

Aerospace Product Highlights



The Most Complete Line of Tools for Aerospace

LMT Onsrud has provided tooling to the aerospace industry for over 60 years. As materials have changed so have our tool designs... from high-speed steel used in hand routing of aluminum sheet to sophisticated coated solid carbide and diamond for today's composite and exotic metal materials.



AR & ARC SERIES

Remove Material 30% Faster with Onsrud's 2 & 3 Flute High-Performance Roughers

LMT Onsrud Aluminum Roughers are designed for heavy metal removal rates. The ground in chipbreaker pattern and open flute geometry are optimized to slot 30% faster than our standard AF Series. Utilize the ARC End mills for improved chip evacuation and longer tool life.

AR-2 OFFERING:

- ARS-2 = 2 FL Rougher Standard Length
- ARNS-2 = 2 FL Necked Rougher Standard Length
- ARNM-2 = 2 FL Necked Rougher Medium Length
- ARNL-2 = 2 FL Necked Rougher Long Length

AR-3 OFFERING:

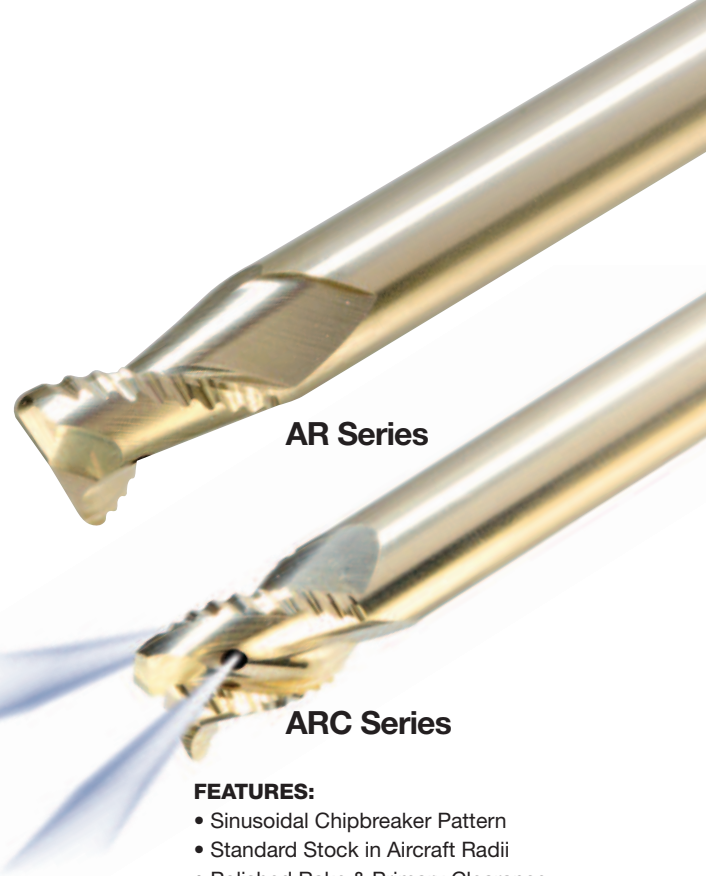
- ARS-3 = 3 FL Rougher Standard Length
- ARNS-3 = 3 FL Necked Rougher Standard Length
- ARNM-3 = 3 FL Necked Rougher Medium Length
- ARNL-3 = 3 FL Necked Rougher Long Length

ARC-2 COOLANT THROUGH OFFERING:

- ARCS-2 = 2 FL Rougher Standard Length
- ARCNS-2 = 2 FL Necked Rougher Standard Length
- ARCNM-2 = 2 FL Necked Rougher Medium Length
- ARCNL-2 = 2 FL Necked Rougher Long Length

ARC-3 COOLANT THROUGH OFFERING:

- ARCS-3 = 3 FL Rougher Standard Length
- ARCNS-3 = 3 FL Necked Rougher Standard Length
- ARCNM-3 = 3 FL Necked Rougher Medium Length
- ARCNL-3 = 3 FL Necked Rougher Long Length



FEATURES:

- Sinusoidal Chipbreaker Pattern
- Standard Stock in Aircraft Radii
- Polished Rake & Primary Clearance
- 4 Neck Lengths
- Zirconium Nitride (ZrN) Coated

BENEFITS:

- Increase Feedrates (Cubic Inches / Minute)
- Reduced Chip Size
- Reduce HP consumption

Landing Gear Component

APPLICATION

Customer Requirements:

Reduce Roughing Cycle Time

Process: Rough Milling

Material: 7075T6 Aluminum

Machine: Horizontal Machining Center

Taper: HSK100A

Coolant: MQL

Tool: 1" Dia. X 1.25" LOC X 3.75" Neck
6" OAL, .120 Radius SC End Mill
Competitor Tool was Not Coolant Thru
and a Special for .120" Radius

INITIAL CUTTING PARAMETERS:

