	3 1/4	2
67-854	2601223	E (0.2500)	2	0.250	3 1/4	2
67-855	2601224	F (0.2570)	2	0.257	3 1/4	2
67-856	2601225	G (0.2610)	2 1/8	0.261	3 1/2	2
67-857	2601226	H (0.2660)	2 1/8	0.266	3 1/2	2
67-858	2601227	I (0.2720)	2 1/8	0.272	3 1/2	2
67-859	2601228	J (0.2770)	2 1/8	0.277	3 1/2	2
67-860	2601229	K (0.2810)	2 1/8	0.281	3 1/2	2
67-861	2601230	L (0.2900)	2 1/8	0.290	3 1/2	2
67-862	2601231	M (0.2950)	2 3/8	0.295	3 3/4	2
67-863	2601232	N (0.3020)	2 3/8	0.302	3 3/4	2

67-800 Series 8 Facet Drill

SC CP SP HP



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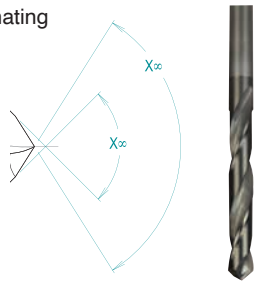


Letter Drills continued

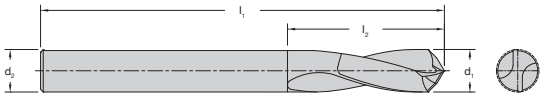
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-864	2601233	O (0.3160)	2 3/8	0.316	3 3/4	2
67-865	2601234	P (0.3230)	2 3/8	0.323	3 3/4	2
67-866	2601235	Q (0.3320)	2 1/2	0.332	4	2
67-867	2601236	R (0.3390)	2 1/2	0.339	4	2
67-868	2601237	S (0.3480)	2 1/2	0.348	4	2
67-869	2601238	T (0.3580)	2 1/2	0.358	4	2
67-870	2601239	U (0.3680)	2 3/4	0.368	4 1/4	2
67-871	2601240	V (0.3770)	2 3/4	0.377	4 1/4	2
67-872	2601241	W (0.3860)	2 7/8	0.386	4 1/2	2
67-873	2601242	X (0.3970)	2 7/8	0.397	4 1/2	2
67-874	2601243	Y (0.4040)	2 7/8	0.404	4 1/2	2
67-875	2601244	Z (0.4130)	2 7/8	0.413	4 1/2	2

Number Drills

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-876	2601245	1 (0.2280)	1 3/4	0.228	3	2
67-877	2601246	2 (0.2210)	1 3/4	0.221	3	2
67-878	2601247	3 (0.2130)	1 3/4	0.213	3	2
67-879	2601248	4 (0.2090)	1 3/4	0.209	3	2
67-880	2601249	5 (0.2055)	1 3/4	0.206	3	2
67-881	2601250	6 (0.2040)	1 3/4	0.204	3	2
67-882	2601251	7 (0.2010)	1 3/4	0.201	3	2
67-883	2601252	8 (0.1990)	1 3/4	0.199	3	2
67-884	2601253	9 (0.1960)	1 3/4	0.196	3	2
67-885	2601254	10 (0.1935)	1 5/8	0.194	2 3/4	2
67-886	2601255	11 (0.1910)	1 5/8	0.191	2 3/4	2
67-887	2601256	12 (0.1890)	1 5/8	0.189	2 3/4	2
67-888	2601257	13 (0.1850)	1 5/8	0.185	2 3/4	2
67-889	2601258	14 (0.1820)	1 5/8	0.182	2 3/4	2
67-890	2601259	15 (0.1800)	1 5/8	0.180	2 3/4	2
67-891	2601260	16 (0.1770)	1 5/8	0.177	2 3/4	2
67-892	2601261	17 (0.1730)	1 5/8	0.173	2 3/4	2
67-893	2601262	18 (0.1695)	1 5/8	0.170	2 3/4	2
67-894	2601263	19 (0.1660)	1 5/8	0.166	2 3/4	2
67-895	2601264	20 (0.1610)	1 3/8	0.161	2 1/2	2
67-896	2601265	21 (0.1590)	1 3/8	0.159	2 1/2	2
67-897	2601266	22 (0.1570)	1 3/8	0.157	2 1/2	2
67-898	2601267	23 (0.1540)	1 3/8	0.154	2 1/2	2
67-899	2601268	24 (0.1520)	1 3/8	0.152	2 1/2	2
67-900	2601269	25 (0.1495)	1 3/8	0.150	2 1/2	2
67-901	2601270	26 (0.1470)	1 3/8	0.147	2 1/2	2
67-902	2601271	27 (0.1440)	1 3/8	0.144	2 1/2	2

67-800 Series 8 Facet Drill *continued*

SC CP SP HP



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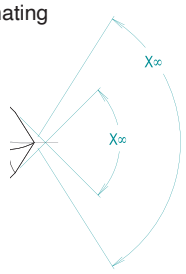


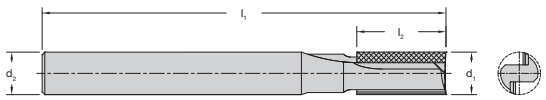
Number Drills

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
67-903	2601272	28 (0.1405)	1 3/8	0.141	2 1/2	2
67-904	2601273	29 (0.1360)	1 3/8	0.136	2 1/2	2
67-905	2601274	30 (0.1285)	1 1/4	0.129	2 1/4	2
67-906	2601275	31 (0.1200)	1 1/4	0.120	2 1/4	2
67-961	6602179	3.00 (0.1181)	32	3.00	57	2
67-962	6602180	3.50 (0.1378)	35	3.50	64	2
67-963	6602181	4.00 (0.1575)	35	4.00	64	2
67-964	9088471	4.50 (0.1772)	41	4.50	70	2
67-965	6602183	5.00 (0.1969)	44	5.00	76	2
67-966	6602184	5.50 (0.2165)	44	5.50	76	2
67-967	6602185	6.00 (0.2362)	51	6.00	83	2
67-968	6602186	6.50 (0.2559)	51	6.50	83	2
67-969	6602187	7.00 (0.2756)	57	7.00	89	2
67-970	6602188	7.50 (0.2953)	60	7.50	95	2
67-971	7053357	8.00 (0.3150)	60	8.00	95	2
67-972	6602190	8.50 (0.3346)	64	8.50	102	2
67-973	6602191	9.00 (0.3543)	64	9.00	102	2
67-974	6602192	9.50 (0.3740)	70	9.50	108	2
67-975	6602193	10.00 (0.3937)	73	10.00	114	2
67-976	6602194	10.50 (0.4134)	73	10.50	114	2
67-977	6602195	11.00 (0.4331)	73	11.00	114	2
67-978	6602196	11.50 (0.4528)	76	11.50	121	2
67-979	6602197	12.00 (0.4724)	76	12.00	121	2

68-000 PCD Tipped

PCD 0° CP

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



68-000 Series Two Flute - PCD Full Face Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
68-005	2601276	1/4	3/4	1/4	3	2
68-010	7092849	3/8	3/4	3/8	3	2
68-020	2601277	1/2	3/4	1/2	4	2
68-030	2601278	3/4	1	3/4	4	2

68-000 Series Two Flute - PCD Tipped Tooling PCD Full Face With Plunge Point Product Offering

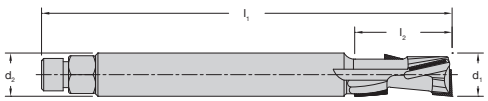
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
68-050	2601279	1/4	3/4	1/4	3	2
68-055	7092850	3/8	7/8	3/8	3	2
68-062	7057544	1/2	1 1/4	1/2	4	2
68-070	2601280	3/4	1 1/4	3/4	4	2
68-072	2601281	3/4 Down Shear	1 1/4	3/4	4	2

HELIX ANGLE ≈ 0 - 3°

68-100 Series PCD Compression

PCD 0° CW HW SW LW

This economical PCD compression tool will provide long tool life in abrasive wood products. Mortise tip allowing for through cuts and dado's to be produced using one tool. The compression design ensures chip free edges on the top and bottom.



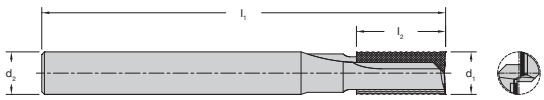
68-100 Series Single Flute - PCD Compression Tool Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Upcut LOC	Shank Diameter d_2	Overall Length l_1	Flutes
68-101	2601284	3/8	1	0.188	3/8	3	1
68-101L	2601285	3/8	1	0.188	3/8	3	1
68-100	2601282	3/8	1	0.188	1/2	3	1
68-100L	2601283	3/8	1	0.188	1/2	3	1
68-102	2601286	1/2	1	0.200	1/2	3	1
68-102L	2601287	1/2	1	0.200	1/2	3	1
68-103	2601288	1/2	1 1/4	0.200	1/2	3	1
68-104	2601289	5/8	1	0.200	5/8	3 1/2	1
68-104L	2601290	5/8	1	0.200	5/8	3 1/2	1
68-110	2601293	5/8	1 5/8	0.200	5/8	4	1
68-110L	2601294	5/8	1 5/8	0.200	5/8	4	1
68-106	2601291	3/4	1	0.200	3/4	4	1
68-106L	2601292	3/4	1	0.200	3/4	4	1
68-112	2601295	3/4	1 5/8	0.200	3/4	4	1
68-112L	2601296	3/4	1 5/8	0.200	3/4	4	1

L = Left Hand Rotation

68-200 Series PCD SERF™ Cutter

PCD 0° CP



This tool is designed to act like a rougher and finishing tool in one. The unique geometry reduces the cutting forces resulting in longer tool life, higher feed rates and reduced noise.

68-200 Series Two Flute - PCD SERF™ Cutter Product Offering

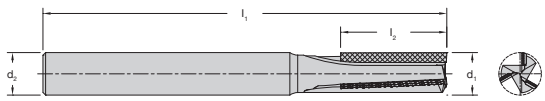
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
68-210	7053916	1/4	3/8	1/4	3	2
68-213	7053917	1/4	3/4	1/4	3	2
68-216	7053918	1/4	1	1/4	3 1/2	2
68-220	7053919	3/8	3/8	3/8	3	2
68-223	7053920	3/8	3/4	3/8	3	2
68-226	7053921	3/8	1	3/8	3 1/2	2
68-230	7053922	1/2	3/4	1/2	4	2
68-233	7053923	1/2	1	1/2	4	2
68-236	7053924	1/2	1 1/4	1/2	4	2

68-200 Series Two Flute - PCD SERF™ Cutter Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
68-213M	7052123	6	20	6	76	2
68-226M	7053914	10	25	10	88	2
68-236M	7053915	12	32	12	100	2

68-300 Series PCD SERFIN™ Cutter

PCD 0° CP



Three-Flute tool with two roughing edges that have geometry to reduce cutting forces and shear fibers in high-strength composite and other fiber reinforced plastic materials. The finishing edge cleans up after roughing cuts to create a smooth edge on material.

68-300 Series Three Flute - PCD SERFIN™ Cutter Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
68-315	7053896	3/8	1/2	3/8	4	3
68-320	7053897	3/8	7/8	3/8	4	3
68-340	7053898	1/2	5/8	1/2	4	3
68-345	7053899	1/2	1	1/2	4	3
68-350	7053900	1/2	1 1/4	1/2	4	3
68-360	7053901	3/4	1 3/8	3/4	5	3

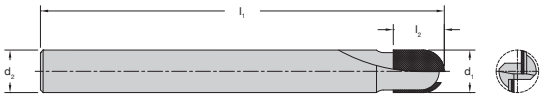
68-300 Series Three Flute - PCD SERFIN™ Cutter Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
68-310	7052122	8	10	8	76	3
68-325	7053902	10	14	10	100	3
68-330	7053903	12	14	12	100	3
68-335	7053904	12	26	12	100	3
68-355	7053905	16	26	16	100	3

68-400 Series PCD Ballnose

PCD 0° CP

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



68-400 Series Two Flute - PCD Ballnose Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
68-405	2609044	1/4	3/8	1/4	2 1/2	2
68-410	2609045	3/8	1/2	3/8	3	2
68-420	2609046	1/2	5/8	1/2	4	2
68-425	2609047	5/8	7/8	5/8	4	2
68-430	2609048	3/4	1	3/4	4	2

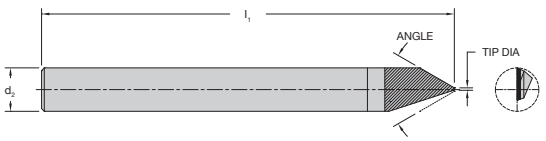
68-400 Series Two Flute - PCD Ballnose Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
68-440	2609049	6	10	6	76	2
68-445	2609050	8	10	8	76	2
68-450	2609051	10	12	10	76	2
68-455	7088736	12	20	12	100	2

68-500 Series PCD Engravers

PCD 0° CP A

LMT Onsrud designed 68-500 Series PCD Engravers with tool life in mind. The ultra-high performance PolyCrystalline Diamond (PCD) provides extreme performance and best-in-class tool life. Safely run at feed rates up to 30% faster than carbide and achieve better finishes and faster results with the flexibility of a wide range of tips for any type of engraving.



Features and Benefits

- PCD engraving bits can be recommended for use in all materials except soft plastics and ferrous metals.
- PCD engraving bits increase tool life over carbide engraving bits for CFRP and other materials.
- Feed rates when using LMT Onsrud PCD Engravers in aluminum can be increased up to 30%.

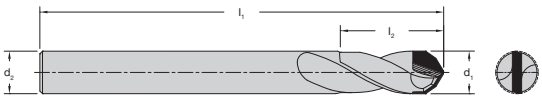
68-500 Series PCD Engravers Product Offering

Part Number	SAP Number	Tip DIA	Included Angle	Shank Diameter d_2	Overall Length l_1
68-502	2641601	0.010	60˚	1/4	2 1/4
68-504	2641602	0.020	60˚	1/4	2 1/4
68-506	2641603	0.030	60˚	1/4	2 1/4

68-900 Series PCD 8 Facet Drills

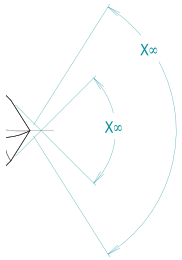
PCD CP

The PCD 8 facet drill works well in composite material where long tool life and a delamination free hole is required. The drill diameters are oversized allowing for aircraft fasteners to extend through the holes.



What is an 8 Facet Drill?

An 8 facet drill consists of 4 cutting edges with 2 facets per cutting edge. These facets consist of the lip relief and the lip clearance angle.

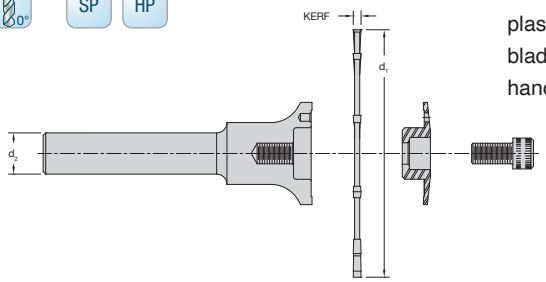


68-900 Series Two Flute PCD 8 Facet Drills Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
68-902	7054167	0.100	1	1/4	3	2
68-904	7054168	0.129	1	1/4	3	2
68-908	7054169	0.147	1	1/4	3	2
68-910	7054170	0.192	1	1/4	3	2
68-914	7054171	0.251	1	1/4	3	2
68-918	7054172	0.313	1	5/16	3	2
68-922	7054173	0.376	1	3/8	3	2
68-926	7054174	0.502	1	1/2	3	2

70-100 Series Trim Blade and Arbor

CT | 0° | SP | HP



Designed to trim and groove both hard and soft plastics. These blades run in conjunction with the blade arbors. Blades are reversible for right or left hand rotation cutting.

70-100 Series Carbide Tipped Trim Blade Soft Plastic - Slow Feed Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Teeth	Rake	Kerf	Grind
70-100	2349796	2	10	0°	095	TCG
70-102	2349797	2 1/2	10	0°	095	TCG
70-104	2349798	3	10	0°	095	TCG
70-108	2349800	4	10	0°	095	TCG

70-100 Series Carbide Tipped Trim Blade Soft Plastic - Fast Feed Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Teeth	Rake	Kerf	Grind
70-120	2349801	2	16	0°	095	TCG
70-122	2349802	2 1/2	20	0°	095	TCG
70-124	2349803	3	20	0°	095	TCG
70-126	2349804	3 1/2	20	0°	095	TCG
70-128	2349805	4	20	0°	095	TCG

70-100 Series Carbide Tipped Trim Blade Hard Plastic - Fast Feed Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Teeth	Rake	Kerf	Grind
70-160	2349811	2	16	-5°	095	TCG
70-162	2349812	2 1/2	20	-5°	095	TCG
70-164	2349813	3	20	-5°	095	TCG
70-166	2349814	3 1/2	20	-5°	095	TCG
70-168	2349815	4	20	-5°	095	TCG

70-100 Series Carbide Tipped Trim Blade And Arbor - Saw Arbor Product Offering

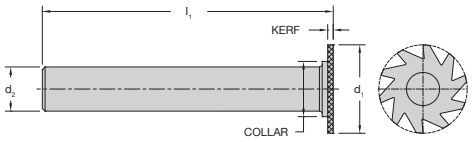
Part Number	SAP Number	Cutting Diameter d_1	Overall Length l_1
70-180	2601297	1/2	3 1/4
70-181	2601298	1/2	4 1/2

These saw arbors are designed to hold the carbide tipped saws.

*SEE FEED & SPEED CHART ON PAGE 99

70-200 Series Trim Blade Flush Mount

SC | 0° | SP | HP



These small diameter solid carbide arbor mounted blades are designed for trimming and slotting plastics. Blades are permanently attached to arbors and are not reversible.

