IMTS 2012

NEW PRODUCT HIGHLIGHTS

LMT • ONSRUD

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.

TV-7 Series

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 AlTiN.

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

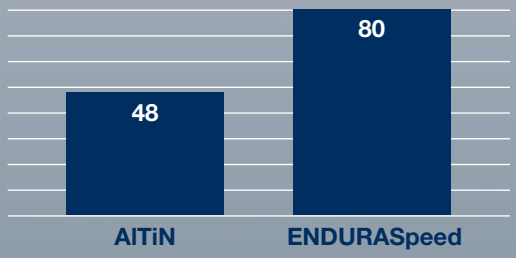
TV-7 NECKED OFFERING:

- 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.

Tool Life (ft.)



Distance Cut (ft.)

AlTiN - 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

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

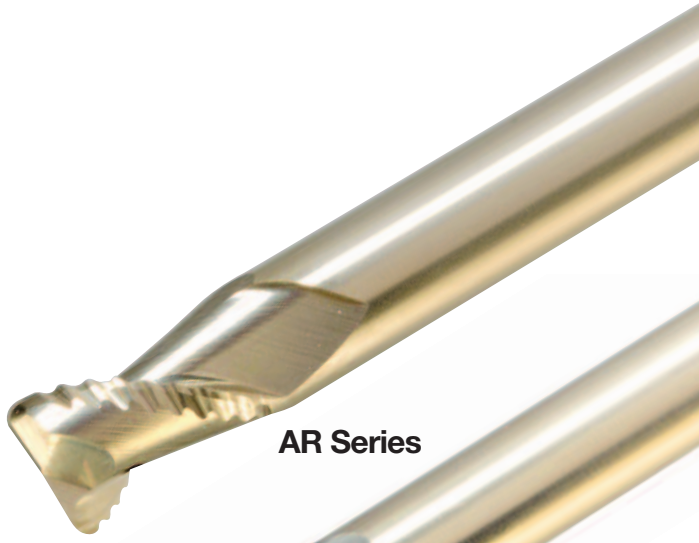
LMT Onsrud Aluminum Roughers are designed for heavy metal removal rates. The ground in chipbreaker pattern and open flute geometry are optimized to slot 30% faster than our standard AF Series. Utilize the ARC End mills for improved chip evacuation and longer tool life.

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



AR Series

ARC Series

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!

65-200B/65-300B SERIES
High Finish Ballnose for Plastics

Typically, when a ball nose tool is used to machine contours in plastic, the surface finish is slightly irregular with evident tool marks. While this finish is acceptable in most applications, it is not satisfactory in many medical components, such as a knee replacement part. To achieve the surface finish required for the plastic insert, LMT Onsrud, developed an **innovative** solid carbide ball nose tool. The new tool's unique geometry, **specially designed point**, and **highly polished** primary clearance and flute give the tool the ability to attain a surface finish of 28 Ra in mechanical plastic.

65-200B Series

65-300B Series

PART #	CED	FLUTE LGTH	SHANK	OAL	FLUTES
TWO FLUTE					
65-205B	1/16	1/4	1/8	2	2
65-210B	1/8	1/2	1/8	2-1/2	2
65-215B	3/16	1/2	1/4	2-1/2	2
65-220B	1/4	1/2	1/4	2-1/2	2
65-225B	1/4	1-1/8	1/4	3	2
65-235B	5/16	1/2	5/16	3	2
65-240B	5/16	1-1/8	5/16	3	2
65-250B	3/8	1-1/8	3/8	3	2
65-260B	1/2	1-1/8	1/2	3	2
METRIC					
65-280B	3mm	12mm	3mm	64mm	2
65-285B	6mm	20mm	6mm	76mm	2
65-290B	8mm	25mm	8mm	76mm	2
65-295B	10mm	30mm	10mm	76mm	2
FOUR FLUTE					
65-310B	1/4	1/2	1/4	3	4
65-315B	5/16	1/2	5/16	3	4
65-320B	3/8	5/8	3/8	3	4
65-325B	1/2	3/4	1/2	3	4

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).