Speed: 19,000 RPM

Feed: 600 IPM

Axial DOC: .330"

Radial DOC: .330"

SOLUTION

New LMT Onsrud ARC Series Rougher ARCNM-31000
(EDP# AMC800173) LMT Onsrud Standard Catalog Item

1" Dia. X 1.25" LOC X 3.125" Neck 3 Flute, 6" OAL,
.120 Radius SC End Mill ZrN Coated -
Radial Coolant Through

IMPROVED CUTTING PARAMETERS:

Speed: 19,000 RPM

Feed: 1340 IPM

Axial DOC: .330"

Radial DOC: .500"

CUSTOMER'S BENEFIT

Increased Feed Rates by 56% while taking
34% more radial engagement per pass.

MRR Increased from 65 Cubic Inch/Min
To 221 Cubic Inch/ Min

Part cycle time reduce from 10 hrs to 6 hrs.

**More Chips on the Floor
and More parts out the Door!**

Please see High Performance End Mill Catalog (OCMR-12) for our full line of end mills.

TV-7 SERIES

Semi-Finish & Finish with LMT Onsrud's 7 Flute High Performance End Mills

LMT Onsrud Exotic Metals 7 Flute End Mills are optimized for high speed machining with low radial engagement, producing accurate and superior surface finishes. The unique geometry with variable indexing and large core diameter prevents deflection on even the longest length tools.

ENDURASpeed Coating

LMT Onsrud's NEW **ENDURASpeed** in house PVD coating features Extremely High Heat Resistance and Nanohardness. These properties provide decreased edge wear for increased tool life in difficult to machine materials when compared to the industry standard AITiN.

TV-7 OFFERING:

- TVS-7 = 7 Flute Standard Length (4 x Dia.)
- TVM-7 = 7 Flute Medium Length (5 x Dia.)
- TVL-7 = 7 Flute Long Length (6 x Dia.)

- 3 Cut Lengths on TV-7

TV-7 NECKED OFFERING:

- TVNS-7 = 7 Flute Standard Length
- TVNM-7 = 7 Flute Medium Length
- TVNL-7 = 7 Flute Long Length

- Corner Radii .015, .030, .060, .090, .120, .190, .250 & Square Shoulder

ENDURASpeed will improve your productivity and reduce your part costs by putting more chips on the floor and parts out the door.

Distance Cut (ft.)

AITiN - 48 • ENDURASpeed - 80

Work Piece Material: Titanium 6Al4V - Block 12"x7"x4"

End Mill: 3/4" Dia., 1-1/8" LOC, 4" OAL

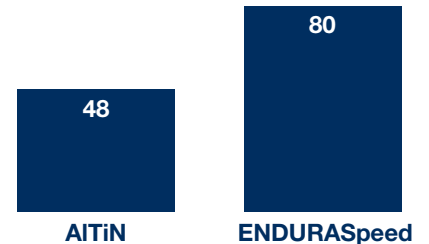
Coating: ENDURASpeed

Failure Mode: Unacceptable Part Finish

TV-7 Series



Tool Life (ft.)



Helicopter Rotor Component

APPLICATION

Work Piece: Rotor Link

Customer Requirements:

Reduced Finishing Time

Process: Finish Milling

Material: 6Al4V Titanium

Machine: Horizontal Machining Center

Taper: Cat 50

Coolant: Flood

Tool: 1" Dia. X 1.25" LOC X 4.125" Neck
7" OAL, .190 Radius (4.6mm)
Solid Carbide End Mill

INITIAL CUTTING PARAMETERS:

Speed: 534 RPM

Feed: 16 IPM (406 mm/min)

Axial DOC: 1.0" (25.4 mm)

Radial DOC: .030" (.76 mm)

IMPROVED CUTTING PARAMETERS:

Speed: 916 RPM

Feed: 20 IPM (508 mm/min)

Axial DOC: 1.0" (25.4 mm)

Radial DOC: .030" (.76 mm)

SOLUTION

LMT Onsrud 7 Flute HP End Mill

TVNL-71000 (EDP# EMC700383)

1" Dia. X 1.25" LOC X 4.125" Neck

7 Flute, 6" OAL, .190 (4.06 mm) Radius

SC End Mill EnduraSpeed Coated



CUSTOMER'S BENEFIT

Increased Feed Rates by 25% while increasing tool life from 8 parts to 34. A 435% improvement

MRR Increased from .48 Cubic Inch/Min (12.19 Cubic mm/Min) to .60 Cubic Inch/Min (15.24 Cubic mm/Min)

Part cycle time reduced by 25%

**More Chips on the Floor
and More parts out the Door!**

Please see **High Performance End Mill Catalog (OCMR-12)** for our full line of end mills.

54-200 SERIES

Three and Four Flute - Solid Carbide Spiral for Glass-Reinforced Plastic (Coated)

Updated line of 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).