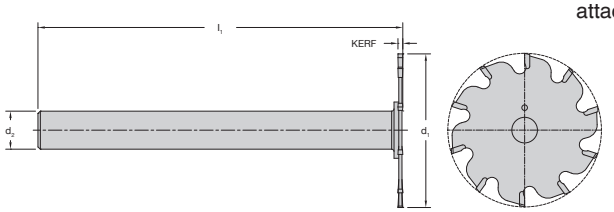
70-200 Series Solid Carbide Trim Blade Flush Mount Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Collar	Shank Diameter d_2	Kerf	Overall Length l_1	Rotation
70-204	2601299	1	9/16	1/2	0.062	4	Right
70-224	2601300	1 1/4	5/8	1/2	0.062	4	Right

*SEE FEED & SPEED CHART ON BELOW

70-300 Series Trim Blade Flush Mount

CT | 0° | SP | HP



Designed for flush trimming and slotting of both hard and soft plastics. Blades are permanently attached to arbors and are not reversible.

70-300 Series Solid Carbide Tipped Trim Blade Flush Mount Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Teeth	Rake	Shank Diameter d_2	KERF	Overall Length l_1	Grind	Rotation	Plastic	Feed
70-300	2601301	2	10	0°	1/2	.095	4	TCG	RH	Soft	Slow
70-302	2601302	2	10	0°	1/2	.095	4	TCG	LH	Soft	Slow
70-320	2601303	2	16	0°	1/2	.095	4	TCG	RH	Soft	Fast
70-322	2601304	2	16	0°	1/2	.095	4	TCG	LH	Soft	Fast
70-340	2601305	2	10	-5°	1/2	.095	4	TCG	RH	Hard	Slow
70-342	2601306	2	10	-5°	1/2	.095	4	TCG	LH	Hard	Slow
70-360	2601307	2	16	-5°	1/2	.095	4	TCG	RH	Hard	Fast
70-362	2601308	2	16	-5°	1/2	.095	4	TCG	LH	Hard	Fast

*SEE FEED & SPEED CHART ON BELOW

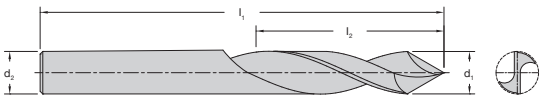
TCG = Triple Chip Grind

Feeds & Speeds for Blades (Inches Per Minute)					
Tool Series	Cutting Diameter d_1	Max RPM	Soft Plastic	Hard Plastic	Fiber Reinforced
70-100	2”	18,000	150	150	150
70-100	2-1/2”	16,000	150	150	150
70-100	3”	14,000	150	150	150
70-100	3-1/2”	12,000	150	150	150
70-100	4”	10,000	150	150	150
70-200	1-1/2” & Smaller	14,000	150	150	150
70-300	2”	16,000	150	150	150

70-500 Series HSS Plastic Drill

HSS SP HP

Designed to produce holes in hard and soft plastic while eliminating edge chipping and chip wrapping.



Fractional Drills

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
70-502	7054199	1/8 (0.125)	1 1/2	1/8	2 3/4	2
70-503	7054200	9/64 (0.141)	1 3/4	9/64	2 7/8	2
70-506	7054201	5/32 (0.156)	1 15/16	5/32	3 1/8	2
70-509	7054202	11/64 (0.172)	1 3/4	11/64	3 1/4	2
70-510	7054203	3/16 (0.188)	2 1/8	3/16	3 1/2	2
70-511	7054204	13/64 (0.203)	2 7/16	13/64	3 5/8	2
70-512	7054205	7/32 (0.219)	2 1/2	7/32	3 3/4	2
70-513	7054206	15/64 (0.234)	2 5/8	15/64	3 7/8	2
70-514	7054207	1/4 (0.250)	2 7/16	1/4	4	2
70-515	7054208	17/64 (0.266)	2 7/8	17/64	4 1/8	2
70-516	7054209	9/32 (0.281)	2 15/16	9/32	4 1/4	2
70-517	7054210	19/64 (0.297)	3 1/16	19/64	4 3/8	2
70-520	7054211	5/16 (0.313)	1 3/4	1/4	3 1/8	2
70-521	7054212	21/64 (0.328)	3 5/16	21/64	4 5/8	2
70-522	7054213	11/32 (0.344)	3 7/16	11/32	4 3/4	2
70-523	7054214	23/64 (0.359)	3 1/2	23/64	4 7/8	2
70-524	7054215	3/8 (0.375)	2 1/4	1/4	4 3/8	2
70-525	7054216	25/64 (0.391)	3 3/4	25/64	5 1/8	2
70-526	7054217	13/32 (0.406)	3 7/8	13/32	5 1/8	2
70-527	7054218	27/64 (0.422)	3 15/16	27/64	5 3/8	2
70-528	7054219	7/16 (0.438)	2 1/2	1/4	4 3/4	2
70-529	7054220	29/64 (0.453)	4 3/16	29/64	5 5/8	2
70-530	7054221	15/32 (0.469)	4 5/16	15/32	5 3/4	2
70-531	7054222	31/64 (0.484)	4 3/8	31/64	5 7/8	2
70-532	7054223	1/2 (0.500)	2 5/8	1/4	5 1/8	2

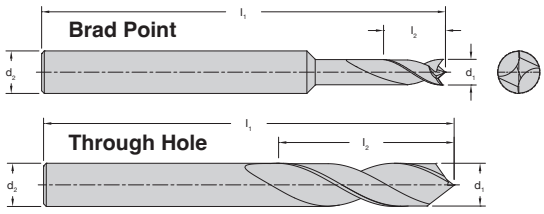
Metric Drills

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
70-714	6602390	3.00 (0.118)	41	3.00	70	2
70-716	6602392	4.00 (0.157)	54	4.00	83	2
70-718	6602394	5.00 (0.197)	62	5.00	92	2
70-720	6602396	6.00 (0.236)	70	6.00	102	2
70-722	6602398	7.00 (0.276)	73	7.00	105	2
70-724	6602400	8.00 (0.315)	81	8.00	114	2
70-726	6602402	9.00 (0.354)	89	9.00	124	2
70-728	6602404	10.00 (0.394)	95	10.00	130	2

NO Wrapping
NO Cleaning
NO Melting
NO Surface Marring
NO Interrupted Operation

72-000 Series Boring Bits

SC SW HW CW LW



Two style of tools are available in this series. The brad point drill is designed to cut blind holes and produce a clean edge on the top surface. The 60° through drill is designed to produce through holes while providing clean edges on both sides of both hard and soft plastics.

72-000 Series Solid Carbide Boring Bits - **Right Hand Rotation** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1	Flutes
72-001	2601366	3	10	57	2
72-005	2601368	5	10	57	2
72-009	2601370	6	10	57	2
72-013	2601372	8	10	57	2
72-021	7086843	3	10	70	2
72-025	2601374	5	10	70	2
72-029	2601376	6	10	70	2
72-033	2601378	8	10	70	2

72-000 Series Solid Carbide Boring Bits - **Left Hand Rotation** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1	Flutes
72-002	2601367	3	10	57	2
72-006	2601369	5	10	57	2
72-010	2601371	6	10	57	2
72-014	2601373	8	10	57	2
72-022	7086861	3	10	70	2
72-026	2601375	5	10	70	2
72-030	2601377	6	10	70	2
72-034	2601379	8	10	70	2

72-000 Series Solid Carbide Boring Bits - **Right Hand Rotation** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1	Flutes
72-053	2601380	3	10	57	2
72-057	2601382	5	10	57	2
72-061	2601384	6	10	57	2
72-065	2601386	8	10	57	2
72-075	2601388	3	10	70	2
72-079	2601390	5	10	70	2
72-083	2601392	6	10	70	2
72-087	2601394	8	10	70	2

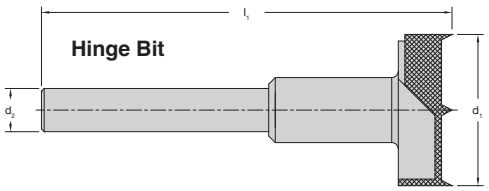
72-000 Series Solid Carbide Boring Bits - **Left Hand Rotation** Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1	Flutes
72-054	2601381	3	10	57	2
72-058	2601383	5	10	57	2
72-062	2601385	6	10	57	2
72-066	2601387	8	10	57	2
72-076	2601389	3	10	70	2
72-080	2601391	5	10	70	2
72-084	2601393	6	10	70	2
72-088	2601395	8	10	70	2

Brad Point - Designed to produce a blind hole while preventing fraying on the top edge.
Through Hole 60° Point - Produces a through hole and reduces fraying on the entry and exit edges.

72-000 Series Hinge Bits

CT SW HW CW LW



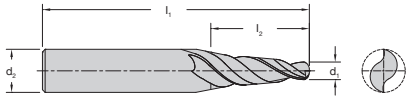
Hinge Bit - This 35mm carbide tipped bit is designed to produce a flat bottom hole with clean edges for hinge mounting.

72-000 Series Carbide Tipped Hinge Bit Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1	Flutes
72-097	2601396	35	10	70	2

77-100 Series Taper Tool

SC SW HW CW LW SP HP A



The taper tools are available with a variety of taper angles and come standard with a Ballnose point. The tools are designed to produce a good edge finish in a wide variety of materials.

77-100 Series Two or Three Flute Solid Carbide Taper Tools Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Angle Per Side	Radius (in)	Flutes
77-102	2601411	1/8	1 1/2	1/4	3	1°	1/16	3
77-104	7100376	1/8	1	1/4	3	3°	1/16	3
77-106	2601412	1/8	3/4	1/4	3	5°	1/16	3
77-108	2601413	1/8	1/2	1/4	3	7°	1/16	3
77-112	7092854	1/4	2	1/2	4	3°	1/8	2
77-114	2601414	1/4	1 3/8	1/2	4	5°	1/8	2
77-116	2601415	1/4	1	1/2	4	7°	1/8	2

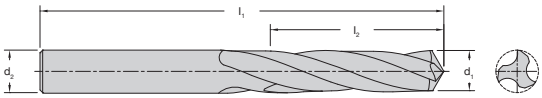
77-100 Series Two or Three Flute Solid Carbide Taper Tools Product Offering - Metric

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Angle	Radius	Flutes
77-102M	9125270	3mm	39mm	6mm	76mm	1°	1.5mm	3
77-104M	9125271	3mm	25mm	6mm	76mm	3°	1.5mm	3
77-106M	9125272	3mm	19mm	6mm	76mm	5°	1.5mm	3
77-108M	9125273	3mm	12mm	6mm	76mm	7°	1.5mm	3
77-112M	9125274	6mm	50mm	12mm	100mm	3°	3mm	2
77-114M	9125275	6mm	35mm	12mm	100mm	5°	3mm	2
77-116M	9125276	6mm	25mm	12mm	100mm	7°	3mm	2

80-000 Series Taper Pin Router

HSS A

These three flute upcuts with a tapered flute are used for profiling and trimming primarily in aircraft assembly operations.



80-000 Series Three Flute - High Speed Steel Taper Pin Router Product Offering

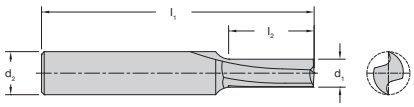
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
80-001	2601416	.098	3/4	.098	2	3
80-002	2601417	.110	7/8	.128	2 1/4	3
80-003	2601418	.165	1 1/16	.1875	2 1/2	3

HELIX ANGLE ≈ 24°

81-000 Series Lo Helix

HSS A

These lo helix upcut spirals were developed for CNC routers used primarily in the aircraft industry. They are designed with maximum strength of configuration to cut T, O or combined stacks of aluminum-using coolant.



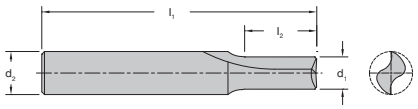
81-000 Series Two Flute - High Speed Steel Lo Helix Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Helix	ALUM Condition	Flutes
81-001	2349719	1/4	3/4	1/2	3 1/16	5°	T	2
81-003	2349721	5/16	3/4	1/2	3 1/16	10°	C	2

81-100 Series Spiral Extrusion Cutters

SC | 0° | A

Designed for reduced vibration producing smoother finish cuts. Extended reach during side thinning and gage reduction. Longer tool life to reduce tool changes.



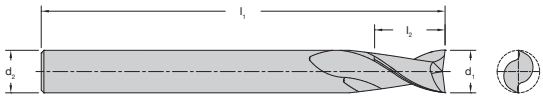
81-100 Series Two Flute - Solid Carbide Spiral Extrusion Cutters Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	ERL	Shank Diameter d_2	Overall Length l_1	Helix & DIR	CNR RAD Chamfer	Aluminum Condition	Machining Environment	Flutes
81-103	2349774	5/16	13/16	-	1/2	3	10°RH	.02 x 45°	C	Wet	2
81-104	2349775	3/8	13/16	-	1/2	3	10°RH	.02 x 45°	O	Wet	2

83-300 Series Stainless Steel

SC | ESG | M

Special cutting geometry is required to cut stainless steel and achieve decent tool life. LMT Onsrud has developed a line of cutters which are capable of cutting stainless steel.



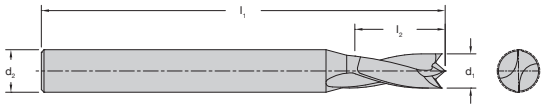
83-300 Series Two Flute - Solid Carbide Coated **Upcut** Spiral for Stainless Steel Product Offering

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
83-305ALTIN	2601582	1/8	1/4	1/8	2	2
83-310ALTIN	2601583	3/16	3/8	3/16	2 1/2	2
83-315ALTIN	2601584	1/4	3/8	1/4	2 1/2	2
83-320ALTIN	2601585	3/8	1/2	3/8	3	2

Cutting Parameters				
Part Number	SAP Number	RPM	Feedrate	Depth of Cut
83-305ALTIN	18,000	18 IPM	.012	0.012
83-310ALTIN	12,000	20 IPM	.020	0.020
83-315ALTIN	9,000	25 IPM	.030	030
83-320ALTIN	6,010	27 IPM	.045	045

85-800 Series CFRP Drill

SC DLC CP



The CFRP drill is designed to ensure hole quality and diameter. The “W” point of the drill centers the drill to let the peripheral cutting edges shear the material producing a clean, tight tolerance hole without fraying or delamination. The drills are coated with a Diamond Like Carbon (DLC).

Fractional Drills

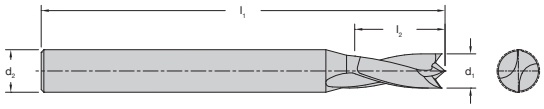
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
85-807	7077102	1/8 (0.1250)	0.500	1/8	3	2
85-808	2606742	9/64 (0.1406)	0.500	3/16	3	2
85-809	2606743	5/32 (0.1563)	0.500	3/16	3	2
85-810	2606744	11/64 (0.1719)	0.500	3/16	3	2
85-811	7077103	3/16 (0.1875)	0.500	3/16	3	2
85-812	2606745	13/64 (0.2031)	0.500	1/4	3	2
85-813	2606746	7/32 (0.2188)	0.500	1/4	3	2
85-814	2606747	15/64 (0.2344)	0.500	1/4	3	2
85-815	7077104	1/4 (0.2500)	0.500	1/4	3	2
85-816	2606748	17/64 (0.2656)	0.500	5/16	3	2
85-817	2606749	9/32 (0.2813)	0.500	5/16	3	2
85-818	2606750	19/64 (0.2969)	0.500	5/16	3	2
85-819	2606751	5/16 (0.3125)	0.500	5/16	3	2
85-820	2606752	21/64 (0.3281)	0.500	3/8	3	2
85-821	2606753	11/32 (0.3438)	0.500	3/8	3	2
85-822	2606754	23/64 (0.3594)	0.500	3/8	3	2
85-823	2606755	3/8 (0.3750)	0.500	3/8	3	2
85-827	2606756	7/16 (0.4375)	0.500	7/16	3	2
85-831	2606757	1/2 (0.5000)	0.500	1/2	3	2

Number Drills

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
85-876	2606758	1 (0.2280)	0.500	1/4	3	2
85-877	2606759	2 (0.2210)	0.500	1/4	3	2
85-878	2606760	3 (0.2130)	0.500	1/4	3	2
85-879	2606761	4 (0.2090)	0.500	1/4	3	2
85-880	2606762	5 (0.2055)	0.500	1/4	3	2
85-881	2606763	6 (0.2040)	0.500	1/4	3	2
85-882	2606764	7 (0.2010)	0.500	1/4	3	2
85-883	2606765	8 (0.1990)	0.500	1/4	3	2
85-884	2606766	9 (0.1960)	0.500	1/4	3	2
85-885	2606767	10 (0.1935)	0.500	1/4	3	2
85-886	2606768	11 (0.1910)	0.500	1/4	3	2
85-887	2606769	12 (0.1890)	0.500	1/4	3	2
85-888	2606770	13 (0.1850)	0.500	3/16	3	2
85-889	2606771	14 (0.1820)	0.500	3/16	3	2
85-890	2606772	15 (0.1800)	0.500	3/16	3	2
85-891	2606773	16 (0.1770)	0.500	3/16	3	2
85-892	2606774	17 (0.1730)	0.500	3/16	3	2
85-893	2606775	18 (0.1695)	0.500	3/16	3	2
85-894	2606776	19 (0.1660)	0.500	3/16	3	2
85-895	2606777	20 (0.1610)	0.500	3/16	3	2

85-800 Series CFRP Drill *continued*

SC DLC CP



The CFRP drill is designed to ensure hole quality and diameter. The “W” point of the drill centers the drill to let the peripheral cutting edges shear the material producing a clean, tight tolerance hole without fraying or delamination. The drills are coated with a Diamond Like Carbon (DLC).