54-200 Series

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

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	UPCUT LGTH	FLUTE 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

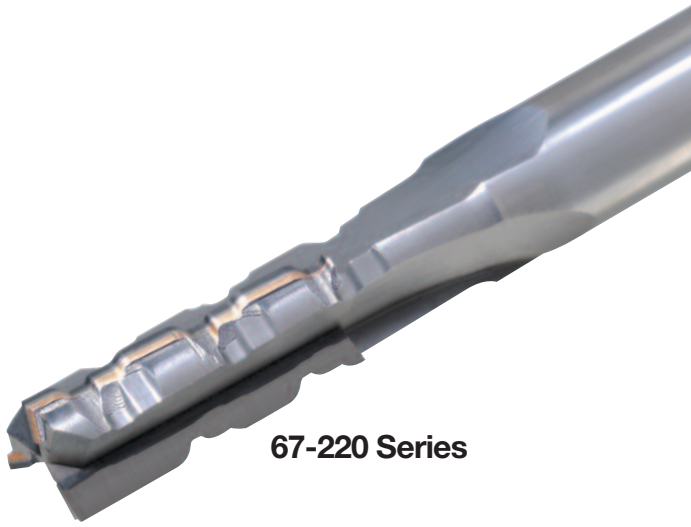
METRIC						
66-852DFC	6mm	20mm	7.75mm	6mm	90mm	4
66-858DFC	8mm	25mm	8mm	8mm	100mm	4
66-864DFC	10mm	25mm	8.5mm	10mm	100mm	6
66-870DFC	12mm	25mm	9mm	12mm	100mm	6

66-800 Series

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.

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	3



67-220 Series

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.

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

68-300 Series

66-900 SERIES
High Perfomance 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.

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

63-400 SERIES
Soft Aluminum

The new series of solid carbide, single edge, O-flutes address the issues with machining very soft aluminum alloys, such as 3003. The product has a more **open flute design** to increase chip evacuation and is coated with ZrN (Zirconium-Nitride). There are many advantages of the ZrN coating; it **reduces the amount of heat** on the carbide substrate, it's very low coefficient of friction allows the chip to easily slide up the flute, and it **prevents aluminum build** up on the cutting edge.

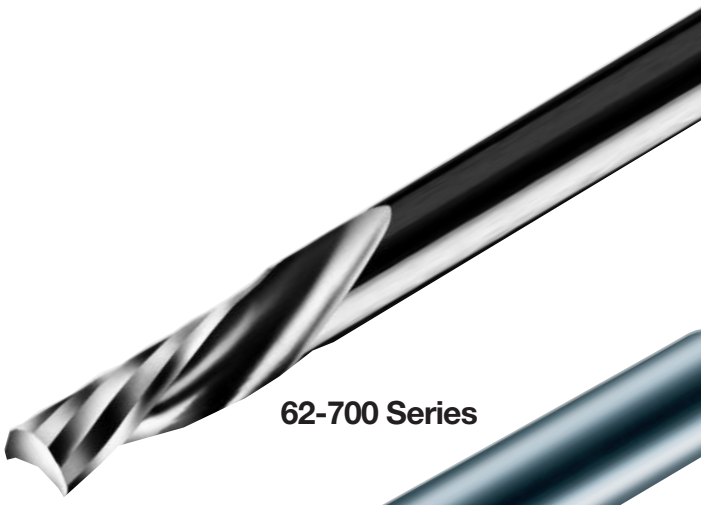
PART #	CED	FLUTE LGTH	SHANK	OAL	COATING
63-420	3/16	1/4	1/4	2	ZRN
63-430	1/4	1/4	1/4	2	ZRN
METRIC					
63-450	5mm	6mm	6mm	64mm	ZRN
63-460	6mm	6mm	6mm	64mm	ZRN

63-400 Series

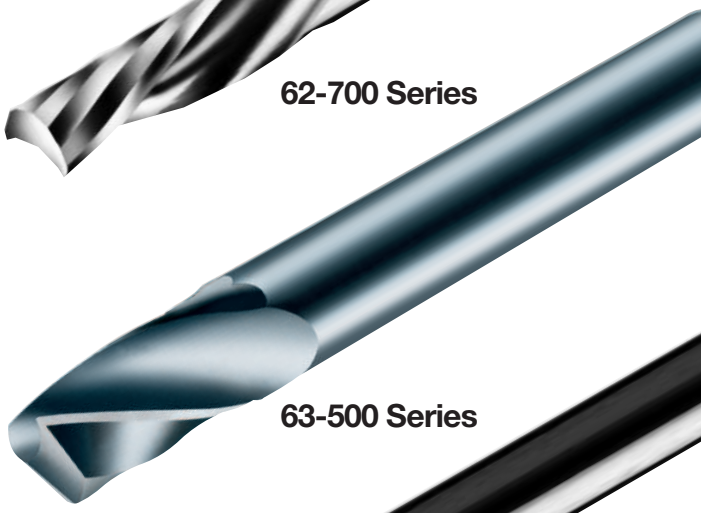
60,000 RPM
Spindle Speeds

The following part numbers have been balanced by design to run at spindle speeds up to 60,000 RPM.