PART #	CED	FLUTE LGTH	SHANK	OAL	FLUTES	UP/DOWN
54-205	1/8	1/2	1/4	2	3	Upcut
54-206	1/8	1/2	1/4	2	3	Downcut
54-210	3/16	5/8	1/4	2	3	Upcut
54-211	3/16	5/8	1/4	2	3	Downcut
54-220	1/4	3/4	1/4	2-1/2	4	Upcut
54-221	1/4	3/4	1/4	2-1/2	4	Downcut
54-230	3/8	1-1/8	3/8	3	4	Upcut
54-231	3/8	1-1/8	3/8	3	4	Downcut
54-240	1/2	1-1/8	1/2	3-1/2	4	Upcut
54-241	1/2	1-1/8	1/2	3-1/2	4	Downcut

METRIC

54-260	6mm	19mm	6mm	76mm	4	Upcut
54-261	6mm	19mm	6mm	76mm	4	Downcut
54-266	8mm	22mm	8mm	76mm	4	Upcut
54-267	8mm	22mm	8mm	76mm	4	Downcut
54-270	10mm	25mm	10mm	76mm	4	Upcut
54-271	10mm	25mm	10mm	76mm	4	Downcut
54-276	12mm	25mm	12mm	76mm	4	Upcut
54-277	12mm	25mm	12mm	76mm	4	Downcut



54-200 Series

66-800 SERIES

DFC Compression for Composites

The diamond film coated solid carbide compression routers **unique** geometry prevents delamination on top and the bottom edges of the composites. The open flute geometry dissipates heat to prevent resin flow.

PART #	CED	FLUTE LGTH	UPCUT LGTH	SHANK	OAL	FLUTES
66-802DFC	1/4	.750	.325	1/4	3-1/2	4
66-811DFC*	3/8	1	.100	3/8	4	4
66-814DFC	3/8	1	.340	3/8	4	6
66-817DFC*	1/2	1.125	.100	1/2	4	6
66-823DFC	1/2	1.125	.350	1/2	4	6

*Downcut edge to within .050" of tool end

METRIC

66-852DFC	6mm	20mm	7.75mm	6mm	90mm	4
66-858DFC	8mm	25mm	8mm	8mm	100mm	4
66-864DFC	10mm	25mm	8.5mm	10mm	100mm	6
66-870DFC	12mm	25mm	9mm	12mm	100mm	6



66-800 Series

Please see **Milling & Drilling Tools for Composite & Honeycomb Materials (OCComp-12) Catalog** for our full Advanced Materials tooling.

66-900 SERIES High Performance Composite Router

The new High Performance Composite Router is designed for **more efficient routing** of composite materials, in both hand-fed and in CNC applications. Conventional composite routing tools, commonly referred to as “burrs” have a diamond tooth pattern that produces a grinding action more than a cutting action. Therefore, the conventional tools generate large amounts of heat resulting in premature tool failure. The new High Performance Composite Router is a **true cutting tool**. It cuts the material into distinct chips which **remove heat from the cut**. Deep cutting flutes increase the chip flow and aids in dissipating heat resulting in longer tool life. The geometry produces a **smooth edge** on the material, eliminating secondary operations. In a hand router application, the geometry **reduces the cutting force** required by the operator. In a CNC router application, higher speeds and feeds can be achieved, increasing productivity and lowering costs.



66-900 Series

PART #	POINT STYLE	CED	FLUTE LGTH	SHANK	OAL
66-901ALTIN	No	1/8	1/2	1/8	1 1/2
66-902ALTIN	BURR	1/8	1/2	1/8	1 1/2
66-903ALTIN	Endmill	1/8	1/2	1/8	1 1/2
66-904ALTIN	Drill	1/8	1/2	1/8	1 1/2
66-905ALTIN	No	3/16	5/8	1/4	2
66-906ALTIN	BURR	3/16	5/8	1/4	2
66-907ALTIN	Endmill	3/16	5/8	1/4	2
66-908ALTIN	Drill	3/16	5/8	1/4	2
66-909ALTIN	No	1/4	1	1/4	3
66-910ALTIN	BURR	1/4	1	1/4	3
66-911ALTIN	Endmill	1/4	1	1/4	3
66-912ALTIN	Drill	1/4	1	1/4	3
66-913ALTIN	No	1/4	1-1/2	1/4	3-1/2
66-914ALTIN	BURR	1/4	1-1/2	1/4	3-1/2
66-915ALTIN	Endmill	1/4	1-1/2	1/4	3-1/2
66-916ALTIN	Drill	1/4	1-1/2	1/4	3-1/2
66-917ALTIN	No	1/4	2-1/8	1/4	4
66-918ALTIN	BURR	1/4	2-1/8	1/4	4
66-919ALTIN	Endmill	1/4	2-1/8	1/4	4
66-920ALTIN	Drill	1/4	2-1/8	1/4	4
66-921ALTIN	No	3/8	1	3/8	3
66-922ALTIN	BURR	3/8	1	3/8	3
66-923ALTIN	Endmill	3/8	1	3/8	3
66-924ALTIN	Drill	3/8	1	3/8	3
66-925ALTIN	No	3/8	1-5/8	3/8	3-1/2
66-926ALTIN	BURR	3/8	1-5/8	3/8	3-1/2
66-927ALTIN	Endmill	3/8	1-5/8	3/8	3-1/2
66-928ALTIN	Drill	3/8	1-5/8	3/8	3-1/2
66-929ALTIN	No	3/8	2-1/8	3/8	4
66-930ALTIN	BURR	3/8	2-1/8	3/8	4
66-931ALTIN	Endmill	3/8	2-1/8	3/8	4
66-932ALTIN	Drill	3/8	2-1/8	3/8	4
66-933ALTIN	No	1/2	1-1/8	1/2	3
66-934ALTIN	BURR	1/2	1-1/8	1/2	3
66-935ALTIN	Endmill	1/2	1-1/8	1/2	3
66-936ALTIN	Drill	1/2	1-1/8	1/2	3
66-937ALTIN	No	1/2	1-5/8	1/2	4
66-938ALTIN	BURR	1/2	1-5/8	1/2	4
66-939ALTIN	Endmill	1/2	1-5/8	1/2	4