Number Drills

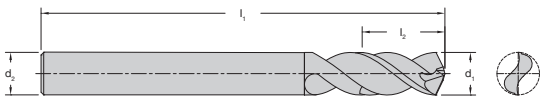
Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
85-896	2606778	21 (0.1590)	0.500	3/16	3	2
85-897	2606779	22 (0.1570)	0.500	3/16	3	2
85-898	2606780	23 (0.1540)	0.500	5/32	3	2
85-899	2606781	24 (0.1520)	0.500	5/32	3	2
85-900	2606782	25 (0.1495)	0.500	5/32	3	2
85-901	2606783	26 (0.1470)	0.500	5/32	3	2
85-902	2606784	27 (0.1440)	0.500	5/32	3	2
85-903	2607016	28 (0.1405)	0.500	5/32	3	2
85-904	2607017	29 (0.1360)	0.500	5/32	3	2
85-905	2607018	30 (0.1285)	0.500	5/32	3	2
85-906	2607019	31 (0.1200)	0.500	1/8	2 1/2	2
85-907	2607020	32 (0.1160)	0.500	1/8	2 1/2	2
85-908	2607021	33 (0.1130)	0.500	1/8	2 1/2	2
85-909	2607022	34 (0.1110)	0.500	1/8	2 1/2	2
85-910	2607023	35 (0.1100)	0.500	1/8	2 1/2	2
85-911	2607024	36 (0.1065)	0.500	1/8	2 1/2	2
85-912	2607025	37 (0.1040)	0.500	1/8	2 1/2	2
85-913	2607026	38 (0.1015)	0.500	1/8	2 1/2	2
85-914	2607027	39 (0.0995)	0.500	1/8	2 1/2	2
85-915	2607028	40 (0.0980)	0.500	1/8	2 1/2	2
85-916	2607029	41 (0.0960)	0.500	1/8	2 1/2	2

Metric Drills

Part Number	SAP Number	Cutting Diameter d_1	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
85-961	7068593	3.00 (0.1181)	12.000	3	76	2
85-963	7068592	4.00 (0.1575)	12.000	4	76	2
85-965	7068591	5.00 (0.1969)	12.000	5	76	2
85-967	7068590	6.00 (0.2362)	12.000	6	76	2
85-971	7068589	8.00 (0.3150)	12.000	8	76	2
85-975	7068448	10.00 (0.3937)	12.000	10	76	2
85-979	7068447	12.00 (0.4724)	12.000	12	76	2

86-150 Series DFC Aerospace Composite Drill

SC | 0° | DFC | CP



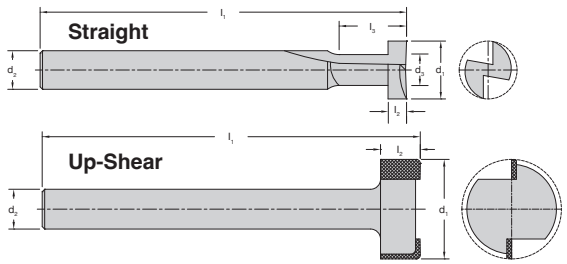
Carbon Fiber Reinforced (CFRP) drills produce a clean tight tolerance hole without fraying or delamination. Top-quality point grind ensures fiber shearing and prevents delamination on hole entry and exit. Enhanced diamond coating to protect cutting edges resulting in less tool changes.

86-150 Series DFC Aerospace Composite Drill (ACD) Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Cutting Diameter d_1 (mm)	LOC l_2	Shank Diameter d_2	Overall Length l_1	Flutes
86-152	2644495	0.1000	2.54	1	1/4	3	2
86-154	2644496	0.1295	3.29	1	1/4	3	2
86-156	2644497	0.1620	4.11	1	1/4	3	2
86-158	2644498	0.1920	4.88	1	1/4	3	2
86-160	2644499	0.2220	5.64	1	1/4	3	2
86-162	2644500	0.2510	6.38	1	1/4	3	2
86-164	2644501	0.3135	7.96	1	5/16	3	2
86-166	2644502	0.3760	9.55	1	3/8	3	2
86-168	2644503	0.4385	11.14	1	7/16	3	2
86-170	2644504	0.5010	12.73	1	1/2	3	2

91-000/91-100 Series Spoilboard Surfacing Cutters

SC | 0° | SP | CW | HP | A



Designed for surfacing MDF, particleboard and balsa core where "flow through" or "high flow" fixturing is employed using large capacity vacuum pumps. This method of surfacing spoilboards allows for much faster table planing.

91-000/91-100 Series Spoilboard Surfacing Cutters **Straight** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1	Flutes
91-000*	2601587	1 1/4	1/2	1 1/2	2
91-102	2601588	2 1/2	1/2	2	2
91-106	6602647	4	3/4	2 1/4	3

* = Carbide Tipped

91-000/91-100 Series Spoilboard Surfacing Cutters **Up-Shear** Product Offering

Part Number	SAP Number	Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1	Flutes
91-104	2601589	2 1/2	1/2	2	2
91-108	7085264	4	3/4	2 1/4	3
91-112[2]	2601590	2 1/2	1/2	2	3
91-114[2]	2601591	4	3/4	2 1/4	3

[2] Radius edges excellent for plastic and aluminum surfacing.

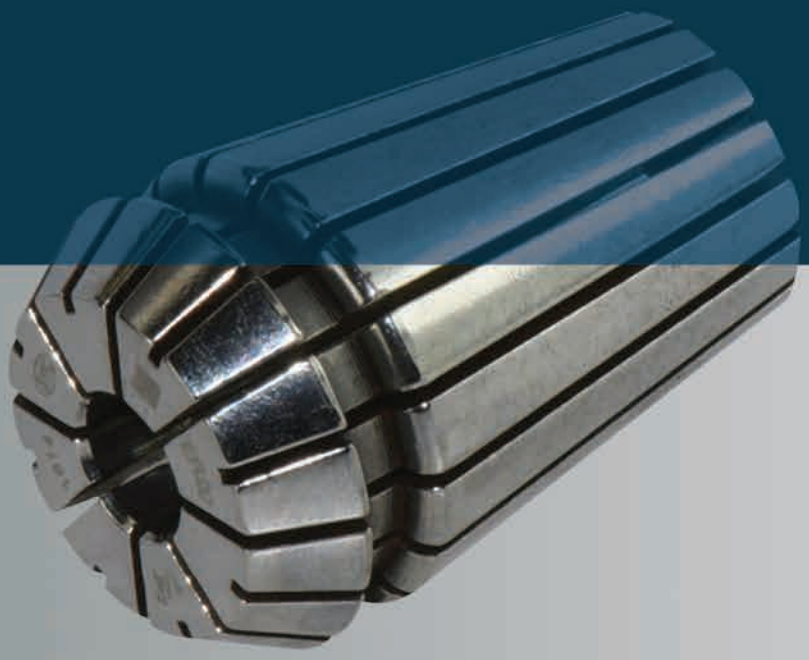
Note: 91-102, 91-104, 91-106 & 91-108 use 91-125 insert and 91-133 screw 91-112 & 91-114 use 91-127 insert and 91-133 screw.

- 2-1/2" diameter tools should be fed at 200-600 IPM at 12,000-16,000 RPM.
- 4" diameter tools should be fed at 200-600 IPM at 12,000-14,000 RPM.
- These tools are dynamically balanced and approved for use on CNC Routers. Max RPM 18,000.

* Do Not Exceed 1/8" Depth Per Pass.

Spare Parts

Part Number	Description
91-125	Insert 10/pk
91-127	Radius Insert 10/pk
91-130	Screw M4 (Old Version)
91-133	Screw M5
91-136	Wrench (T20)



ACCESSORIES

33-00 Series Fiber Adapter Bushing

Used to downsize the bore for smaller shank diameters. Bushings are not recommended for production routing. They should be used only as a temporary substitute for the proper size collet.

- Temporary collet downsizing

33-00 Series Fiber Adapter Bushing Product Offering

Part Number	OD	Hole	Length
33-01	1/4	1/8	1-1/4
33-02	1/4	3/16	1-1/4
33-03	1/2	1/4	1-1/2
33-04	1/2	5/16	1-1/2
33-05	1/2	3/8	1-1/2

33-10 Series Collet Brush Kit

33-10 Series Collet Brush Kit

Part Number	Description
33-10	Collet Brush Kit: 1/4”-3/4” (includes 4 brushes in tube)
33-15	1/4” Brush
33-16	3/8” Brush
33-17	1/2” Brush

33-10 Series Collet Brush Kit

Part Number	Description
33-18	3/4” Brush
33-19	1” Brush
33-25	Collet Brush Kit: 1/4”-1” (includes 5 Brushes in Tube)
33-28	Brass Brush

33-21 Seriees Cleaning Solvent & Rust Protector

RUST FREE™ is a cleaner designed to provide a simple solution to your collet cleaning needs. Use T-9™ to protect parts from rust and corrosion. Designed to be used after RUST FREE™-use on collets and tool holders.

33-21 Series Cleaning Solvent & Rust Protector

Part Number	Description
33-21	Rust Free 8.45oz and T-9 4oz drip

33-30 Series Tool Extender

Designed to increase the overall reach of 3/8” and smaller router bits. These extensions are used mainly on CNC routers when routing three dimensional parts.

- Collet Pocket T.I.R. 0.0001”
- Nut Inclucded

NOTE: Tool extenders should be cut off to required length before use.
Extension should not exceed a 4 to 1 ratio. The 4 being the length and the 1 being the diameter. I.E. a 1/2” shank should not extend out over 2” in front of the holder. Recommended Spindle Speed 15,000 to 18,000 RPM.

33-30 Series Tool Extender Product Offering

Part Number	EXT OAL	SHK DIA	SHK LGTH	HEAD DIA	COLLET	Spare Parts		WRENCH
						NUT	SET SCREW	
33-32	6-9/16	1/2	5-1/2	5/8	ER11	34-721	33-701	34-761
33-34	6-1/4	5/8	5-1/2	5/8	ER11	34-721	33-701	34-761
33-36	7	1/2	5-1/2	7/8	ER16	34-722	33-701	34-762
33-38	6-9/16	3/4	5-1/2	7/8	ER16	34-722	33-701	34-762
33-31	7	1/2	5-1/2	1-1/8	ER20	34-723	33-701	34-763
33-35	7	3/4	5-1/2	1-1/8	ER20	34-723	33-701	34-763
33-37	6-5/8	1	5-1/2	1-1/8	ER20	34-723	33-701	34-763
33-39	5-1/2	3/4	4	1-3/8	ER25	34-724	33-702	34-764

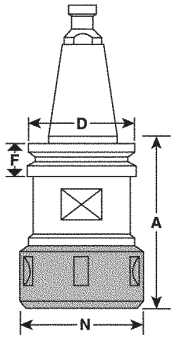
33-60 Series Spindle Taper Wiper

Spindle taper wipers are used to ensure clean spindle taper before installing collet chucks into CNC router spindles.

33-60 Series Spindle Taper Wiper

Part Number	TYPE	TOTAL LENGTH	TAPER LENGTH	HANDLE DIA	TAPER MAX DIA
33-60	ISO-30	6-5/8	2-3/8	1	1-1/4
33-62	ISO-40	7-1/2	3-1/16	1	1-3/4
33-66	HSK-63F	6-1/2	1-1/4	1	N/A

33-70 Series ISO Toolholders for CNC Routers



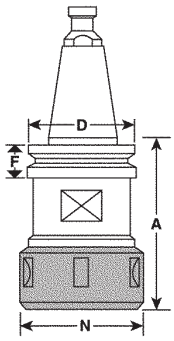
Note:
Measure the “A” dimension wth the collet in the nut. Dimensions in Millimeters.

- Balanced to 25,000 RPM at G2.5
- T.I.R 0.0001” or better from taper to collet pocket
- Nut and pull stud included

33-70 Series ISO Toolholders for CNC Routers Product Offering

Part Number	Description	D (mm)	A (mm)	N (mm)	Spare Parts		Wrench
					Collet Nut	Pull Stud	
33-73	ISO 30 x ER 32-50mm	50	50	50	34-705	33-114	34-757
33-75	ISO 30 x ER 32-63mm	50	63	50	34-705	33-112	34-757
33-77	ISO 30 x ER 32-90mm	50	90	50	34-705	33-112	34-757
33-79	ISO 30 x ER 40-57mm	50	57	63	34-706	33-112	34-758
33-78	ISO 40 x ER 40-70mm	63.55	70	63	34-706	33-118	34-758
33-80	SK-30 x SYOZ 25 tool holder	50	63	60	34-708	–	–

33-80 Series BT Toolholders for CNC Routers



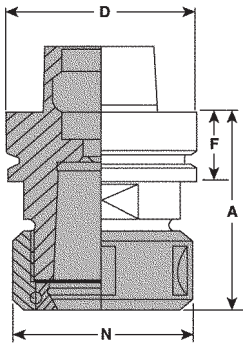
Note:
Measure the “A” dimension wth the collet in the nut. Dimensions in Millimeters.

- Balanced to 25,000 RPM at G2.5
- T.I.R 0.0001” or better from taper to collet pocket
- Nut and pull stud included

33-80 Series BT Toolholders for CNC Routers Product Offering

Part Number	Description	D (mm)	A (mm)	F (mm)	N (mm)	Spare Parts		Set Screw
						Collet Nut	Pull Stud	
33-81	BT 30 x ER 32-60mm w/o slots	46	60	20	50	34-705	33-111	33-702
33-82	BT 30 x ER 32-90mm w/o slots	46	90	20	50	34-705	33-111	33-702
33-84	BT 35 x ER 32-76mm	53	76	22	50	34-705	33-117	-
33-85	BT 30 x ER 32-70mm	46	70	20	50	34-705	33-117	33-702
33-86	BT 40 x ER 32-70mm	50	70	25.3	50	34-705	-	33-702
33-87	BT 40 x ER 40-80mm	50	80	25.3	63	34-706	-	33-702

33-90 Series HSK 63F Toolholders for CNC Routers



Note:
Measure the “A” dimension wth the collet in the nut. Dimensions in Millimeters

- Balanced to 25,000 RPM at G2.5
- T.I.R 0.0001” or better from taper to collet pocket
- Nut and pull stud included

33-90 Series HSK 63F Toolholders for CNC Routers Product Offering

Part Number	Description	D (mm)	A (mm)	F (mm)	N (mm)	Spare Parts	Wrench
						Collet Nut	
33-90	HSK 50F x ER32-80mm	50	80	26	50	34-705	34-757
33-91	HSK 63F x ER40-76mm	63	76	26	63	34-706	34-758
33-92	HSK 63F x ER40-90mm	63	90	26	63	34-706	34-758
33-93	HSK 63 F x SYOZ 25-80mm	63	80	26	60	34-708	34-758
33-94	HSK 63 F x ER32-70mm	63	70	26	50	34-705	34-757
33-95	HSK 63 F x ER40-125mm	63	125	26	63	34-706	34-758

34-50 Series Collet Life Plug

Collet plugs are designed to keep full grip collets from collapsing in the back when the router bit shank does not fill the full grip collet completely.

34-50 Series Collet Life Plug Product Offering

Part Number	Size	Part Number	Size
34-51	1/4	34-54	5/8
34-52	3/8	34-55	3/4
34-53	1/2		

Collets ER Precision Inch

- Standard 0.0002” T.I.R.
- Collapse range: 0.039”

Collets I ER Precision Inch

Collet ID	34-60 ER11	34-70 ER16	34-90 ER20	34-150 ER25	34-200 ER32	34-250 ER40	Collet Range
1/16”	34-61	34-71	–	–	–	–	.043-.062”
3/32”	34-62	34-72	34-92	34-151	34-201	–	.054-.093”
1/8”	34-63	34-73	34-93	34-152	34-202	34-251	.086-.125”
5/32”	34-64	34-74	34-94	34-153	34-203	–	.117-.156”
3/16”	34-65	34-75	34-95	34-154	34-204	34-252	.148-.187”
7/32”	34-66	34-76	34-96	34-155	34-205	–	.179-.218”
1/4”	34-67	34-77	34-97	34-156	34-206	34-253	.211-.250”
9/32”	–	34-78	34-98	34-157	34-207	–	.242-.281
5/16”	–	34-79	34-99	34-158	34-208	34-254	.273-.312”
11/32”	–	34-80	34-100	34-159	34-209	–	.304-.343
3/8”	–	34-81	34-101	34-160	34-210	34-255	.336-.375”
13/32”	–	34-82	34-102	34-161	34-211	–	.367-.406”
7/16”	–	–	34-103	34-162	34-212	34-256	.398-.437”
15/32”	–	–	34-104	34-163	34-213	–	.429-.468”
1/2”	–	–	34-105	34-164	34-214	34-257	.461-.500”
17/32”	–	–	–	34-165	34-215	–	.492-.531”
9/16”	–	–	–	34-166	34-216	34-258	.523-.562”
19/32”	–	–	–	34-167	34-217	–	.554-.593”
5/8”	–	–	–	34-168	34-218	34-259	.586-.625”
21/32”	–	–	–	–	34-219	–	.617-.656”
11/16”	–	–	–	–	34-220	34-260	.648-.687”
23/32”	–	–	–	–	34-221	–	.679-.718”
3/4”	–	–	–	–	34-222	34-261	.711-.750”
7/8”	–	–	–	–	–	34-262	.836-.875”
1”	–	–	–	–	–	34-263	.961-1.000”

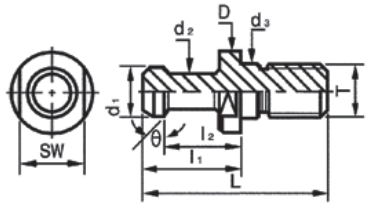
Collets ER Precision Metric

- Standard 0.0002” T.I.R.
- Collapse range: 0.039”

Collets I ER Precision - Metric

Collet ID (mm)	34-300 ER20	34-350 ER25	34-400 ER32	34-450 ER40	Inch	Collet Range
1-2	34-301	34-351	–	–	1/16”	.039-.079”
2-3	34-302	34-352	34-401	–	7/64”	.079-.118”
3-4	34-303	34-353	34-402	34-451	1/8”	.118-.157”
4-5	34-304	34-354	34-403	34-452	3/16”	.157-.197”
5-6	34-305	34-355	34-404	34-453	7/32”	.197-.236”
6-7	34-306	34-356	34-405	34-454	1/4”	.236-.276”
7-8	34-307	34-357	34-406	34-455	5/16”	.276-.315”
8-9	34-308	34-358	34-407	34-456	11/32”	.315-.354”
9-10	34-309	34-359	34-408	34-457	3/8”	.354-.394”
10-11	34-310	34-360	34-409	34-458	13/32”	.394-.433”
11-12	34-311	34-361	34-410	34-459	7/16”	.433-.472”
12-13	34-312	34-362	34-411	34-460	1/2”	.472-.512”
13-14	–	34-363	34-412	34-461	17/32”	.512-.551”
14-15	–	34-364	34-413	34-462	9/16”	.551-.591”
15-16	–	34-365	34-414	34-463	5/8”	.591-.630”
16-17	–	–	34-415	34-464	21/32”	.630-.669”
17-18	–	–	34-416	34-465	11/16”	.669-.709”
18-19	–	–	34-417	34-466	3/4”	.709-.748”
19-20	–	–	34-418	34-467	25/32”	.748-.787”
20-21	–	–	–	34-468	13/16”	.787-.827”
21-22	–	–	–	34-469	27/32”	.827-.866”
22-23	–	–	–	34-470	7/8”	.866-.906”
23-24	–	–	–	34-471	15/16”	.906-.945”
24-25	–	–	–	34-472	31/32”	.945-.984”
25-26	–	–	–	34-473	1”	.984-1.024”