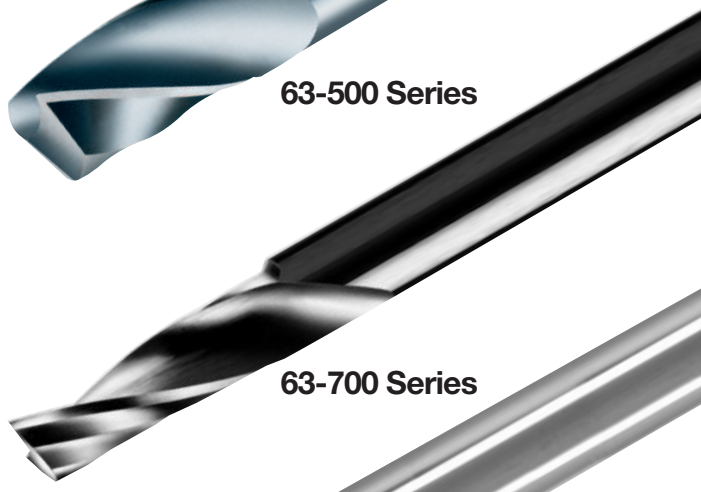
62-606	**63-505**	**63-717**	**63-769**	**63-842**	**65-000**
62-712	**63-510**	**63-718**	**63-793**	**63-854**	**65-010**
62-713	**63-515**	**63-719**	**63-804**	**63-860**	**65-012**
62-715	**63-520**	**63-727**	**63-808**	**63-862**	**65-013**
62-719	**63-700**	**63-743**	**63-810**	**63-864**	**65-018**
62-727	**63-701**	**63-750**	**63-812**	**63-866**	**65-019**
62-762	**63-706**	**63-751**	**63-814**	**63-870**	**65-020**
62-763	**63-707**	**63-760**	**63-816**	**63-874**	**65-021**
62-769	**63-710**	**63-761**	**63-818**	**63-878**	**65-027**
62-816	**63-711**	**63-762**	**63-820**	**63-892**	
62-824	**63-712**	**63-763**	**63-822**	**63-924**	
62-842	**63-713**	**63-766**	**63-824**	**64-000**	
62-866	**63-715**	**63-767**	**63-826**	**64-012**	
62-874	**63-716**	**63-768**	**63-832**	**64-016**	