PART #	POINT STYLE	CED	FLUTE LGTH	SHANK	OAL
66-940ALTIN	Drill	1/2	1-5/8	1/2	4
66-941ALTIN	No	1/2	2-1/8	1/2	4
66-942ALTIN	BURR	1/2	2-1/8	1/2	4
66-943ALTIN	Endmill	1/2	2-1/8	1/2	4
66-944ALTIN	Drill	1/2	2-1/8	1/2	4
66-945ALTIN	No	1/2	3-1/8	1/2	5
66-946ALTIN	BURR	1/2	3-1/8	1/2	5
66-947ALTIN	Endmill	1/2	3-1/8	1/2	5
66-948ALTIN	Drill	1/2	3-1/8	1/2	5
66-949ALTIN	No	1/2	4-1/8	1/2	6
66-950ALTIN	BURR	1/2	4-1/8	1/2	6
66-951ALTIN	Endmill	1/2	4-1/8	1/2	6
66-952ALTIN	Drill	1/2	4-1/8	1/2	6

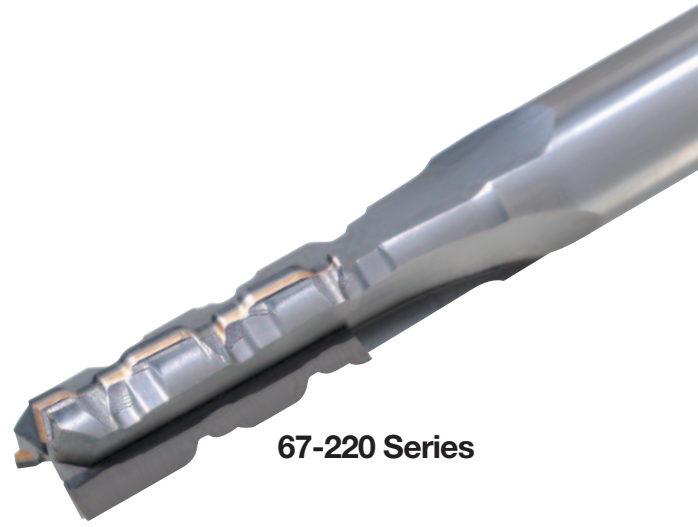
METRIC

66-971ALTIN	No	4mm	16mm	6mm	50mm
66-972ALTIN	BURR	4mm	16mm	6mm	50mm
66-973ALTIN	Endmill	4mm	16mm	6mm	50mm
66-974ALTIN	Drill	4mm	16mm	6mm	50mm
66-975ALTIN	No	6mm	19mm	6mm	75mm
66-976ALTIN	BURR	6mm	19mm	6mm	75mm
66-977ALTIN	Endmill	6mm	19mm	6mm	75mm
66-978ALTIN	Drill	6mm	19mm	6mm	75mm
66-979ALTIN	No	6mm	25mm	6mm	75mm
66-980ALTIN	BURR	6mm	25mm	6mm	75mm
66-981ALTIN	Endmill	6mm	25mm	6mm	75mm
66-982ALTIN	Drill	6mm	25mm	6mm	75mm
66-983ALTIN	No	8mm	25mm	8mm	63mm
66-984ALTIN	BURR	8mm	25mm	8mm	63mm
66-985ALTIN	Endmill	8mm	25mm	8mm	63mm
66-986ALTIN	Drill	8mm	25mm	8mm	63mm
66-987ALTIN	No	10mm	25mm	10mm	75mm
66-988ALTIN	BURR	10mm	25mm	10mm	75mm
66-989ALTIN	Endmill	10mm	25mm	10mm	75mm
66-990ALTIN	Drill	10mm	25mm	10mm	75mm
66-991ALTIN	No	12mm	25mm	12mm	75mm
66-992ALTIN	BURR	12mm	25mm	12mm	75mm
66-993ALTIN	Endmill	12mm	25mm	12mm	75mm
66-994ALTIN	Drill	12mm	25mm	12mm	75mm