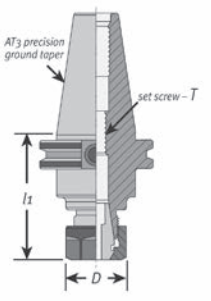
33-110 Series Pull Studs for CNC Router



33-110 Series Pull Studs for CNC Router Product Offering

Part Number	Type	D (mm)	d1 (mm)	d2 (mm)	d3 (mm)	L (mm)	l1 (mm)	l2 (mm)	O	T
33-111	KOMO 30-A 12.5	17	13	9	12.5	44	23.4	18.2	15°	M12
33-112	DAT 30- A	17	13	9	13	44	24	19	15°	M12
33-113	Colombo 30- Ball	17	12.8	9	13	44	24	19	45°	M12
33-114	HSD ISO 30	17	12	8	13	44	23.9	-	radius	M12
33-115	DAT-A PULL STUD	36	28	21	25	74	34	25	30°	M24
33-117	BT 35- Heian	20	13	8.5	12.5	43	28	22.5	-	M12
33-118	DAT 40 – A	23	19	14	17	54	26	20	15°	M16

33-120 Series Cat 40 Precision Toolholder

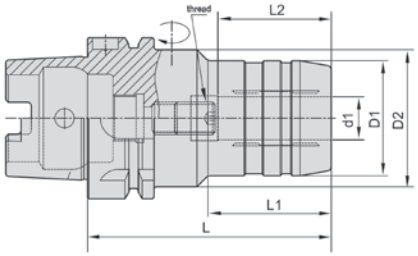


- Balanced to 25,000 RPM at G2.5
- T.I.R 0.0001” or better from taper to collet pocket
- Nut included

33-120 Series Cat 40 Precision Toolholder Product Offering

Part Number	Description	L1	D	Spare Parts		Wrench
				Collet Nut	Set Screw	
33-120	CAT 40 x ER 32-4	4	1.97	34-705	33-702	34-757
33-121	CAT 40 x ER 32-6	6	1.97	34-705	33-702	34-757
33-122	CAT 40 x ER 32-8	8	2.48	34-705	33-702	34-757
33-123	CAT 40 x ER 40-4	4	2.48	34-706	33-703	34-758

34-170 HSK63F Hydraulic Holders and Reduction Sleeves



- Balanced to 25,000 RPM at G2.5
- T.I.R. 0.0001” measured from taper to bore

34-170 Series HSK63F Hydraulic Holders

Part #	Description	d1 (mm)	D1 (mm)	D2 (mm)	L (mm)	L1 (mm)	L2 (mm)	Thread
34-171	HSK63F-HC19.05-85	19 (.75")	42	50	85	43	42	M16x1.0
34-172	HSK63F-HC25.4-120	25 (1.0")	57	63	120	59	40	M16x1.0

Reduction Sleeves	
Part #	Description
34-175	3/4-1/8 Reduction Sleeve
34-176	3/4-3/16 Reduction Sleeve
34-177	3/4-1/4 Reduction Sleeve
34-178	3/4-5/16 Reduction Sleeve
34-179	3/4-3/8 Reduction Sleeve
34-180	3/4-1/2 Reduction Sleeve
34-181	3/4-5/8 Reduction Sleeve

NOTE: Assemble the cutting tool into the sleeve first, then insert the assembly into the hydraulic toolholder. Do not load the sleeve and collet separately. Turn the clamping screw clockwise to apply the clamping pressure.

34-550 Series Perske (SYOZ)/DIN6388 Collets and Nuts

Snap collet into the nut before screwing nut onto spindle or collet holder.
SYOZ 20-L=34 D=20
SYOZ 25-L=52 D=35

34-550 Perske (SYOZ)/DIN6388 Collets Product Offering

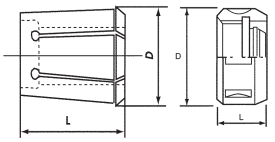
Collet ID	Part # for SYOZ 20	Part # for SYOZ 25
1/8”	34-551	34-601
3/16”	34-552	34-602
1/4”	34-553	34-603
5/16”	34-554	34-604
3/8”	34-555	34-605
7/16”	34-556	34-606
1/2”	34-557	34-607
9/16”	–	34-608

34-550 Perske (SYOZ)/DIN6388 Collets Product Offering

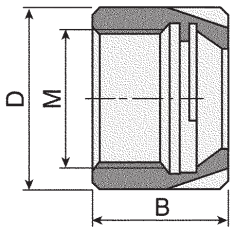
Collet ID	Part # for SYOZ 20	Part # for SYOZ 25
5/8”	–	34-609
3/4”	–	34-610
7/8”	–	34-611
1"	–	34-612
10 mm	34-558	34-613
16 mm	–	34-614
20 mm	–	34-615
25 mm	–	34-616

34-550 Perske Nuts Product Offering

Part Number	Description
34-707	SYOZ 20 RH Collet Nut
34-708	SYOZ 25 RH Collet Nut



34-700 Series Ultra High-Speed ER Coated Nuts



Use RH-B nuts for applications where speeds exceed 5,000 RPM's to maintain tool balance. RH-B series nuts are manufactured to the closest tolerance for ultra high speeds. The eccentric ring is perfectly round and all parts of the nut are totally ground.

Features and Benefits

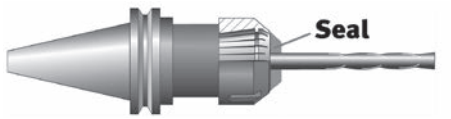
- B Nuts Balanced to 25,000 RPM
- Mini Nuts Balanced to 20,000 RPM

34-700 Ultra High-Speed ER Coated Nuts Product Offering

Part #	Description	D (mm)	B (mm)	M (mm)	Max Speed	Wrench	*Max Torque
34-701	ER RH 11 B Nut	19	11.8	M14 x 0.75	70,000	34-751	20 ft/lbs
34-702	ER RH 16 B Nut	32	18.0	M22 x 1.5	65,000	34-754	42 ft/lbs
34-703	ER RH 20 B Nut	35	19.5	M25 x 1.5	60,000	34-755	59 ft/lbs
34-704	ER RH 25 B Nut	42	20.5	M32 x 1.5	55,000	34-756	77 ft/lbs
34-705	ER RH 32 B Nut	50	23.0	M40 x 1.5	50,000	34-757	100 ft/lbs
34-706	ER RH 40 B Nut	63	26.0	M50 x 1.5	40,000	34-758	130 ft/lbs
34-720	ER 8 Mini Nut	12	11.0	M10 x 0.75	20,000	34-760	7 ft/lbs
34-721	ER 11 Mini Nut	16	12.0	M13 x 0.75	20,000	34-761	12 ft/lbs
34-722	ER 16 Mini Nut	22	18.0	M19 x 1.0	20,000	34-762	20 ft/lbs
34-723	ER 20 Mini Nut	28	19.5	M24 x 1.0	20,000	34-763	22 ft/lbs
34-724	ER 25 Mini Nut	36	21.0	M30 x 1.0	20,000	34-764	26 ft/lbs

34-743 Series Dust Cover

Keeps dust and chips from entering collet.
Keeps tool balanced.



34-743 Series Dust Cover Product Offering

Part Number	Description
34-740	Dust cover for 3/16" tool shank
34-741	Dust cover for 1/4" tool shank
34-742	Dust cover for 5/16" tool shank
34-743	Dust cover for 3/8" tool shank
34-744	Dust cover for 1/2" tool shank
34-745	Dust cover for 5/8" tool shank
34-746	Dust cover for 3/4" tool shank

34-750 Series Hand Wrenches for Collet Nuts

A-TYPE E-TYPE M-TYPE

34-750 Series Hand Wrenches for Collet Nuts Product Offering

Part Number	Description	Nut Type
34-751	ER 11-A Wrench	A (Hex)
34-752	ER 16-A Wrench	A (Hex)
34-753	ER 20-A Wrench	A (Hex)
34-754	ER 16-E Wrench	Slotted
34-755	ER 20-E Wrench	Slotted
34-756	ER 25-E Wrench	Slotted
34-757	ER 32-E Wrench	Slotted
34-758	ER 40-E Wrench	Slotted
34-760	ER 8-M Wrench	Mini
34-761	ER 11-M Wrench	Mini
34-762	ER 16-M Wrench	Mini
34-763	ER 20-M Wrench	Mini
34-764	ER 25-M Wrench	Mini

34-800 Series Torque Wrench

34-800 Series Torque Wrench Product Offering

Part Number	Description	Torque Range	Length	Weight	Spigot
34-801	Torque Wrench	30-150 ft/lbs	16.5”	1.75 lbs.	16mm round
34-802	Torque Wrench	45-228 ft/lbs	21.5”	2.5 lbs.	16mm round

34-810 Series Adapter Socket

Use with Torque Wrench (34-800 Series)
and Socket (34-820 Series)

34-810 Adapter Socket Product Offering

Part Number	Description
34-810	3/8” Square Drive
34-812	1/2” Square Drive

34-820 Series Pull Stud Socket

Use with Torque Wrench (34-800 Series)
and Adapter (34-810 Series)

34-820 Series Pull Stud Socket Product Offering

Part Number	Description	Square Drive	Torque
34-820	BT30	3/8"	36 ft/lbs
34-822	ISO 30	3/8"	36 ft/lbs
34-824	All 40 Taper	3/8"	76 ft/lbs

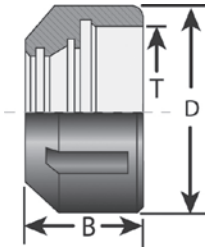
34-850 Series Collet Keys for Torque Wrenches

Use with Torque Wrench (34-800 Series)

34-850 Collet Keys for Torque Wrenches Product Offering

Part #	Collet Nut Size	Wrench Type	Torque
34-851	ER 16 Hex	Hex	42 ft/lbs
34-852	ER 20 Hex	Hex	59 ft/lbs
34-853	ER 25 Slotted	Slotted	95 ft/lbs
34-854	ER 32 Slotted	Slotted	100 ft/lbs
34-855	ER 40 Slotted	Slotted	130 ft/lbs
34-856	SYOZ 25/TG 100	Hook	90 ft/lbs

34-920 Series ER Dust Seal Nuts and Dust Seal



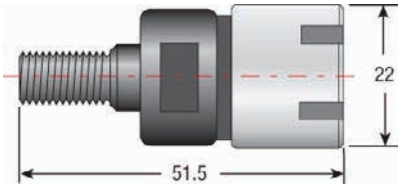
Balanced to 25,000 RPM Internal Dust Seals extend the life of a collet. Must use Internal Dust Seal with Dust Seal Nuts. Can not be used separately.

34-920 ER Dust Seal Nuts and Dust Seals Product Offering

Part #	Description	D (mm)	B (mm)	T	Wrench	Recommended Torque
34-921	ER16 Dust Seal Nut	32	22.5	M22x1.5	34-754	42 ft/lbs
34-922	ER20 Dust Seal Nut	35	24	M25x1.5	34-755	59 ft/lbs
34-923	ER25 Dust Seal Nut	42	25	M32x1.5	34-756	77 ft/lbs
34-924	ER32 Dust Seal Nut	50	27.5	M40x1.5	34-757	100 ft/lbs
34-925	ER40 Dust Seal Nut	63	30.7	M50x1.5	34-758	130 ft/lbs

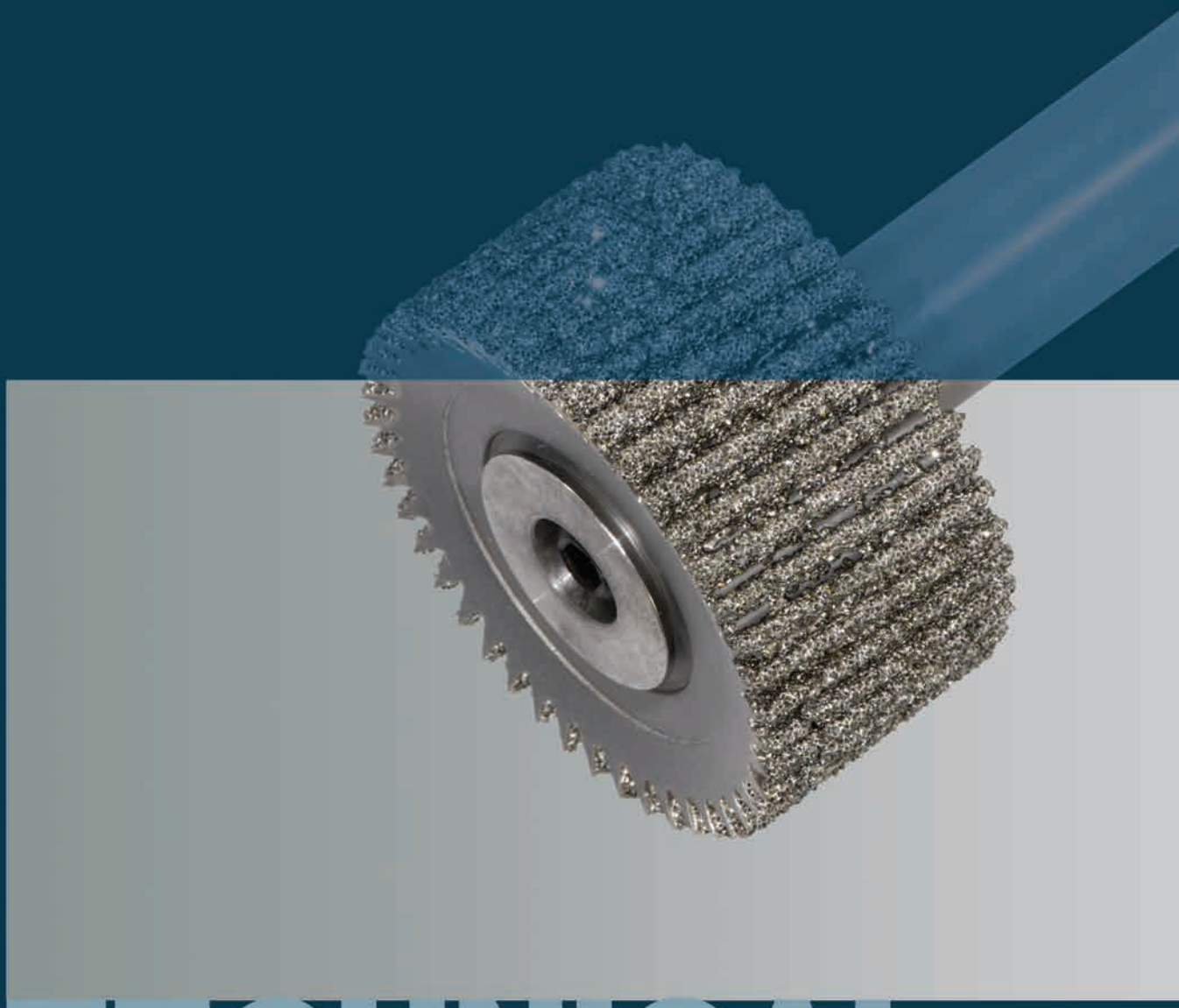
Internal Dust Seals					
For Shank Size	ER16	ER20	ER25	ER32	ER40
	Part #	Part #	Part #	Part #	Part #
1/8”	34-930	34-935	34-941	34-948	34-962
3/16”	34-931	34-936	34-942	34-949	34-963
1/4”	34-932	34-937	34-943	34-955	34-964
5/16”	34-933	34-938	34-944	34-956	34-965
3/8”	34-934	34-939	34-945	34-957	34-966
1/2”	–	34-940	34-946	34-958	34-967
5/8”	–	–	34-947	34-959	34-968
3/4”	–	–	–	34-961	34-969
1”	–	–	–	–	34-970

34-950 Series Spindle Drill Adapters



34-950 Series Spindle Drill Adapters Product Offering

Part Number	Description	Shank	Collet	Capacity	Thred
34-950	Inline Multi Spindles Drill Adapters	M10 x 1.05	ER16	3/8 or 10mm	RIGHT
34-951	Inline Multi Spindles Drill Adapters	M10 x 1.05	ER16	3/8 or 10mm	LEFT



TECHNICAL
INFORMATION

Technical Data

Tool Selection

TOOL MATERIAL

- Solid Carbide: Primarily used in CNC operations. Material provides best rigidity and long tool life.
- Carbide Tipped: Incorporates the wear resistance of carbide and the toughness of a HSS body-mainly hand held.
- HSS: Primarily used in hand routing. Material provides a tough body and sharper cutting edge.
- PCD: Long life in abrasive materials.