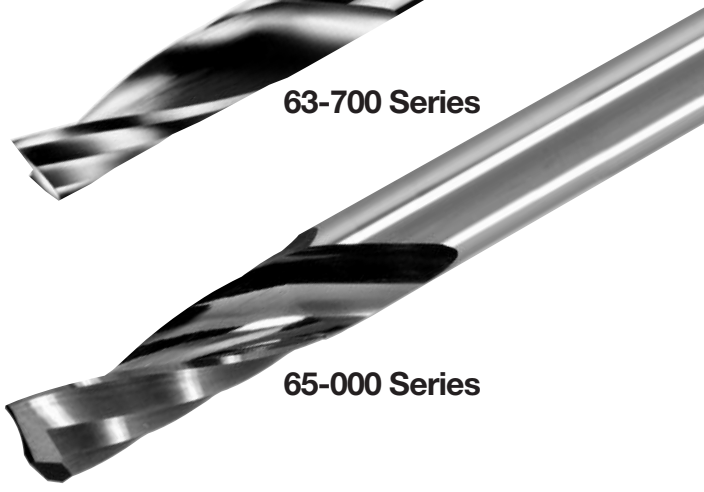
62-700 Series



63-500 Series



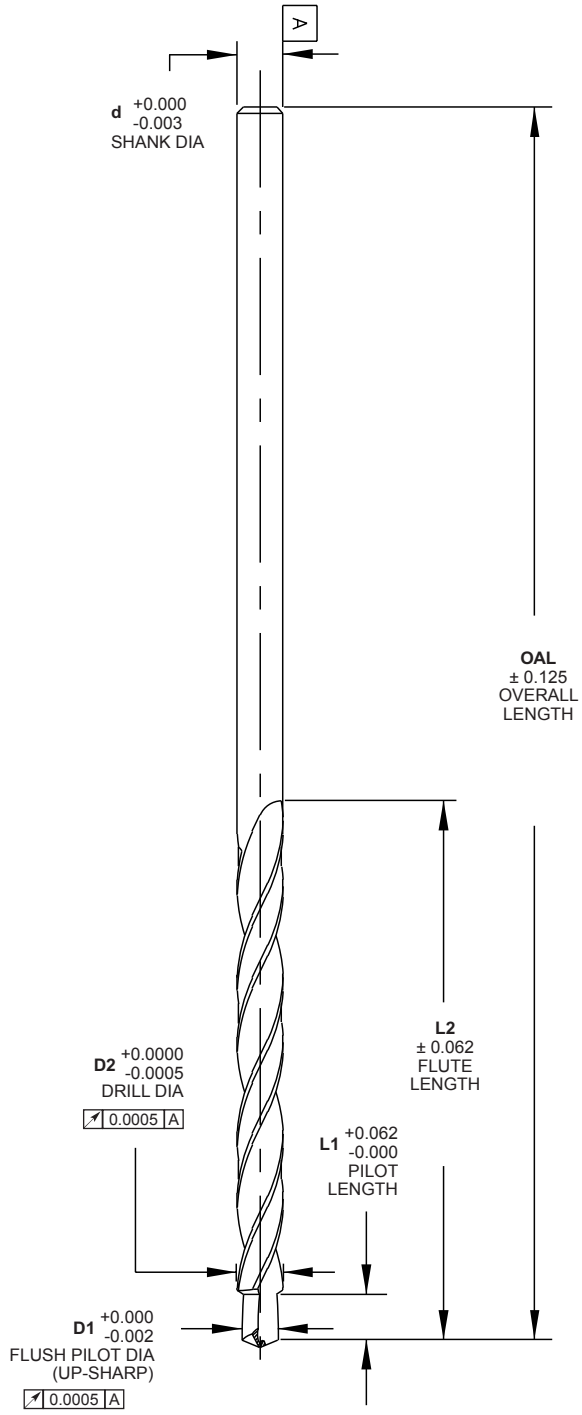
63-700 Series



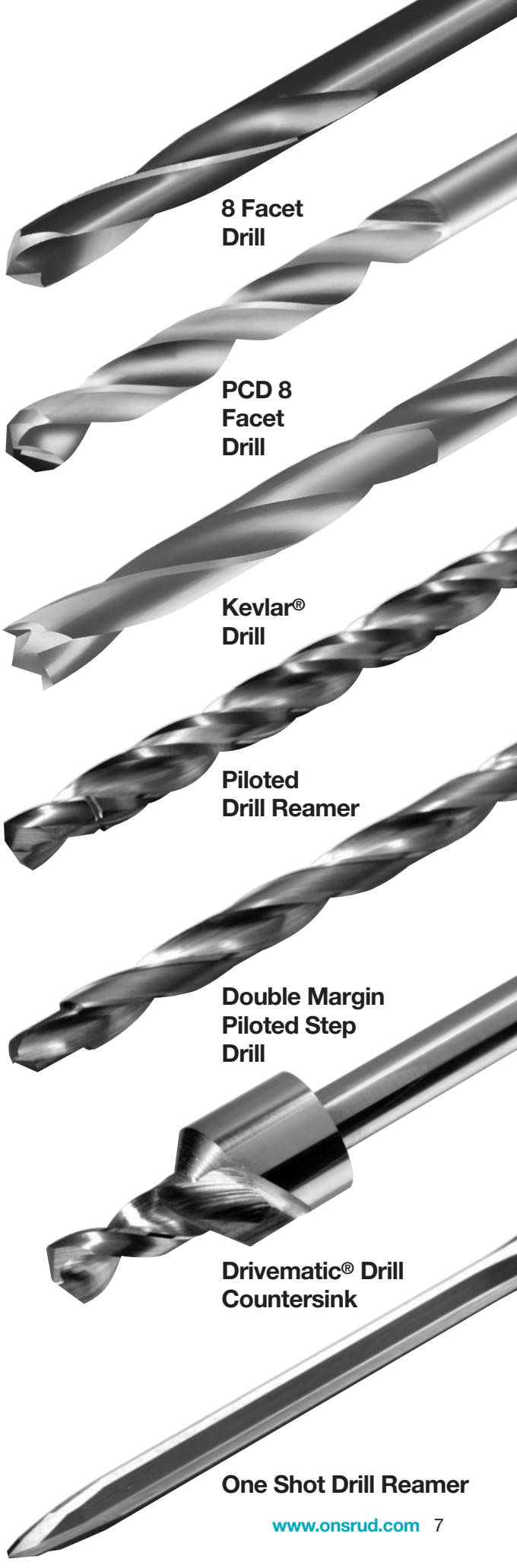
65-000 Series

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



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