67-220 SERIES

PCD Progressive Chipbreaker for Composites

The Progressive Chipbreaker is designed to provide **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

PART #	CED	FLUTE LGTH	SHANK	OAL	FLUTES
67-221	3/8	3/8	3/8	3	3
67-225	1/2	5/8	1/2	3	3
67-227	1/2	1-1/8	1/2	3-1/2	3

68-300 SERIES

Three Flute - PCD SERF™ Cutter for Composites

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

PART #	CED	FLUTE LGTH	SHANK	OAL	FLUTES
68-315	3/8	1/2	3/8	4	3
68-320	3/8	7/8	3/8	4	3
68-340	1/2	5/8	1/2	4	3
68-345	1/2	1	1/2	4	3
68-350	1/2	1-1/4	1/2	4	3
68-360	3/4	1-3/8	3/4	5	3

METRIC

68-310	8mm	10mm	8mm	76mm	3
68-325	10mm	14mm	10mm	100mm	3
68-330	12mm	14mm	12mm	100mm	3
68-335	12mm	26mm	12mm	100mm	3
68-355	16mm	26mm	16mm	100mm	3

68-400 SERIES

Double Flute - PCD Ballnose

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



68-400 Series

PART #	CED	FLUTE LGTH	SHANK	OAL
68-405	1/4	3/8	1/4	2-1/2
68-410	3/8	1/2	3/8	3
68-420	1/2	5/8	1/2	4
68-425	5/8	7/8	5/8	4
68-430	3/4	1	3/4	4

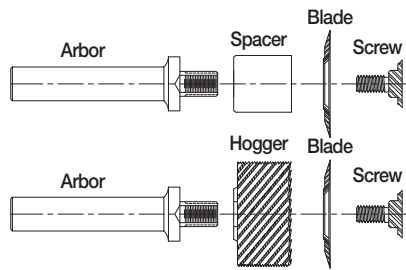
METRIC

68-440	6mm	10mm	6mm	76mm
68-445	8mm	10mm	8mm	76mm
68-450	10mm	12mm	10mm	76mm
68-455	12mm	20mm	12mm	100mm

Please see **Milling & Drilling Tools for Composite & Honeycomb Materials (OCComp-12) Catalog** for our full Advanced Materials tooling.

32-200 SERIES HSS Three Piece Honeycomb Hogger (Coated)

Designed with more aggressive hogger geometry than the 32-000 series. 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 use without the hogger by replacing the hogger with a spacer.



32-200 Series

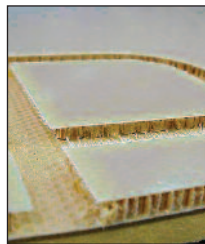
HONEYCOMB HOGGER			SHANK			CUTTING BLADE OPTIONS			SPARE PARTS	
Part #	Cutting Diameter	Hogger Depth	Part #	Shank DIA	OAL	Blade Diameter	Solid Carbide	Solid Carbide w/Teeth	Spacer	Retaining Screw
32-210	0.94" (23.88mm)	1" (25.4mm)	32-221	3/8"	4"	1" (25.4mm)	32-412	32-512	32-221-3	32-221-4
32-225	1.94" (49.28mm)	1" (25.4mm)	32-231	1/2"	4"	2" (50.8mm)	32-422	32-522	32-231-3	32-231-4
			32-241	5/8"	4"					
32-235	2.94" (74.68mm)	1" (25.4mm)	32-231	1/2"	4"	3" (76.2mm)	32-432	32-532	32-231-3	32-231-4
			32-241	5/8"	4"					
32-220	1.72" (43.69mm)	1" (25.4mm)	32-231	1/2"	4"	1.77" (45mm)	32-426	32-526	32-231-3	32-231-4
			32-241	5/8"	4"					
32-230	2.42" (61.47mm)	1" (25.4mm)	32-231	1/2"	4"	2.48" (63mm)	32-436	32-536	32-231-3	32-231-4
			32-241	5/8"	4"					

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")

34-000 SERIES Aircraft Panel Tools

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 diamond grit or HSS under cutting tool to be screwed into it.