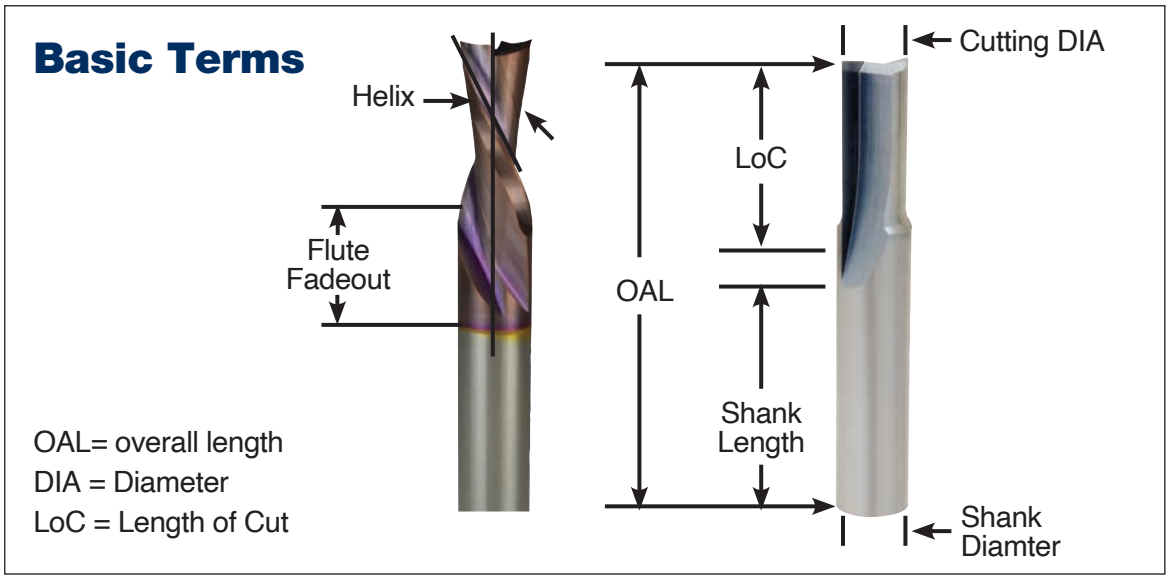
FLUTE GEOMETRY

- Straight flute: Offers a neutral cutting action-highest force.
- Upcut flute: Provides the best surface finish and allows for good chip extraction. May cause part lifting if vacuum or fixturing is not sufficient.
- Downcut flute: Provides a downward force which helps eliminate part lifting. Chip rewelding MAY occur if there is no space below the part for chip expansion.
- Compression: Used for laminated materials, produces a good top and bottom finish on the part.

NUMBER OF FLUTES

- Single Flute: Allows for larger chiploads in softer materials
- Two Flute: Allows for better part finish in harder materials.
- Multiple Flutes: Allows for an even better part finish in harder materials.

Note: As the number of cutting edges increase, your feed rate should increase to prevent burning and premature tool dulling.



OPTIMIZING SPEED AND FEEDS

1. Start off using the recommended chipload and RPM for the material you are cutting.
2. Increase the feedrate until the part finish starts to decrease or you risk moving the part off the vacuum. Decrease the feed by 10%.
3. Next decrease your RPM by a set increment until your surface finish deteriorates again. Once this happens increase your RPM until the finish is acceptable.
4. You have now optimized your speed and feed by taking the largest chip possible.

Note: This should be done in the first sheet of material to prevent tool dulling due to excessive heat.

TOOL HEAT

If a feed rate is too low, heat will be generated causing the cutting edge to break down and dull quickly. To check this, run a nest of parts and stop the spindle. When the spindle has stopped rotating, carefully feel the tool's temperature. It should be at or near room temperature. If the tool is hot, review "Optimizing Speed and Feeds".

Technical Data

FIXTURING METHODS

FLOW THROUGH VACUUM

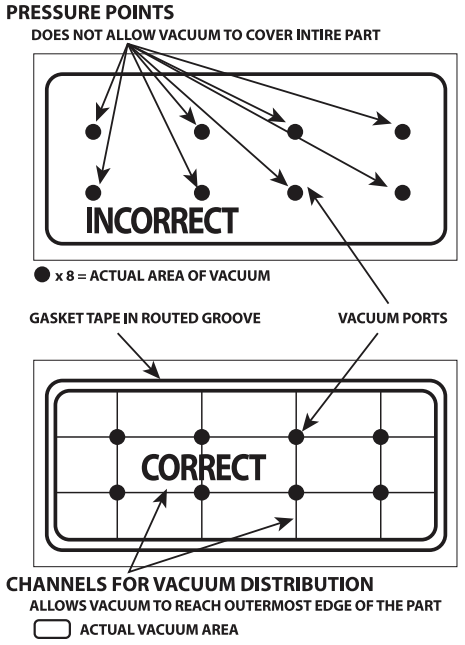
This style uses LDF (Low Density Fiberboard) or MDF (Medium Density Fiberboard) as a sacrificial surface for sheet material to be cut on. The porous nature of LDF or MDF allows vacuum to pass through allowing the material to be held in place for machining. As parts are cut out of the sheet material, vacuum loss starts to occur from the slot produced by the cutting tool. This can lead to part lifting or movement especially in small parts. Cutter diameter will also influence part movement. A 1/2 diameter tool will exert 25% more lateral pressure than a 3/8 diameter tool.

When cutting small parts in sheet material, one may want to consider tab or skin cutting to prevent part movement.

DEDICATED SPOILBOARD

Dedicated spoilboards are used for reoccurring production runs where optimal cycle times are needed. This work holding method creates vacuum chambers in the sacrificial board specifically to the shape of the parts being cut. This elimination of vacuum loss relates to improved cycle times and part finish.

Proper Spoilboard Techniques



STEPS TO CREATE A DEDICATED SPOILBOARD:

1. Surface both sides of your MDF board.
2. Lay out the part pattern on the MDF and determine quantity that will fit.
3. Cut the part profile into the MDF board using a larger diameter tool than would normally cut the part. Make your slot depth 1 to 1.5 times the cutter diameter.
4. A gasket groove must be cut next inside the part profile to create a vacuum seal. The groove should be 1/2 the gasket material thickness to allow for proper compression.
5. A grid pattern must then be cut inside the gasket groove to distribute the vacuum evenly through out the vacuum area.
6. Drill holes throughout the pattern in the intersections of the vacuum grid until there is no resistance on your vacuum gage on the machine table.
7. Seal the board using rubberized coatings, polyurethane sealers or a sanding sealer to prevent vacuum from passing through the board in unwanted areas.
8. Apply the gasket tape.

These operations sound time consuming. It will be for your first board. Once you become familiar making these fixtures, you will make up for it in your cycle time reductions and part finish. A lot of headaches and problems can be resolved by using the proper work holding.

RAISED SPOILBOARD

This is generally used where secondary operations are needed and the spoilboard will interfere with the secondary tool. Raised spoilboards are another type of fixturing that works well for routing parts such as circles from squares where the scrap or fall off is of such a size to be potentially harmful to the tool and or operator when it is cut free. A raised spoilboard should make sure the fall off would not interfere with the first and second tool and that the fall off would be free and clear of the tool path.

SPOILBOARD PREPARATION

GOOD PART HOLDING IS ESSENTIAL FOR ROUTING PRODUCTS AND THE FOLLOWING STEPS WILL ensure you properly surface your new spoilboard to get maximum air flow.

1. Place your new sheet of MDF on the router table.
2. Turn on your vacuum
3. Use the 91-100 series spoilboard cutter and surface the top edge.
4. Flip over the sheet of MDF and turn the vacuum on again
5. Surface the top side.
6. Tape or seal the edges of the spoilboard to prevent air leakage.

The following benefits will be achieved if you surface your spoilboard daily:

- A level spoilboard allows for consistent cuts
- Removes grooves caused by routing
- Reduce vacuum loss due to clogged pores a the material surface due to dust and chips
- Preventing material warpage caused by humidity in summer time

Technical Data

COLLETING

COLLET LIFE SPAN

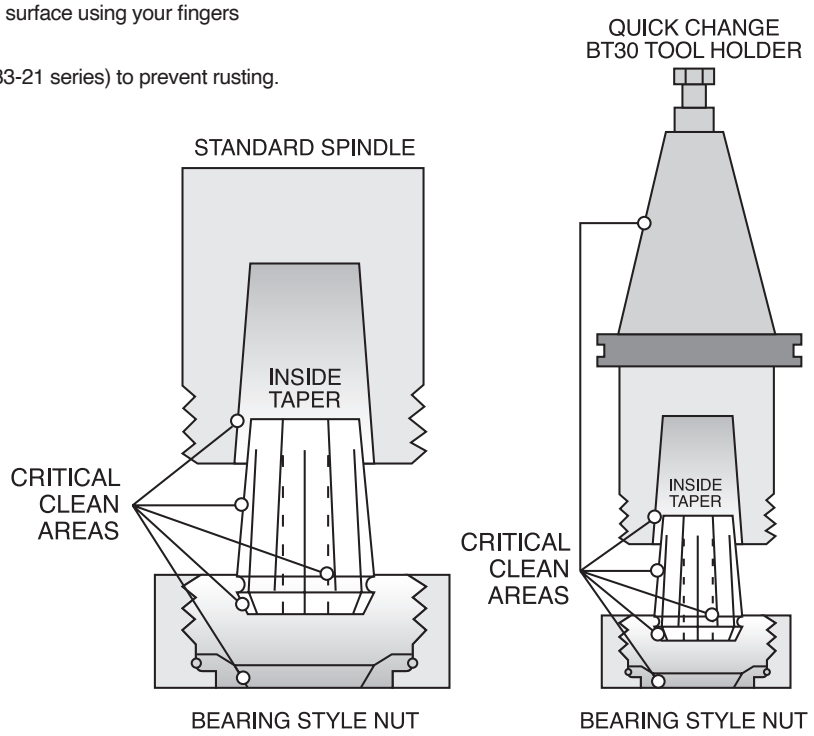
Collets have a life span of 3 months if used 8 hours a day. Replacing the collets will ensure your operation runs consistently and prevents tool breakage. When inserting a tool into the collet make sure the flute fadeout does not enter the collet. This will cause run out and potentially lead to tool breakage. To ensure proper clamping, the tool shank should fill, at the minimum, 80% of the depth of the collet. If this can not be achieved, use a collet life plug (34-50 series) to ensure a proper clamping effect.

COLLET MAINTENANCE

Cleaning is an essential part of collet maintenance. As material is cut it causes the collet, tool holder, collet nut and spindle to become dirty. This causes your tool to cut in an elliptical fashion which will decrease tool life and cause inconsistency in your operation. Collets, tool holder, and collet nut should be cleaned daily using the Rust Free solvent and a brass brush (33-21 and 33-10 series). Refer to the critical areas diagram to see which surfaces must be clean.

CLEANING INSTRUCTIONS

1. Spray the cleaner on the surface and allow it to soak for a minute.
2. Use a brass brush to clean the surface thoroughly.
3. Rinse off using distilled alcohol. Feel the surface using your fingers to make sure the surface is clean.
4. Apply a small amount of Lubricant T-9 (33-21 series) to prevent rusting.



TOOL BREAKAGE

If a condition arises where multiple tools should break, follow these steps to solve your problem:

1. Are you using the proper tool for the job?
2. Make sure your collets and tool holders are clean and the tool is colleted properly.
3. Check your speed and feed (is your tool hot?)
4. Is your depth of cut too excessive for the material you are cutting?
5. Do you have any part movement?
6. Do you have ample part hold down?
7. Stop running parts and check with your distributor or LMT Onsrud's Technical Support.

If you have to contact your distributor or Technical Support, have the following information:

1. Machine being used.
2. Material being cut.
3. Part number of tool along with the batch number which is below the part number etched on shank of tool.
4. Speed / Feed / Depth of cut.
5. Where did the tool break (flute, shank, or in the collet)?
6. How long did the tool work before it broke?
7. Have you done this operation in the past using this tool?

Technical Data

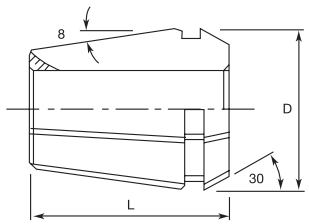
COLLET MEASURING GUIDE

The best way to tell what type of collet the machine has is to measure the length of the collet. Almost all collets have a distinctive length and diameter.

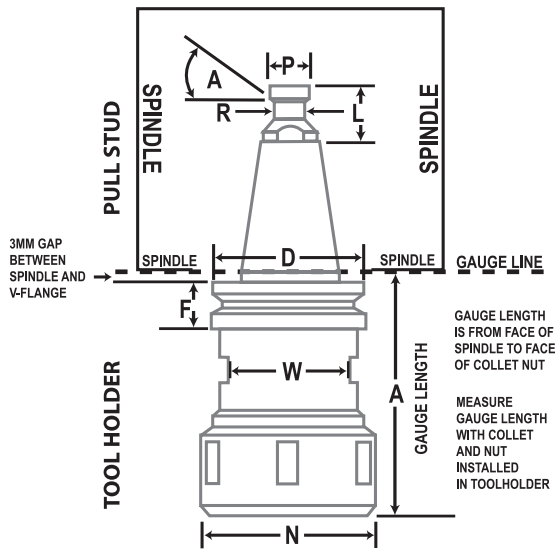
Collet Series	Length	(OD) Diameter	Onsrud Series	Page
ER 11	18mm (0.708")	11.5mm (0.45")	34-60	–
ER 16	27.5mm (1.08")	17mm (0.67")	34-70	–
ER 20	31.5mm (1.24")	21mm (0.83")	34-90/ 34-300	–
ER 25	34mm (1.34")	26mm (1.02")	34-150/34-350	–
ER 32	40mm (1.57")	33mm (1.3")	34-200/34-400	–
ER 40	46mm (1.81")	41mm (1.61")	34-250/34-450	–
ER 50	60mm (2.36")	52mm (2.05")	–	–
EOC 8	26mm (1.026")	14.4mm (0.567")	–	–
SYOZ 20-RDO 20-407E-EOC12	34mm (1.34")	20mm (0.78")	34-550	–
EOC 16-RDO 25	40mm (1.57")	25.5mm (1")	–	–
SYOZ 25-RDO 35-462E	52mm (2.06")	35mm (1.38")	34-550	–
EOC 32	60mm (2.36")	43.7mm (1.72")	–	–
TG 75	47mm (1.85")	27mm (1.06")	–	–
TG 100	60mm (2.36")	35mm (1.38")	–	–
Shoda Collets				
Shoda 20mm	52mm (2.06")	20mm (Back side)	–	–
Shoda Piggyback	52mm (2.06")	16mm (Back side)	–	–
Super Shoda	40mm (1.58")	23.5mm 0.925" (OD)	–	–
Shoda 24mm	52mm (2.06")	24mm (Back side)	–	–
SS-18	30mm (1.18")	19.5mm (.766")	–	–
Heian Collets				
HN-24mm	55mm (2.16")	24mm(1.14")(Back side)	–	–
HN-29mm	55mm (2.16")	24mm(1.14")(Back side)	–	–
HN-Piggyback	36.5mm (1.43")	22mm (.886")	–	–
Pin Router Collets				
A421-69	43.62mm (1.72")	28mm (1.1")	–	–
A450-	41.3mm (1.62")	36mm (1.41")	–	–

TOOL HOLDER MEASURING GUIDE

Use this guide for measuring your tools to determine what you need to re-order.



ER Series Collet



Toolholder Dimensions

D = _____

F = _____

W = _____

A = _____

N = _____

Pull Stud Dimensions

P = _____

A = _____

L = _____

R = _____

Collet Dimensions

D = _____

L = _____

Soft Wood Cutting Data Recommendations

SW

Application	Good	Better	Best
Single Pass	52-200/57-200	60-300/60-350	60-100C
Roughing	52-200/57-200	60-800/60-900	60-000
Finishing		60-300/60-350	60-200

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1-1/8	1-1/4	1-1/2	113/4	2
10-00	1 x D	.004-.006	.004-.006	.005-.007				.007-.009		.008-.010												
37-00/37-20	Varies							.004-.006														
37-50	1/2 x D					.003-.006		.003-.006		.003-.006												
37-60	1/2 x D									.004-.006		.004-.006			.006-.008		.008-.010					
37-80	Varies																.004-.006		.004-.006*			.004-.006**
40-50	1 1/2 X D											.003-.005										
40-000	1 x D			.002-.004	.002-.004	.003-.005		.004-.006	.004-.006	.005-.007												
40-100	1 x D			.005-.007		.005-.007	.005-.007	.006-.008	.006-.008	.007-.009		.008-.010			.010-.012							
52-200/ 57-200	1 x D			.006-.008	.006-.008	.006-.008	.006-.008	.007-.009	.007-.009	.008-.010	.008-.010	.009-.011	.009-.011	.010-.012	.011-.013							
52-400/ 57-400	1 x D				.006-.008	.006-.008		.007-.009	.007-.009	.008-.010		.009-.011										
52-900	1 x D							.007-.009		.008-.010		.009-.011										
57-200MD	1 x D							.009-.011		.010-.012		.011-.013										
56-200	1 x D			.004-.006	.004-.006	.005-.007	.005-.007	.006-.008	.006-.008	.007-.009		.008-.010			.010-.012							
57-900	1 x D							.007-.009		.008-.010		.009-.011										
60-000 (LH)	1 x D									.013-.015		.015-.017		.017-.019	.019-.021							
60-000 (HH)	1 x D									.016-.018		.018-.020		.020-.022	.022-.024							
60-090	1 x D													.005-.007								
60-100MW	1 x D			.011-.013		.013-.015		.018-.020		.020-.022		.022-.024		.024-.026	.026-.028							
60-100C	1 x D									.024-.026		.026-.028		.028-.030	.030-.032							
60-100MC	1 x D									.019-.021		.021-.023										
60-100PLR	1 x D									.021-.023		.023-.025										
60-200	1 x D							.005-.007		.006-.008		.007-.009			.008-.010							
60-300	1 x D									.024-.026		.026-.028		.028-.030	.030-.032							
60-350	1 x D									.017-.019		.019-.021			.021-.023							
60-600	1 x D											.019-.021			.023-.025							
60-700	1 x D											.019-.021		.021-.023	.023-.025							
60-800	1 x D									.017-.019		.019-.021		.021-.023	.023-.025							
60-900	1 x D									.017-.019		.018-.020										
60-950	1 x D									.024-.026		.026-.028										
61-000	1 x D			.008-.010	.008-.010	.009-.011	.009-.011	.010-.012	.010-.012	.011-.013	.011-.013	.012-.014										
61-200	1 x D			.008-.010				.010-.012	.010-.012	.011-.013		.012-.014										
63-200	1 x D			.003-.005				.005-.007														
64-000/ 65-000	1 x D	.001-.003		.002-.004		.003-.006		.004-.006		.005-.007												
68-100	1 x D									.014-.015		.015-.016										
77-100	1 x D			.003-.005				.005-.007														