PART #	CED	FLUTE LGTH	SHANK	
34-008	1/2	-	1/2	Arbor (non-cutting)
34-010	1/2	1/4	1/2	PCD Arbor
34-022	7/8	0.130	n/a	Diamond Grit Cutter
34-024	7/8	0.250	n/a	Diamond Grit Cutter
34-026	7/8	0.380	n/a	Diamond Grit Cutter
34-028	7/8	0.500	n/a	Diamond Grit Cutter
34-030	7/8	0.630	n/a	Diamond Grit Cutter
34-042	7/8	0.130	n/a	HSS Cutter
34-044	7/8	0.250	n/a	HSS Cutter
34-046	7/8	0.380	n/a	HSS Cutter
34-048	7/8	0.500	n/a	HSS Cutter
34-050	7/8	0.630	n/a	HSS Cutter



Please see **Milling & Drilling Tools for Composite & Honeycomb Materials (OComp-12) Catalog** for our full Advanced Materials tooling.

85-800 SERIES

Solid Carbide CFRP Drill (Coated)

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).



85-800 Series

NUMBER DRILLS

PART #	CED	FLUTE LGTH	SHANK	OAL
85-876	1 (0.2280)	0.500	1/4	3
85-877	2 (0.2210)	0.500	1/4	3
85-878	3 (0.2130)	0.500	1/4	3
85-879	4 (0.2090)	0.500	1/4	3
85-880	5 (0.2055)	0.500	1/4	3
85-881	6 (0.2040)	0.500	1/4	3
85-882	7 (0.2010)	0.500	1/4	3
85-883	8 (0.1990)	0.500	1/4	3
85-884	9 (0.1960)	0.500	1/4	3
85-885	10 (0.1935)	0.500	1/4	3
85-886	11 (0.1910)	0.500	1/4	3
85-887	12 (0.1890)	0.500	1/4	3
85-888	13 (0.1850)	0.500	3/16	3
85-889	14 (0.1820)	0.500	3/16	3
85-890	15 (0.1800)	0.500	3/16	3
85-891	16 (0.1770)	0.500	3/16	3
85-892	17 (0.1730)	0.500	3/16	3
85-893	18 (0.1695)	0.500	3/16	3
85-894	19 (0.1660)	0.500	3/16	3
85-895	20 (0.1610)	0.500	3/16	3
85-896	21 (0.1590)	0.500	3/16	3
85-897	22 (0.1570)	0.500	3/16	3
85-898	23 (0.1540)	0.500	5/32	3
85-899	24 (0.1520)	0.500	5/32	3
85-900	25 (0.1495)	0.500	5/32	3
85-901	26 (0.1470)	0.500	5/32	3
85-902	27 (0.1440)	0.500	5/32	3
85-903	28 (0.1405)	0.500	5/32	3
85-904	29 (0.1360)	0.500	5/32	3
85-905	30 (0.1285)	0.500	5/32	3
85-906	31 (0.1200)	0.500	1/8	2-1/2
85-907	32 (0.1160)	0.500	1/8	2-1/2
85-908	33 (0.1130)	0.500	1/8	2-1/2
85-909	34 (0.1110)	0.500	1/8	2-1/2
85-910	35 (0.1100)	0.500	1/8	2-1/2
85-911	36 (0.1065)	0.500	1/8	2-1/2
85-912	37 (0.1040)	0.500	1/8	2-1/2
85-913	38 (0.1015)	0.500	1/8	2-1/2
85-914	39 (0.0995)	0.500	1/8	2-1/2
85-915	40 (0.0980)	0.500	1/8	2-1/2
85-916	41 (0.0960)	0.500	1/8	2-1/2

FRACTIONAL DRILLS

PART #	CED	FLUTE LGTH	SHANK	OAL
85-807	1/8 (0.1250)	0.500	1/8	3
85-808	9/64 (0.1406)	0.500	3/16	3
85-809	5/32 (0.1563)	0.500	3/16	3
85-810	11/64 (0.1719)	0.500	3/16	3
85-811	3/16 (0.1875)	0.500	3/16	3
85-812	13/64 (0.2031)	0.500	1/4	3
85-813	7/32 (0.2188)	0.500	1/4	3
85-814	15/64 (0.2344)	0.500	1/4	3
85-815	1/4 (0.2500)	0.500	1/4	3
85-816	17/64 (0.2656)	0.500	5/16	3
85-817	9/32 (0.2813)	0.500	5/16	3
85-818	19/64 (0.2969)	0.500	5/16	3
85-819	5/16 (0.3125)	0.500	5/16	3
85-820	21/64 (0.3281)	0.500	3/8	3
85-821	11/32 (0.3438)	0.500	3/8	3
85-822	23/64 (0.3594)	0.500	3/8	3
85-823	3/8 (0.3750)	0.500	3/8	3
85-827	7/16 (0.4375)	0.500	7/16	3
85-831	1/2 (0.5000)	0.500	1/2	3