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Hard Wood Cutting Data Recommendations

HP

Application	Good	Better	Best
Single Pass	52-200/57-200	60-300/60-350	60-100C
Roughing	52-200/57-200	60-800/60-900	60-000
Finishing		60-300/60-350	60-200

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
37-00/37-20	Varies							.004-.006														
37-50	1/2 CED					.003-.006		.003-.006		.003-.006												
37-60	1/2 CED									.004-.006		.004-.006			.006-.008		.008-.010					
37-80	Varies																.004-.006		.004-.006*			.004-.006**
40-50	1 1/2											.003-.005										
40-000	1 x D			.006-.008	.006-.008	.007-.009		.008-.010	.008-.010	.009-.007												
40-100	1 x D			.004-.006		.005-.007	.005-.007	.005-.007	.006-.008	.006-.008		.007-.009			.009-.011							
48-000	1 x D					.004-.006		.005-.007	.005-.007	.005-.007		.006-.008		.007-.009	.008-.010	.009-.011	.010-.012					
52-200/ 57-200	1 x D			.003-.005	.003-.005	.004-.006	.004-.006	.005-.007	.005-.007	.006-.008	.006-.008	.007-.009	.007-.008	.008-.010	.009-.011							
52-700	1 x D			.002-.004		.003-.005		.004-.006		.005-.007		.006-.008		.007-.009	.008-.010		.009-.011					
57-200MD	1 x D							.009-.011		.010-.012		.011-.013										
52-400/ 57-400	1 x D				.004-.006	.004-.006		.005-.007	.005-.007	.006-.008		.007-.009										
52-900	1 x D							.006-.008		.007-.009		.007-.009										
56-200	1 x D			.003-.005	.003-.005	.004-.006	.004-.006	.005-.007	.005-.007	.006-.008		.007-.009			.009-.011							
57-900	1 x D							.005-.007		.006-.008		.007-.009										
60-000 (LH)	1 x D									.013-.015		.014-.016		.016-.018	.017-.019							
60-000 (HH)	1 x D									.015-.017		.017-.019		.019-.021	.021-.023							
60-090	1 x D													.005-.007								
60-100MW	1 x D			.010-.012		.012-.014		.014-.016		.016-.018		.018-.020		.020-.022	.022-.024							
60-100C	1 x D									.019-.021		.021-.023		.023-.025	.025-.027							
60-100MC	1 x D									.019-.021		.021-.023										
60-100PLR	1 x D									.021-.023		.023-.025										
60-200	1 x D							.005-.007		.006-.008		.007-.009			.008-.010							
60-300	1 x D									.024-.026		.026-.028		.028-.030	.030-.032							
60-350	1 x D									.018-.020		.020-.022		.022-.025	.024-.026							
60-600	1 x D											.018-.020			.022-.024							
60-700	1 x D											.018-.020		.020-.022	.022-.024							
60-800	1 x D									.017-.019		.019-.021		.021-.023	.023-.025							
60-900	1 x D									.015-.017		.017-.019			.019-.021							
60-950	1 x D									.019-.021		.021-.023										
61-200	1 x D			.007-.009				.009-.011	.009-.011	.010-.012												
63-200	1 x D			.003-.005				.005-.007														
64-000/ 65-000	1 x D	.001-.003		.002-.004		.003-.005		.004-.006		.005-.007												
68-100	1 x D									.010-.012		.011-.013		.012-.014	.013-.015							
77-100	1 x D			.003-.005				.005-.007														

* = 16,000 RPM
** = 15,000 RPM

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

MDF Cutting Data Recommendations

CW

Application	Good	Better	Best
Single Pass	52-200/57-200	60-100MW	60-100C
Roughing		60-800	60-000
Finishing			60-200

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
37-00/37-20	Varies							.004-.006														
37-50	1/2 CED					.003-.006		.003-.006		.003-.006												
37-60	1/2 CED									.004-.006		.004-.006			.006-.008		.008-.010					
37-80	Varies																.004-.006		.004-.006*			.004-.006**
40-50	1 1/2											.003-.005										
47-00	1 x D															.004-.006			.004-.006	.004-.006		
48-000	1 x D					.004-.006		.005-.007	.005-.007	.005-.007		.006-.008		.006-.008	.007-.009	.008-.010	.009-.011					
52-200/ 57-200	1 x D			.005-.007	.005-.007	.006-.008	.006-.008	.006-.008	.006-.008	.007-.009	.007-.009	.008-.010	.008-.010	.009-.011	.009-.011							
57-200MD	1 x D							.009-.011		.010-.012		.011-.013										
52-400/ 57-400	1 x D				.003-.005	.004-.006		.005-.007	.005-.007	.006-.008		.008-.010	.009-.011	.010-.012	.011-.013	.012-.014						
52-900	1 x D							.006-.008		.007-.009		.008-.010										
56-200	1 x D			.003-.005	.003-.005	.004-.006	.004-.006	.005-.007	.005-.007	.006-.008		.007-.009			.009-.011							
57-900	1 x D							.006-.008		.007-.009		.008-.010										
60-000 (LH)	1 x D									.012-.014		.013-.015		.014-.016	.016-.018							
60-000 (HH)	1 x D									.017-.019		.018-.020		.020-.022	.023-.025							
60-090	1 x D													.004-.006								
60-100MW	1 x D			.010-.012		.010-.012		.013-.015		.014-.016		.016-.018		.018-.020	.019-.021							
60-100C	1 x D									.017-.019		.018-.020		.020-.022	.023-.025							
60-100MC	1 x D									.019-.021		.021-.023										
60-100PLR	1 x D									.021-.023		.023-.025										
60-200	1 x D							.004-.006		.005-.007		.005-.007			.006-.008							
60-300	1 x D									.017-.019		.018-.020		.020-.022	.023-.025							
60-350	1 x D									.014-.016		.016-.018		.017-.019	.019-.021							
60-600	1 x D											.020-.022		.022-.024	.024-.026							
60-700	1 x D											.020-.022		.022-.024	.024-.026							
60-800	1 x D									.017-.019		.019-.021		.021-.023	.023-.025							
60-900	1 x D									.017-.019		.019-.021										
60-950	1 x D									.017-.019		.018-.020										
61-200	1 x D			.007-.009		.008-.010		.009-.011	.009-.011	.010-.012		.011-.013										
63-200	1 x D			.003-.005				.005-.007														
64-000/ 65-000	1 x D	.001-.003		.002-.004		.003-.005		.004-.006		.005-.007												
68-100	1 x D									.008-.010		.012-.014		.015-.017	.018-.020							
77-100	1 x D			.003-.005				.005-.007														

* = 16,000 RPM
** = 15,000 RPM

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Soft Plywood Cutting Data Recommendations

CW

Application	Good	Better	Best
Single Pass	52-200/57-200	60-100MW	60-100C
Roughing		60-800	60-000
Finishing			60-200

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1-1/8	1-1/4	1-1/2	2
37-00/37-20	Varies						.004-.006													
37-50	1/2 x D				.003-.006		.003-.006		.003-.006											
37-60	1/2 x D								.004-.006		.004-.006			.006-.008		.008-.010				
37-80	Varies															.004-.006		.004-.006*		.004-.006**
40-50	1 1/2 x D										.003-.005									
48-000	1 x D				.005-.007		.005-.007	.006-.008	.006-.008		.007-.009		.008-.010	.009-.011	.010-.012	.011-.013				
52-200/ 57-200	1 x D		.005-.007	.005-.007	.006-.008	.006-.008	.006-.008	.006-.008	.007-.009	.007-.009	.008-.010	.008-.010	.009-.011	.009-.011						
52-900	1 x D						.006-.008		.007-.009		.008-.010									
56-200	1 x D		.003-.005	.003-.005	.004-.006	.004-.006	.005-.007	.005-.007	.006-.008		.007-.009			.009-.011						
57-200MD	1 x D						.009-.011		.010-.012		.011-.013									
60-000 (LH)	1 x D								.014-.016		.016-.018		.018-.020	.020-.022						
60-000 (HH)	1 x D								.017-.019		.019-.021		.021-.023	.023-.025						
60-090	1 x D												.003-.005							
60-100MW	1 x D		.013-.015		.014-.016		.017-.019		.019-.021		.021-.023		.023-.025	.025-.027						
60-100C	1 x D								.022-.024		.024-.026		.026-.028	.028-.030						
60-100MC	1 x D								.019-.021		.021-.023									
60-100PLR	1 x D								.021-.023		.023-.025									
60-300	1 x D								.022-.024		.024-.026		.026-.028	.028-.030						
60-350	1 x D								.020-.022		.022-.024		.024-.026	.026-.028						
60-600	1 x D										.028-.030		.030-.032	.032-.034						
60-700	1 x D										.028-.030		.030-.032	.032-.034						
60-800	1 x D								.017-.019		.019-.021		.021-.023	.023-.025						
60-900	1 x D								.017-.019		.019-.021									
60-950	1 x D								.022-.024		.024-.026									
61-200	1 x D		.006-.008		.007-.009		.008-.010	.008-.010	.009-.011		.010-.012									
63-200	1 x D		.003-.005				.005-.007													
64-000/ 65-000	1 x D	.001-.003	.002-.004		.003-.005		.004-.006		.005-.007											
68-100									.010-.012		.012-.014		.017-.019	.018-.020						

* = 16,000 RPM
** = 15,000 RPM

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Hard Plywood Cutting Data Recommendations

CW

Application	Good	Better	Best
Single Pass	60-100MW	60-100C	60-100MC
Roughing		60-800	60-000

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
37-00/37-20	Varies							.004 -.006														
37-50	1/2 x D					.003-.006		.003-.006		.003-.006												
37-60	1/2 x D									.004-.006		.004-.006			.006-.008		.008-.010					
37-80	Varies																.004-.006		.004-.006*			.004-.006**
40-50	1 1/2											.003-.005										
48-000	1 x D					.004 -.006		.005-.007	.005-.007	.006-.008		.007-.009		.008-.010	.009-.011	.010-.012	.011-.013					
52-200	1 x D			.005-.007	.005-.007	.006-.008	.006-.008	.006-.008	.006-.008	.007-.009	.007-.009	.008-.010	.008-.010	.009-.011	.009-.011							
52-900	1 x D							.006-.008		.007-.009		.008-.010										
56-200	1 x D			.003-.005	.003-.005	.004-.006	.004-.006	.005-.007	.005-.007	.006-.008		.007-.009			.009-.011							
57-200	1 x D			.005-.007	.005-.007	.006-.008	.006-.008	.006-.008	.006-.008	.007-.009	.007-.009	.008-.010	.008-.010	.009-.011	.009-.011							
57-200MD	1 x D							.009-.011		.010-.012		.011-.013										
60-000 (LH)	1 x D									.014-.016		.016-.018		.018-.020	.020-.022							
60-000 (HH)	1 x D									.017-.019		.019-.021		.021-.023	.023-.025							
60-090	1 x D													.003-.005								
60-100MW	1 x D			.012-.014		.012-.014		.014-.016		.016-.018		.018-.020		.020-.022	.022-.024							
60-100C	1 x D									.019-.021		.021-.023		.023-.025	.025-.027							
60-100MC	1 x D									.019-.021		.021-.023										
60-100PLR	1 x D									.021-.023		.023-.025										
60-300	1 x D									.019-.021		.021-.023		.023-.025	.025-.027							
60-350	1 x D									.018-.020		.020-.022		.022-.025	.024-.026							
60-600	1 x D											.027-.029		.030-.032	.032-.034							
60-700	1 x D											.027-.029		.029-.031	.032-.034							
60-800	1 x D									.017-.019		.019-.021		.021-.023	.023-.025							
60-900	1 x D									.017-.019		.019-.021										
60-950	1 x D									.019-.021		.021-.023										
61-200	1 x D			.005-.007				.007-.009	.007-.009	.008-.010		.009-.011										
63-200	1 x D			.003-.005				.005-.007														
64-000/ 65-000	1 x D	.001-.003		.002-.004		.003-.005		.004-.006		.005-.007												
68-100	1 x D									.010-.012		.012-.014		.017-.019	.018-.020							
77-100				.003-.005				.005-.007														

* = 16,000 RPM
** = 15,000 RPM

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Laminated Chipboard Cutting Data Recommendations

LW

Application	Good	Better	Best
Single Pass	60-100MW	60-100MC	60-100PLR

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/8	3/16	7/32	1/4	5/16	3/8	1/2	9/16	5/8	3/4	7/8	1	1-1/8	1-1/4	1-1/2	2
37-00/37-20	Varies				.004-.006												
37-50	1/2 CED		.003-.006		.003-.006		.003-.006										
37-60	1/2 CED						.004-.006		.004-.006			.006-.008					
37-80	Varies												.004-.006			.004-.006	.004-.006
48-000	1 x D				.006-.008	.006-.008	.007-.009	.008-.010		.009-.011	.010-.012	.011-.013	.012-.014				
57-200		.003-.005	.003-.005	.004-.006	.004-.006	.005-.007	.005-.007	.006-.008		.007-.009	.007-.008						
57-200MD					.009-.011		.010-.012	.011-.013									
60-100MW	1 x D	.013-.015	.014-.016		.017-.019		.019-.021	.021-.023		.025-.027	.027-.029						
60-100C	1 x D						.022-.024	.024-.026		.026-.028	.028-.030						
60-100MC	1 x D						.019-.021	.021-.023									
60-100PLR	1 x D						.021-.023	.023-.025									
60-600	1 x D							.028-.030		.030-.032	.032-.034						
68-100	1 x D						.008-.010	.012-.014		.016-.018	.019-.021						

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Laminated Plywood Cutting Data Recommendations

CW

Application	Good	Better	Best
Single Pass	60-100MW	60-100MC	60-100PLR

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
37-00/37-20	Varies							.004-.006														
37-50	1/2 CED					.003-.006		.003-.006		.003-.006												
37-60	1/2 CED									.004-.006		.004-.006			.006-.008		.008-.010					
37-80	Varies																.004-.006			.004-.006		.004-.006
48-000	1 x D					.004-.006	.005-.007	.005-.007	.006-.008	.006-.008		.007-.009		.009-.011	.010-.012	.011-.013	.012-.014					
57-200	1 x D			.003-.005	.003-.005	.004-.006	.004-.006	.005-.007	.005-.007	.006-.008		.007-.009	.007-.008									
57-200MD	1 x D						.009-.011		.010-.012	.011-.013												
60-100MW	1 x D			.013-.015		.014-.016		.015-.017		.016-.018		.018-.020		.019-.021	.021-.023							
60-100C	1 x D									.019-.021		.021-.023		.023-.025	.025-.027							
60-100MC	1 x D						.018-.020			.019-.021		.021-.023										
60-100PLR	1 x D									.021-.023		.023-.025										
60-600	1 x D											.027-.029		.030-.032	.032-.034							
68-100	1 x D									.008-.010		.012-.014		.016-.018	.019-.021							

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Soft Plastic Cutting Data Recommendations

SP

< 1/2 DIAMETER TOOL

Application	Good	Better	Best
Single Pass	61-000P	65-000	63-750
Roughing			60-000

≥ 1/2 DIAMETER TOOL

Application	Good	Better	Best
Single Pass	56-600	52-600	52-700
Roughing			60-000

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
10-00	1 x D	.002-.004		.004-.006		.006-.008		.006-.008		.007-.009		.008-.010										
37-00/37-20	Varies							.004-.006														
37-50*	1 x D					.003-.006		.003-.006		.003-.006												
37-60*	1 x D									.004-.006		.004-.006			.006-.008		.008-.010					
52-200B/BL	1 x D	.002-.004		.002-.004		.004-.006		.004-.006		.004-.006		.006-.008		.010-.012	.012-.014							
52-600	1 x D							.008-.010		.010-.012		.012-.014		.014-.016	.016-.018							
52-700	1 x D											.012-.014		.014-.016	.016-.018							
56-430	1 x D			.004-.006		.006-.008		.007-.009		.008-.010		.009-.011										
56-600	1 x D			.004-.006		.006-.008		.008-.010		.010-.012		.012-.014										
57-600	1 x D							.008-.010		.010-.012		.012-.014		.014-.016	.016-.018							
60-000	1 x D									.004-.006		.006-.008		.008-.012	.012-.016							
60-200	1 x D							.004-.006		.004-.006		.006-.010			.012-.016							
60-900	1 x D									.004-.006		.006-.008										
61-000P	1 x D			.004-.006		.006-.008		.008-.012		.014-.018		.018-.022										
61-400	1 x D			.004-.006		.006-.008		.008-.012		.014-.018		.018-.022										
62-750	1 x D			.004-.006		.006-.008		.008-.012		.008-.012		.010-.014										
62-850	1 x D			.004-.006		.006-.008		.008-.012		.008-.012		.010-.014										
63-500	1 x D	.002-.004		.004-.006		.005-.007		.006-.008		.007-.009												
63-750	1 x D	.002-.004		.004-.006		.006-.008		.008-.012		.008-.012		.010-.014										
63-850	1 x D	.002-.004		.004-.006		.006-.008		.008-.012		.008-.012		.010-.014										
64-000/ 65-000	1 x D	.002-.004		.004-.006		.006-.008		.008-.012		.008-.012												
65-200B/ 65-300B	1 x D	.002-.003		.002-.003		.003-.004		.003-.005	.003-.005	.004-.006		.006-.008										
66-000	1 x D							.004-.008		.004-.008		.004-.008										
66-200	1 x D							.004-.006		.006-.008												
66-300	1 x D			.002-.004				.004-.006		.006-.008		.006-.008										
77-100 (DE)	1 x D			.005-.007																		
77-100 (3E)	1 x D							.008-.010														

* = 12,500 RPM

NOTE: To eliminate rewelding increase the feedrate or change to a single edge tool. If using a downcut spiral and chip rewelding occurs, cut a slot in your spoilboard to allow the chips a place to expand. Incorrect chiploads can lead to knife marks occurring.

FORMULAS: Chip Load = Feed Rate /(RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Series	Depth Of Cut x Dia	Starting Rpm	Chip Load Per Tooth		
			3/16	1/4	3/8
65-100	3x dia	18,000	.007-.009	–	–
65-100	3x dia	13,500	–	.007-.009	–
65-100	3x dia	9,000	–	–	.007-.009
65-100	5x dia	18,000	.005-.007	–	–
65-100	5x dia	13,500	–	.005-.007	–
65-100	5x dia	9,000	–	–	.005-.007
65-100	7x dia	18,000	.003-.005	–	–
65-100	7x dia	13,500	–	.003-.005	–
65-100	7x dia	9,000	–	–	.003-.005

Hard Plastic Cutting Data Recommendations

HP

< 1/2 DIAMETER TOOL

Application	Good	Better	Best
Single Pass	56-000P	65-000	63-700
Roughing			60-000
Finishing			60-200

≥ 1/2 DIAMETER TOOL

Application	Good	Better	Best
Single Pass	56-000P	52-600	30-200
Roughing			60-000
Finishing			60-200

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
37-00/37-20	Varies							.004-.006														
37-50	1 x D					.003-.006		.003-.006		.003-.006												
37-60	1 x D									.004-.006		.004-.006			.006-.008		.008-.010					
52-200B/BL	1 x D	.002-.004		.002-.004		.004-.006		.004-.006		.004-.006		.006-.008		.008-.010	.010-.012							
52-600	1 x D							.006-.008		.008-.010		.010-.012		.012-.014	.014-.016							
56-000	1 x D			.002-.004		.004-006		.004-.006	.004-.006			.008-.010										
56-000P	1 x D			.002-.004		.004-006		.004-.006		.006-.008		.008-.010										
56-430	1 x D			.005-.007		.005-.007		.006-.008		.007-.009		.008-.010										
56-450	1 x D					.005-.007		.006-.008		.007-.009		.008-.010										
56-600	1 x D			.003-.005		.005-.007		.007-.009		.009- .011		.011-.013										
57-600	1 x D							.006-.008		.008-.010		.010-.012										
60-000	1 x D									.004-.006		.006-.008		.008-.012	.012-.016							
60-200	1 x D							.004-.006		.004-.006		.006-.010			.012-.016							
60-900	1 x D									.004-.006		.006-.008										
61-000P	1 x D			.003-.005		.005-.007		.007-.011		.013-.017		.017-.021										
61-400	1 x D			.003-.005		.005-.007		.007-.011		.013-.017		.017-.021										
62-700	1 x D			.006-.008		.008-.010		.010-.012		.010-.012		.012-.016										
62-750	1 x D			.004-.006		.006-.008		.008-.012		.008-.012		.010-.014										
62-800	1 x D			.006-.008		.008-.010		.010-.012		.010-.012		.012-.016										
62-850	1 x D			.004-.006		.006-.008		.008-.012		.008-.012		.010-.014										
63-500	1 x D	.002-.004		.003-.005		.003-.005		.004-.006		.005-.007												
63-700	1 x D	.002-.004		.006-.008		.008-.010		.010-.012		.010-.012		.012-.016										
63-750	1 x D	.002-.004		.004-.006		.006-.008		.008-.012		.008-.012		.010-.014										
63-800	1 x D	.002-.004		.006-.008		.008-.010		.010-.012		.010-.012		.012-.016										
63-850	1 x D	.002-.004		.004-.006		.006-.008		.008-.012		.008-.012		.010-.014										
64-000/ 65-000	1 x D	.002-.004		.006-.008		.008-.010		.010-.012		.010-.012												
66-000	1 x D							.004-.008		.004-.008		.004-.008										
66-200	1 x D							.004-.006		.006-.008												
66-300	1 x D			.002-.004				.004-.006		.006-.008		.006-.008										
77-100 (DE)	1 x D			.005-.007																		
77-100 (3E)	1 x D							.008-.010														

NOTE: When chip rewelding occurs while cutting plastic, increase feedrate or go to a single edge tool. Incorrect chiploads can result in cratering.

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Aluminum Cutting Data Recommendations

A

Application	Good	Better	Best
BLOCK			
Single Pass	63-600	AMC 2 Flute	AMC 3 Flute
Roughing	AMC 2 Flute	AMC 3 Flute	AMC Rougher
Finishing		66-300	AMC
Slotting	63-600	AMC 2 Flute	AMC 3 Flute
Profile/Shape		52-200B	AMC
SHEET			
Single Pass	61-000	65-000	63-600
EXTRUSION			
Single Pass	63-600	81-000	81-100

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

To view our complete line of **AMC Tools**, reference our **Milling Tools Catalog** which is available at www.onsrud.com

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
37-00/37-20	Varies							.004-.006														
37-70	Varies							.004-.006														
40-000*	1 x D			.005-.007		.005-.007		.006-.008	.006-.008	.007-.009												
40-100	1 x D			.001-.003		.001-.003		.002-.004	.002-.004	.003-.005		.004-.008			.006-.008							
49-000	1 x D			.001-.003						.003-.005												
52-000	1 x D			.003-.005		.003-.005		.004-.006		.006-.008		.010-.012										
52-200B/BL	1 x D	.002-.004		.003-.005		.003-.005		.004-.006		.006-.008		.010-.012		.012-.014	.014-.016							
57-000*	1 x D			.003-.005		.003-.005		.004-.006		.006-.008		.010-.012										
61-000	1 x D			.001-.003		.002-.005		.002-.005		.003-.007		.007-.009										
62-600	1 x D	.002-.004		.002-.004		.003-.006		.003-.006	.003-.006	.004-.008		.008-.010										
63-600	1 x D	.002-.004		.002-.004		.003-.006		.003-.006	.003-.006	.004-.008		.008-.010										
63-6000NX	1 x D	.002-.004		.002-.004		.003-.006		.003-.006	.003-.006	.003-.006												
63-900	1 x D	.002-.004		.002-.004		.003-.006		.003-.006	.003-.006	.004-.008		.008-.010										
64-000/ 65-000	1 x D	.002-.004		.002-.004		.003-.006		.003-.006		.004-.008												
66-300	1 x D			.002-.004				.004-.006		.006-.008		.006-.008										
77-100	1 x D			.002 -.004				.003-.005														
80-000	1 x D			.001-.003																		
81-000	1 x D								.004-.006	.004-.006												
81-100	1 x D								.002-.005	.003-.008		.003-.008										

* = 16,000 RPM

NOTE: When chip rewelding occurs while cutting plastic, increase feedrate or go to a single edge tool. Incorrect chiploads can result in cratering.

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Solid Surface Cutting Data Recommendations

SSP

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
37-50	1 x D					.003-.006		.003-.006		.003-.006							
37-60	1 x D									.004-.006		.004-.006			.006-.008		.008 -.010
52-000	1 x D			.003-.006		.003-.006		.004-.006		.008-.010		.012-.014					
52-200B/BL	1 x D	.002-.004		.002-.004		.002-.004		.004-.006		.004-.006		.006-.008		.008-.010	.010-.012		
52-600	1 x D							.004-.006		.006-.008		.008-.010		.008-.010	.010-.012		
52-700	1 x D			.002-.004		.003-.005		.004-.006		.005-.007		.006-.008		.007-.009	.008-.010		.009-.011
56-000P	1 x D			.002-.004		.002-.004		.004-.006		.006-.008		.008-.010					
56-450	1 x D			.002-.004		.002-.004		.003-.005		.004-.006		.005-.007					
57-000	1 x D			.002-.004		.002-.004		.003-.005		.004-.006		.005-.007					
57-600	1 x D							.004-.006		.006-.008		.008-.010		.008-.010	.010-.012		
60-200	1 x D							.002-.004		.002-.006		.002-.006		.004-.008			
62-700	1 x D			.002-.004		.004-.006		.006-.010		.006-.010		.010-.012					
62-750	1 x D			.002-.004		.004-.006		.006-.010		.006-.010		.010-.012					
62-800	1 x D			.002-.004		.004-.006		.006-.010		.006-.010		.010-.012					
62-850	1 x D			.002-.004		.004-.006		.006-.010		.006-.010		.010-.012					
63-700	1 x D	.002-.003		.002-.004		.004-.006		.006-.010		.006-.010		.010-.012					
63-750	1 x D	.002-.003		.002-.004		.004-.006		.006-.010		.006-.010		.010-.012					
63-800	1 x D	.002-.003		.002-.004		.004-.006		.006-.010		.006-.010		.010-.012					
63-850	1 x D	.002-.003		.002-.004		.004-.006		.006-.010		.006-.010		.010-.012					
64-000/ 65-000	1 x D	.002-.004		.006-.008		.008-.010	.010-.012	.010-.012		.010-.012							
66-000	1 x D							.002-.004		.003-.005		.004-.006					

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

Drill Cutting Data Recommendations

D

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series		SFM	3	1/8	3/16	5	6	1/4	5/16	8	3/8	7/16	1/2	5/8	3/4	7/8	1
67-800	Composites	230		.001-.003	.001-.003			.002-.004	.002-.004		.003-.005	.003-.005	.003-.005				
68-900	Composites	230		.001				.0015			.0015		.0015				
70-500	Plastic	200		.019-.021				.021-.023			.023-.025		.025-.027				
72-000*	Wood		.009-.011			.011-.013	.013-.015			.015-.017							
85-800	Composites	230		.0005	.0005			.001	.001		.0015		.001				
86-150	Composites	150-250		.001	.001			.0015			.0015		.0015				

*Gang drills run at 4,500 RPM and 150 IPM

FORMULAS: RPM = (3.82 x SFM) / tool dia.
Feedrate (IPM) = RPM x IPR
IPR = Inches Per Revolution

DEFINITIONS: IPM = Inches Per Minute

Foam Cutting Data Recommendations

F

DEPTH OF CUT: 1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
40-550	1 x D											.004-.006										
48-000	1 x D			.002-.004		.002-.004		.003-.005	.003-.005	.004-.006		.005-.007		.006-.008	.007-.009		0.010					
52-550	1 x D			.002-.004		.002-.004		.004-.006	.004-.006	.004-.006												
52-700	1 x D			.002-.004		.002-.004		.004-.006	.004-.006	.004-.006		.005-.007		.006-.008	.007-.009		0.010					
56-000P	1 x D			.002-.004		.002-.004		.004-.006		.004-.006		.005-.007										
77-100	1 x D			.002-.004				.004-.006														

Honeycomb Technical Data

29-000

HONEYCOMB CORE	ALUMINUM		NOMEX		PAPER	
Part #	**RPM**	**Feed Rate**	**RPM**	**Feed Rate**	**RPM**	**Feed Rate**
29-003 (1/4")	500-4,000	100 IPM	500-10,000	120 IPM	500-10,000	120 IPM
29-006 (3/8")	500-4,000	100 IPM	500-10,000	120 IPM	500-10,000	120 IPM
29-009 (1/2")	500-4,000	100 IPM	500-10,000	120 IPM	500-10,000	120 IPM
29-012 (5/8")	500-4,000	100 IPM	500-10,000	120 IPM	500-10,000	120 IPM
29-015 (3/4")	500-4,000	100 IPM	500-10,000	120 IPM	500-10,000	120 IPM

29-050

SPINDLE SPEED			Core TYPE		SPINDLE SPEED	
DIA	**Max RPM**	**Feed Rate**		**Max Feed Rate**	**Max RPM**	**DIA**
1/4	25,000	NR	Aluminum, less than 5#/cuft	100	25,000	1/4
3/8	25,000	NR	Aluminum, more than 5#/cuft	100	25,000	3/8
1/2	25,000	800	Paper based	400	25,000	1/2
3/4	25,000	800	Paper based w/Fiber Reinforcement	800	25,000	3/4
1	25,000	800	Fiberglass	600		
1-1/2	18,000	800	Phenolic	600		
1-3/4	18,000	NR	Carbon Fiber	800		
2	16,500	100	Aramid, less than 5#/cuft	800		
2-1/2	15,000	100	Aramid, more than 5#/cuft	800		
3	14,000					
4	12,000					

29-100

30-000/ 30-300 30-700 32-200

SPEEDS & FEEDS	FEED RATES				SPINDLE SPEED	
Core Type	**Solid Carbide**	**Solid Carbide w/Teeth**	**Diamond Saw**	**HSS**	**DIA**	**Max rpm**
Aluminum, less than 5#/cuft	100	100	NR	150	1/4	25,000
Aluminum, more than 5#/cuft	100	100	NR	100	3/8	25,000
Paper based	400	400	NR	250	1/2	25,000
Paper based with Fiber Reinforcement	800	800	400	150	3/4	25,000
Fiberglass	600	600	600	NR	1	25,000
Phenolic	200	200	400	NR	1-1/2	18,000
Carbon Fiber	NR	NR	800	NR	1-3/4	18,000
Aramid, less than 5#/cuft	800	800	400	150	2	16,500
Aramid, more than 5#/cuft	800	800	400	NR	2-1/2	15,000
					3	14,000
					4	12,000

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

31-000/ 32-000

SPEEDS & FEEDS	FEED RATES						SPINDLE SPEED	
Core Type	**Solid Carbide**	**Diamond Carbide**	**HSS Saw**	**HSS Wavy**	**HSS (31-000)**	**HSS (31-100)**	**DIA**	**MAX RPM**
Aluminum, less than 5#/cuft	100	NR	150	100	100-140	90-140	3/8	25,000
Aluminum, more than 5#/cuft	100	NR	100	100	70	70	1/2	25,000
Paper based	300	NR	200	300	50	50	3/4	25,000
Paper based w/Fiber Reinforcement	400	300	600	300	100-150	100-150	1	25,000
Fiberglass	NR	600	NR	NR	NR	NR	1-1/2	25,000
Phenolic	NR	600	NR	NR	NR	NR	1-3/4	25,000
Carbon Fiber	NR	800	NR	NR	NR	NR	2	18,000
Aramid, less than 5#/cuft	200	NR	150	200	100-150	100-150	2-1/2	18,000
Aramid, more than 5#/cuft	200	400	NR	NR	NR	NR	3	18,000

34-000

CORE TYPE	Cutter	RPM	Feed Rate Side Cut	Feed Rate Plunge	Cut Direction
Fiberglass panels with paper core (Nomex®)	SC Burr	18,000	440	70	Conventional
Aluminum panels with aluminum core	SC Burr	16,000	180	N/A	Conventional
Paper panels wiht paper core	SC Burr	18,000	440	70	Conventional

Composite Cutting Data Recommendations

CP

Application	GOOD	BETTER	BEST
Carbon Fiber Reinforced Plastic (CFRP)-Finishing	N/A	66-700	68-000
Carbon Fiber Reinforced Plastic (CFRP)-Semi Finishing	66-900	66-775	68-200
Carbon Fiber Reinforced Plastic (CFRP)-Roughing	66-900	66-500	68-300
Glass Fiber Reinforced Plastic (GFRP)-Finishing	54-200	66-700	68-000
Glass Fiber Reinforced Plastic (GFRP)-Semi Finishing	54-200	66-775	68-200
Glass Fiber Reinforced Plastic (GFRP)-Roughing	66-900	66-500	68-300
Phenolic-Finishing	67-200	54-200	68-000
Phenolic-Semi Finishing	67-200	67-255	67-220
Phenolic-Roughing	67-200	66-500	68-200
Kevlar-Finishing	N/A	N/A	68-000
Speciality-Edge Finish	66-800		
Speciality-Contouring	68-400		

DEPTH OF CUT:
1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%

Recommended Chip Load per Tooth by Cutting Diameter (in)

Series	Cut	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
54-200	1 x D			.002-.004		.002-.004		.002-.004		.003-.006		.005-.010										
56-000P	1 x D			.002-.004		.002-.004		.004-.006		.004-.006		.004-.006										
56-450	1 x D					.002-.005		.003-.005	.003-.006	.004-.006		.005-.007										
57-000	1 x D			.003-.005		.003-.005		.004-.006		.006-.008		.010-.012										
66-500	See page 127 for technical data																					
66-700	See page 127 for technical data																					
66-750	See page 127 for technical data																					
66-775	See page 127 for technical data																					
66-800	See page 127 for technical data																					
66-900	1 x D			.002-.004		.002-.004		.004 -. 006		.004-.006		.006-.008										
67-000	1 x D							.004-.006		.004-.006		.004-.006										
67-200	1 x D									.002-.010		.002-.010										
67-220*	1 x D									.001-.002		.001-.002										
67-250	1 x D			.002-.004				.004-.006		.004-.006												
67-400	1 x D			.002-.004				.004-.006		.004-.006		.004-.006										
67-500	1 x D			.001-.003		.001-.003		.002-.004	.002-.004	.003-.005		.004-.006										
68-000*	See page 128 for technical data																					
68-200*	See page 129 for technical data																					
68-300*	See page 129 for technical data																					
68-400	See page 129 for technical data																					

NOTE: *Spindle RPM's generally range from 12,000-16,000 for PCD tools when cutting composite materials.
Consider 66-500, 66-900, 67-000, 67-250, 67-500 series tools as a single flute in speed & feed rate calculations.