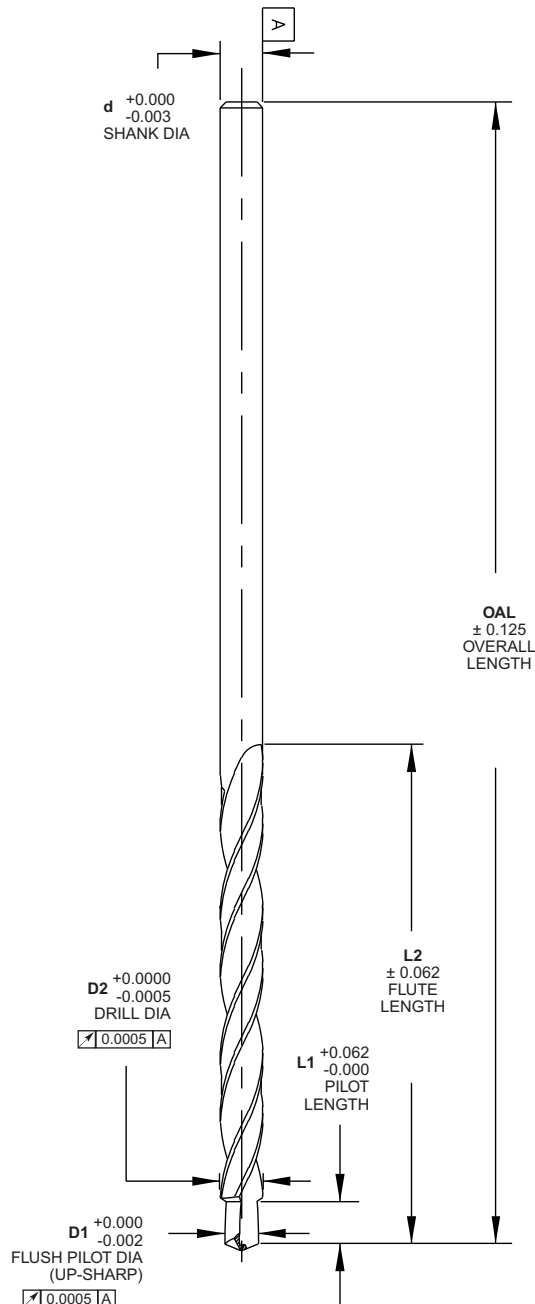
METRIC DRILLS

PART #	CED	FLUTE LGTH	SHANK	OAL
85-961	3.00 (0.1181)	12.000	3	76
85-963	4.00 (0.1575)	12.000	4	76
85-965	5.00 (0.1969)	12.000	5	76
85-967	6.00 (0.2362)	12.000	6	76
85-971	8.00 (0.3150)	12.000	8	76
85-975	10.00 (0.3937)	12.000	10	76
85-979	12.00 (0.4724)	12.000	12	76

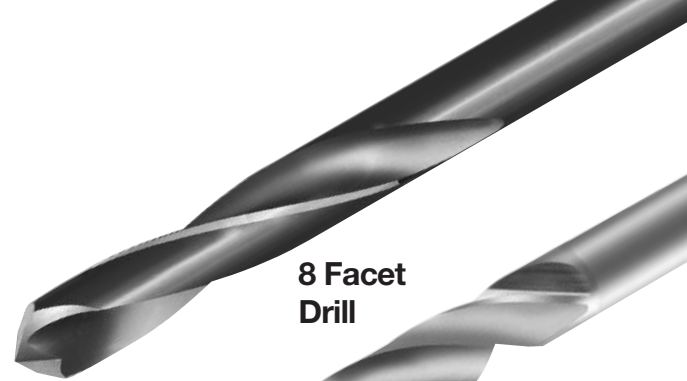
Please see Milling & Drilling Tools for Composite & Honeycomb Materials (OCComp-12) Catalog for our full Advanced Materials tooling.

LMT Onsrud Drilling

Solid Carbide, Coated Solid Carbide and PCD Tipped Drills designed to drill Plastic, Composite, Titanium, Aluminum and Other Non-Ferrous materials.



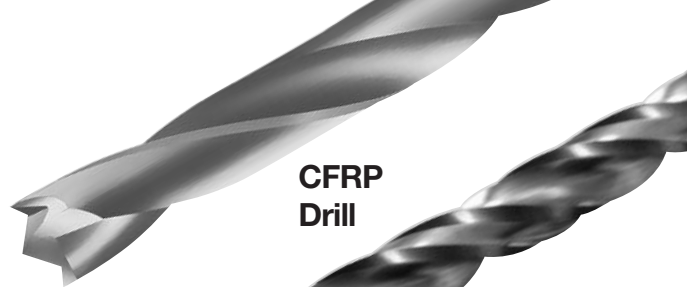
Let LMT Onsrud Design
A Drill for Your
Challenging Application