FORMULAS: Chip Load = Feed Rate / (RPM x # of cutting edges)
Feed Rate (IPM) = RPM x # of cutting edges x chip load
Speed (RPM) = Feed Rate / (# of cutting edges x chip load)

DEFINITIONS: IPM = Inches Per Minute

RECOMMENDED STARTING	
DIA	RPM
1/8-3/16	10,000-12,000
1/4	8,000-10,000
3/8	6,000-8,000
1/2	4,000-6,000

54-775/66-500/66-600/66-700 Series Cutting Data Recommendations

CP

ISO Grade	Material	Application	Recommended Starting Parameters											
			Rad DOC	Axial DOC	SFM Range	Chip Load Per Tooth							
						SFM Starting 1/8	1/8	SFM Starting 1/4	1/4	SFM Starting 3/8	3/8	SFM Starting 1/2	1/2
54-775 Solid Carbide Low-Helix Rougher-Finisher **Upcut**													
O	CFRP	Full Slotting	1 x DIA	.5 x DIA	400-800	400	0.0005	400	0.0005	400	0.0006	400	0.00080
		Heavy Profile	.33 x DIA	1.25 x DIA		400	0.0005	400	0.0008	400	0.0010	400	0.00120
		HEM* Profile	.15 x DIA	2 x DIA		400	0.0007	400	0.0013	400	0.0014	400	0.00160
		Finishing	.05 x DIA	2 x DIA		400	0.0005	400	0.0011	400	0.0012	400	0.00140
	GFRP	Full Slotting	1 x DIA	.5 x DIA	275-1100	275	0.0005	275	0.0010	275	0.0011	275	0.00120
		Heavy Profile	.33 x DIA	1.25 x DIA		275	0.0008	275	0.0014	275	0.0019	275	0.00220
		HEM* Profile	.15 x DIA	2 x DIA		275	0.0011	275	0.0019	275	0.0023	275	0.00260
		Finishing	.05 x DIA	2 x DIA		275	0.0009	275	0.0015	275	0.0020	275	0.00240
	Phenolic	Full Slotting	1 x DIA	1 x DIA	325-1300	325	0.0005	325	0.0005	325	0.0006	325	0.00080
		Heavy Profile	.33 x DIA	1.25 x DIA		325	0.0005	325	0.0008	325	0.0010	325	0.00120
		HEM* Profile	.15 x DIA	2 x DIA		325	0.0007	325	0.0013	325	0.0014	325	0.00160
		Finishing	.05 x DIA	2 x DIA		325	0.0005	325	0.0011	325	0.0012	325	0.00140
66-500 DFC Multi Flute													
O	CFRP	Full Slotting	1 x DIA	.50 x DIA	450/1600	450	0.0015	850	0.0026	1200	0.0035	1600	0.0045
		Heavy Profile	.33 x DIA	1.25 x DIA		450	0.0022	850	0.0035	1200	0.0045	1600	0.0055
		HEM* Profile	.15 x DIA	2 x DIA		450	0.0030	850	0.0050	1200	0.0060	1600	0.0065
		Finishing	.05 x DIA	2 x DIA		450	0.0025	850	0.0035	1200	0.0045	1600	0.0550
	GFRP	Full Slotting	1 x DIA	.50 x DIA	275/1000	275	0.0020	500	0.0030	750	0.0040	1000	0.0050
		Heavy Profile	.33 x DIA	1.25 x DIA		275	0.0030	500	0.0035	750	0.0055	1000	0.0065
		HEM* Profile	.15 x DIA	2 x DIA		275	0.0045	500	0.0052	750	0.0080	1000	0.0095
		Finishing	.05 x DIA	2 x DIA		275	0.0035	500	0.0045	750	0.0062	1000	0.0068
	Phenolic	Full Slotting	1 x DIA	.50 x DIA	325/1400	325	0.0015	700	0.0026	1000	0.0035	1400	0.0045
		Heavy Profile	.33 x DIA	1.25 x DIA		325	0.0022	700	0.0035	1000	0.0045	1400	0.0055
		HEM* Profile	.15 x DIA	2 x DIA		325	0.0030	700	0.0050	1000	0.0060	1400	0.0065
		Finishing	.05 x DIA	2 x DIA		325	0.0025	700	0.0035	1000	0.0045	1400	0.0055
66-600 DFC Ballnose **Upcut**													
O	CFRP	Heavy Profile	.5 x DIA	.5 x DIA	–	275	0.0004	500	0.0006	800	0.0008	1000	0.0010
		Finishing	.05 x DIA	.05 x DIA		275	0.0005	500	0.0011	800	0.0012	1000	0.0014
	GFRP	Heavy Profile	.5 x DIA	.5 x DIA	–	200	0.0006	400	0.0011	600	0.0015	800	0.0018
		Finishing	.05 x DIA	.05 x DIA		200	0.0009	400	0.0015	600	0.0016	800	0.0024
	Phenolic	Heavy Profile	.5 x DIA	.5 x DIA	–	250	0.0004	450	0.0006	700	0.0008	900	0.0010
		Finishing	.05 x DIA	.05 x DIA		250	0.0005	450	0.0011	700	0.0012	900	0.0014
66-700 DFC Low-Helix Finisher **Upcut**													
O	CFRP	Finishing	.05 x DIA	2 x DIA	450/1000	–	–	1000	0.0008	1000	0.0010	1000	0.0015
	GFRP	FInishing	.05 x DIA	2 x DIA	450/1000	–	–	450	0.0015	450	0.0020	450	0.0030
	Phenolic	FInishing	.05 x DIA	2 x DIA	450/1000	–	–	650	0.0011	650	0.0023	650	0.0025

*No more than 6 flutes for slotting in G10

66-750/66-775/66-800 Series Cutting Data Recommendations

CP

ISO Grade	Material	Application	Recommended Starting Parameters											
			Rad DOC	Axial DOC	SFM Range	Chip Load Per Tooth								
						SFM Starting 1/8	1/8	SFM Starting 1/4	1/4	SFM Starting 3/8	3/8	SFM Starting 1/2	1/2
66-750 DFC Low-Helix Cutter													
O	CFRP	Full Slotting	1 x DIA	.5 x DIA	500/1600	–	–	850	0.001	1200	0.001	1600	0.0008
		Heavy Profile	.33 x DIA	1.25 x DIA		–	–	850	0.001	1200	0.001	1600	0.0012
		HEM* Profile	.15 x DIA	2 x DIA		–	–	850	0.001	1200	0.001	1600	0.0016
		Finishing	.05 x DIA	2 x DIA		–	–	850	0.001	1200	0.001	1600	0.0014
	GFRP	Full Slotting	1 x DIA	.5 x DIA	500/1500	–	–	500	0.001	750	0.002	1000	0.0018
		Heavy Profile	.33 x DIA	1.25 x DIA		–	–	500	0.001	750	0.002	1000	0.0022
		HEM* Profile	.15 x DIA	2 x DIA		–	–	500	0.002	750	0.002	1000	0.0026
		Finishing	.05 x DIA	2 x DIA		–	–	500	0.002	750	0.002	1000	0.0024
	Phenolic	Full Slotting	1 x DIA	.5 x DIA	500/1200	–	–	700	0.001	1000	0.001	1400	0.0008
		Heavy Profile	.33 x DIA	1.25 x DIA		–	–	700	0.001	1000	0.001	1400	0.0012
		HEM* Profile	.15 x DIA	2 x DIA		–	–	700	0.001	1000	0.001	1400	0.0016
		Finishing	.05 x DIA	2 x DIA		–	–	700	0.001	1000	0.001	1400	0.0014
66-775 DFC Low-Helix Rougher-Finisher-**Upcut**													
O	CFRP	Full Slotting	1 x DIA	1 x DIA	500/2000	–	–	850	0.0005	1200	0.0006	1600	0.00080
		Heavy Profile	.33 x DIA	1.25 x DIA		–	–	850	0.0008	1200	0.0010	1600	0.00120
		HEM* Profile	.15 x DIA	2 x DIA		–	–	850	0.0013	1200	0.0014	1600	0.00160
		Finishing	.06 x DIA	2 x DIA		–	–	850	0.0011	1200	0.0012	1600	0.00140
	GFRP	Full Slotting	1 x DIA	1 x DIA	500/2000	–	–	500	0.0010	750	0.0015	1000	0.00180
		Heavy Profile	.33 x DIA	1.25 x DIA		–	–	500	0.0014	750	0.0019	1000	0.00220
		HEM* Profile	.15 x DIA	2 x DIA		–	–	500	0.0019	750	0.0023	1000	0.00260
		Finishing	.06 x DIA	2 x DIA		–	–	500	0.0015	750	0.0016	1000	0.00240
	Phenolic	Full Slotting	1 x DIA	1 x DIA	300/2000	–	–	700	0.0005	1000	0.0006	1400	0.00080
		Heavy Profile	.33 x DIA	1.25 x DIA		–	–	700	0.0008	1000	0.0010	1400	0.00120
		HEM* Profile	.15 x DIA	2 x DIA		–	–	700	0.0013	1000	0.0014	1400	0.00160
		Finishing	.06 x DIA	2 x DIA		–	–	700	0.0011	1000	0.0012	1400	0.00140
66-800 DFC Compression													
O	CFRP	Full Slotting	1 x DIA	1 x DIA	500/1600	–	–	850	0.0008	1200	0.0010	1600	0.0012
		Heavy Profile	.33 x DIA	1.25 x DIA		–	–	850	0.0010	1200	0.0012	1600	0.0014
		HEM* Profile	.15 x DIA	2 x DIA		–	–	850	0.0015	1200	0.0016	1600	0.0018
		Finishing	.06 x DIA	2 x DIA		–	–	850	0.0014	1200	0.0013	1600	0.0015

PCD Cutting Data Recommendations

CP

ISO Grade	Material	Application	Recommended Starting Parameters										
			Rad DOC	Axial DOC	SFM Range	SFM Starting	Chip Load Per Tooth						
							1/8	1/4	3/8	1/2	5/8	3/4	1
67-220-PCD Progressive Chipbreakers													
O	CFRP	Full Slotting	1 X DIA	.5 x DIA	750/1250	800	–	–	0.0010	0.0015	–	–	–
		Heavy Profile	.33 x DIA	1 x DIA		800	–	–	0.0015	0.0020	–	–	–
		HEM* Profile	.15 x DIA	1 x DIA		900	–	–	0.0020	0.0030	–	–	–
		Finishing	.05 x DIA	1 x DIA		1100	–	–	0.0020	0.0030	–	–	–
	GFRP	Full Slotting	1 X DIA	.5 X DIA	500/750	500	–	–	0.0010	0.0015	–	–	–
		Heavy Profile	.33 x DIA	.75 x DIA		500	–	–	0.0015	0.0025	–	–	–
		HEM* Profile	.15 x DIA	1 x DIA		600	–	–	0.0020	0.0030	–	–	–
		Finishing	.05 x DIA	1 x DIA		700	–	–	0.0020	0.0030	–	–	–
	Phenolic	Full Slotting	1 X DIA	.5 x DIA	750/1500	800	–	–	0.0010	0.0015	–	–	–
		Heavy Profile	.33 x DIA	1 x DIA		800	–	–	0.0015	0.0025	–	–	–
		HEM* Profile	.15 x DIA	1 x DIA		900	–	–	0.0020	0.0030	–	–	–
		Finishing	.05 x DIA	1 x DIA		1100	–	–	0.0020	0.0030	–	–	–
68-000 PCD Tipped Tools													
O	CFRP	Full Slotting	1 X DIA	.5 x DIA	500/1000	800	–	0.0010	0.0015	0.0020	–	0.0030	–
		Heavy Profile	.33 x DIA	1 x DIA		800	–	0.0015	0.0020	0.0025	–	0.0035	–
		HEM* Profile	.15 x DIA	1 x DIA		800	–	0.0020	0.0025	0.0030	–	0.0040	–
		Finishing	.05 x DIA	1 x DIA		800	–	0.0010	0.0020	0.0030	–	0.0040	–
	GFRP	Full Slotting	1 X DIA	.5 x DIA	375/625	400	–	0.0010	0.0015	0.0020	–	0.0030	–
		Heavy Profile	.33 x DIA	1 x DIA		400	–	0.0015	0.0020	0.0025	–	0.0035	–
		HEM* Profile	.15 x DIA	1 x DIA		400	–	0.0020	0.0025	0.0030	–	0.0040	–
		Finishing	.05 x DIA	1 x DIA		400	–	0.0010	0.0020	0.0030	–	0.0040	–
	Phenolic	Full Slotting	1 X DIA	.5 x DIA	500/1000	500	–	0.0010	0.0015	0.0020	–	0.0030	–
		Heavy Profile	.33 x DIA	1 x DIA		500	–	0.0015	0.0020	0.0030	–	0.0040	–
		HEM* Profile	.15 x DIA	1 x DIA		600	–	0.0015	0.0020	0.0030	–	0.0040	–
		Finishing	.05 x DIA	1 x DIA		800	–	0.0020	0.0030	0.0040	–	0.0040	–
68-200-PCD SERF Cutter													
O	CFRP	Full Slotting	1 x DIA	1 x DIA	750/1250	800	–	0.0010	0.0015	0.0020	–	–	–
		Heavy Profile	.33 x DIA	1 x DIA		1000	–	0.0020	0.0030	0.0040	–	–	–
		HEM* Profile	.15 x DIA	1.5 x DIA		1000	–	0.0030	0.0040	0.0050	–	–	–
	GFRP	Full Slotting	1 x DIA	.5 x DIA	500/750	500	–	0.0010	0.0015	0.0020	–	–	–
		Heavy Profile	.33 x DIA	.75 x DIA		600	–	0.0020	0.0030	0.0040	–	–	–
		HEM* Profile	.15 x DIA	1 x DIA		600	–	0.0020	0.0030	0.0040	–	–	–
	Phenolic	Full Slotting	1 x DIA	1 x DIA	750/1500	800	–	0.0010	0.0015	0.0020	–	–	–
		Heavy Profile	.33 x DIA	1 x DIA		1000	–	0.0020	0.0030	0.0040	–	–	–
		HEM* Profile	.15 x DIA	1.5 x DIA		1200	–	0.0020	0.0030	0.0040	–	–	–

PCD Cutting Data Recommendations

PCD

ISO Grade	Material	Application	Recommended Starting Parameters										
			Rad DOC	Axial DOC	SFM Range	SFM Starting	Chip Load Per Tooth						
							1/8	1/4	3/8	1/2	5/8	3/4	1
68-300-PCD SERFIN Cutter													
O	CFRP	Full Slotting	1 x DIA	.5 x DIA	750/1250	800	–	–	0.0015	0.0020		0.0025	–
		Heavy Profile	.33 x DIA	1 x DIA		1000	–	–	0.0020	0.0025		0.0035	–
		HEM* Profile	.15 x DIA	1 x DIA		1000	–	–	0.0030	0.0030		0.0040	–
		Finishing	.05 x DIA	1 x DIA		1000	–	–	0.0020	0.0025		0.0035	–
	GFRP	Full Slotting	1 x DIA	.5 x DIA	500/750	500	–	–	0.0015	0.0020		0.0030	–
		Heavy Profile	.33 x DIA	.5 x DIA		500	–	–	0.0020	0.0030		0.0040	–
		HEM* Profile	.15 x DIA	1 x DIA		500	–	–	0.0020	0.0030		0.0040	–
		Finishing	.05 x DIA	1 x DIA		600	–	–	0.0020	0.0030		0.0040	–
	Phenolic	Full Slotting	1 x DIA	.5 x DIA	750/1500	800	–	–	0.0010	0.0020		0.0020	–
		Heavy Profile	.33 x DIA	1 x DIA		1000	–	–	0.0020	0.0030		0.0040	–
		HEM* Profile	.15 x DIA	1 x DIA		1200	–	–	0.0020	0.0030		0.0040	–
		Finishing	.05 x DIA	1 x DIA		1200	–	–	0.0020	0.0030		0.0040	–
68-400-PCD Ballnose													
O	CFRP	Heavy Profile	.25 - .5 x DIA	.5 x DIA	750/1000	800	–	0.0005	0.0010	0.0015	0.0017	0.0020	–
		–	–	–			–	–	–	–	–	–	–
		Finishing	.05 x DIA	.05 x DIA		900	–	0.0020	0.0030	0.0035	0.0040	0.0045	–
	GFRP	Heavy Profile	.25 - .5 x DIA	.5 x DIA	350/600	375	–	0.0010	0.0020	0.0030	0.0035	0.0040	–
		–	–	–			–	–	–	–	–	–	–
		Finishing	.05 x DIA	.05 x DIA		500	–	0.0020	0.0030	0.0040	0.0045	0.0050	–
	Phenolic	Heavy Profile	.25 - .5 x DIA	.5 x DIA	500/750	600	–	0.0010	0.0020	0.0030	0.0035	0.0040	–
		–	–	–			–	–	–	–	–	–	–
		Finishing	.05 x DIA	.05 x DIA		700	–	0.0020	0.0030	0.0040	0.0045	0.0050	–

RPM
(3.82 x SFM) / tool diameter

SFM
RPM x .262 x tool diameter

FEED RATE (in / min)
chipload x # flutes x RPM

Feed / Tooth (in)
Feed Rate / (RPM x # Flutes)

Inquiry Sheet Routing Tools

Customer Information

Company		Street	
End User		City / Zip Code	
Name		Date	
E-Mail		Contact	

Tool Material

☐ HSS ☐ PCD Full Face
☐ Solid Carbide ☐ PCD
☐ Carbide Tip ☐ Powder Material
☐ Other _____

Flute Style

☐ Up ☐ Straight
☐ Down ☐ Compression

Flute Form

☐ Rougher ☐ Finisher
☐ Chipbrk/Finisher ☐ Burr
☐ Other _____

Point Geometry

☐ Square ☐ Non-Center Cutting
☐ Center Cutting ☐ Ballnose
☐ Other _____

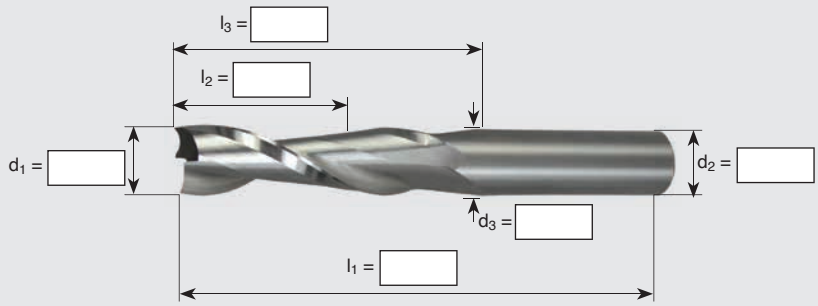
Tool Data

Tool similar to	
Number of Flutes	
Coating	☐ ESG ☐ ESR ☐ ZRN ☐ TiN ☐ MAR ☐ PLR ☐ Uncoated ☐ Other _____
Flat	☐ Weldon ☐ Whistle Notch ☐ Other _____

Machine & Material Information

Machine Type	☐ CNC Router ☐ Air Router ☐ Hand Router
Material Being Machined	

Dimensions



Corner Radius	

Quantity & Pricing

Quantity Needed **(Minimum of 6 pieces)**		
Target Pricing?		☐ Distributor ☐ End User

Notes

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