8 Facet Drill



PCD 8 Facet Drill



CFRP Drill



Piloted Drill Reamer



Double Margin Piloted Step Drill



Drivematic® Drill Countersink



One Shot Drill Reamer

CUTTING TOOL QUOTE REQUEST FORM

1081 S. Northpoint Blvd. • Waukegan, Illinois 60085 • Phone (847) 362-1560 • Fax (800) 557-6720 • www.onsrud.com

*Starred Items = Required information

*Distributor Name _____ *Distributor's Reference Number _____

*Distributor Address _____

*Contact _____ *Email Address _____

*Telephone _____ *Fax _____

End User Name _____ Customer Reference Number _____

End User Address _____

Contact _____ Email Address _____

Telephone _____ Fax _____

*Material being machined _____ Hardness _____

Machine type (Check all that apply): CNC Router CNC Mill Inverted Air Router Hand Other

If other, describe _____

H.P.= _____

Max. Spindle Speed _____ Coolant Type _____

*Tool Material: HSS Solid Carbide Carbide Tip Powder Metal PCD Full Face PCD Tip Other

If other, describe _____

*Flute Style: Spiral Up Spiral "O" Up Straight "V" Flute Compression
 Spiral Down Spiral "O" Down Straight "O" Flute Morise Compression

*Flute Form: Rougher Chipbrk/Finisher Finisher Other

*Point Geometry: Square Ball Nose Drill Point Other
 Center Cutting Non-Center Cutting

*If other, describe _____

*Tool Similar To: _____

Number of Flutes _____

Cutting Diameter (CED) _____

Cutting Length (CEL) _____

Shank Diameter (SHK) _____

Overall Length (OAL) _____

Neck Diameter (ND) _____

Neck Radius (NL) _____

Corner Radius (CR) _____

Coolant Through Yes No

Transition Grind Needed _____

Flat Y / N What Type? _____

Coating Types: TiN TiCN AlTiN Diamond Grit ZrN TiAlN DFC Diamond "Like" Other

If other, describe _____

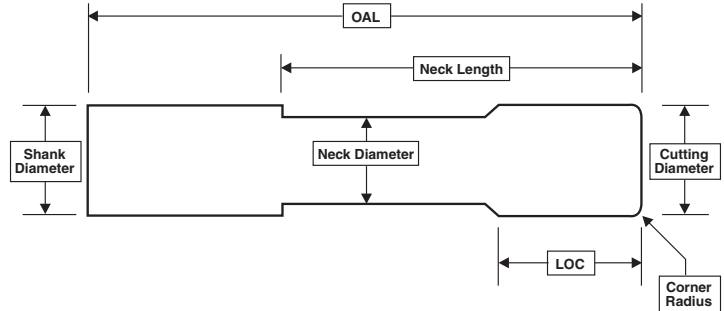
*Quantities Needed: _____

Minimum is 6 pieces

Any Target Pricing? _____

Distributor / End User? _____

Additional Notes: _____



OC-12 Catalog

See Our Complete Offering
in Our Full Line Catalogs...



OCCOMP-12 Catalog



OCMR-12 Catalog



LMT Onsrud LP
1081 S. Northpoint Blvd.
Waukegan, IL 60085 USA
Toll Free: + 1 800 234 1560
Direct: + 1 847 362 1560
www.onsrud.com

ISO 9001 Certified



LMT Tool Systems GmbH
Heidenheimer Straße 84
73447 Oberkochen
Fon +49 73 64 95 79-0
Fax +49 73 64 95 79-80 00
lmt.de@lmt-tools.com
www.lmt-tools.com

Distributed By:

Printed in USA/Catalog AERO-13

LMT BELIN S.A.S.
01590 Lavancia
Frankreich
Telefon +33 474 758989
Telefax +33 474 758990
info@lmt-belin.com
www.lmt-belin.com

LMT KIENINGER GmbH
Vogesenstraße 23
77933 Lahr
Deutschland
Telefon +49 7821 943-0
Telefax +49 7821 943213
info@lmt-kienger.com
www.lmt-keinnger.com

in alliance **BILZ Werkzeugfabrik
GmbH & Co. KG**
Vogelsangstraße 8
73760 Ostfildern
Deutschland
Telefon +49 711 348010
Telefax +49 711 3481256
info@bilz.com
www.bilz.com

LMT Technology Group
**BELIN
FETTE
KIENINGER
ONSRUD**

**LMT FETTE Werkzeugtechnik
GmbH & Co. KG**
Grabauer Straße 24
21493 Schwarzenbek
Deutschland
Telefon +49 4151 12-0
Telefax +49 4151 3797
info@lmt-fette.com
www.lmt-fette.com

LMT ONSRUD LP
1081 S. Northpoint Blvd.
Waukegan, Illinois 60085
USA
Phone +1 847 362 1560
Fax +1 800 557 6720
info@onsrud.com
www.onsrud.com

BOEHLERIT GmbH & Co. KG
Werk-VI-Straße
8605 Kapfenberg
Osterreich
Telefon +43 3862 300-0
Telefax +43 3862 300793
info@boehlert.com
www.boehlert.com

in alliance
**BILZ
BOEHLERIT**