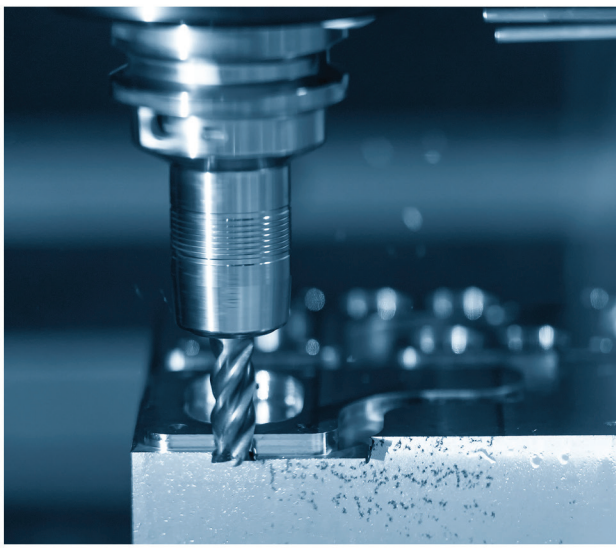
ORION
End Mills for Machining Aluminum

TyCarb



ORION End Mills for Aluminum

ORION end mills are ideal for high performance milling in all grades of aluminum, including the high silicon series as well as extruded and die cast parts.

Due to the unique and polished flute configuration, the Orion end mills are designed for aggressive chip evacuation under extremely heavy chip loads. Orion end mills are capable of speeds in excess of 2,000 SFM when run in a balanced assembly. Orion End Mills are available as 2 flute, 3 flute as well as 3 flute Rougher/Finishers.

MADE IN CANADA
FABRIQUÉ AU CANADA

UK20 This uncoated carbide grade is made from high quality micro grain material. Due to it's exceptional balance of wear and toughness this grade maintains sharp cutting edges and consistent controlled wear rates. UK20 is used for general purpose to high speed machining of aluminum and non-ferrous materials.

ORION 3 Flute
Roughing End Mills for Aluminum

- Orion 3 flute Roughing End Mills specifically designed for Aluminum
- Differential flute spacing for chatter free performance
- Polished flute design for effective chip evacuation
- Designed for aggressive feed rates while maintaining good surface finishes
- Specially designed chipbreaker creates smaller chips and reduces cutting loads on lighter duty machines
- These end mills are available with a Zirconium or DLC coating on request
- 3 Flute to center end cut design for improved plunging capbilities

ORION 3 Flute Roughing End Mills

(Variable Flute / Center Cutting / Cylindrical Shank)

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Radius	UK20 Uncoated
RCOR3RC-SQ0250-R020	1/4	1/4	3/4	2.1/2	.020	●
RCOR3RC-SQ0375-R030	3/8	3/8	7/8	2.1/2	.030	●
RCOR3EC-SQ0375-R030	3/8	3/8	1.1/8	3	.030	●
RCOR3MC-SQ0375-R030	3/8	3/8	1.1/2	3	.030	●
RCOR3EC-SQ0500-R030	1/2	1/2	1.1/4	3	.030	●
RCOR3LC-SQ0500-R030	1/2	1/2	2	4	.030	●
RCOR3RC-SQ0625-R030	5/8	5/8	1.1/4	3.1/2	.030	●
RCOR3LC-SQ0625-R030	5/8	5/8	2	4	.030	●
RCOR3RC-SQ0750-R060	3/4	3/4	1.1/2	4	.060	●
RCOR3SP-SQ0750-R060	3/4	3/4	1.5/8	4	.060	●
RCOR3EC-SQ0750-R060	3/4	3/4	1.3/4	4	.060	●
RCOR3MC-SQ0750-R060	3/4	3/4	3.1/4	2.1/4	.060	●
RCOR3LC-SQ0750-R060	3/4	3/4	3	6	.060	●
RCOR3EC-SQ1000-R060	1	1	1.1/2	4	.060	●
RCOR3MC-SQ1000-R060	1	1	2	4.1/2	.060	●
RCOR3LC-SQ1000-R060	1	1	3	6	.060	●

Recommended Cutting Parameters		Application			Uncoated UK20 Cutting Speed Vc	Cutting Speed (Vc) Maximum Feed per Tooth for Side Milling Operations* Cutting Diameter						
		Side Milling		Slotting								
		Axial Depth	Radial Depth	Max. Axial Depth								
Tool Series	Material	ap	ae	ap	SFM	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
ORION Roughing Cutters	Aluminum Alloys	1.5 x D	.5 x D	1 x D	1000 - 2000	.003 - .0054	.0035 - .0068	.004 - .0075	.0056 - .010	.007 - .0118	.0085 - .0138	.0113 - .0163
	Aluminum with High Silicon	1.5 x D	.5 x D	1 x D	700 - 2000	.0023 - .0054	.003 - .0063	.0034 - .0068	.0045 -.0076	.0056 - .0094	.0068 - .010	.009 - .0138
	other Non-Ferrous materials	1.5 x D	.5 x D	1 x D	750 - 1500	.0023 - .0054	.003 - .0063	.0034 - .0068	.0045 -.0076	.0056 - .0094	.0068 - .010	.009 - .0138

* Feed per tooth in slotting applications should not exceed 80% of feed per tooth for side milling

ORION 2 Flute End Mills for Machining Aluminum

- Orion 2 flute End Mills specifically designed for Aluminum
- New Polished flute design for effective chip evacuation
- One tool for roughing, semi-finishing as well as finishing operations
- Effective for slotting up to 1xD axial depth
- For Side or profile milling capable of 0.5xD radial and 1.5xD axial depth
- Cutting speeds only limited by your machine (Tool Balancing for Higher speeds recommended)
- Multiple length and radius tools available
- These end mills are available with a Zirconium or DLC coating on request

ORION 2 Flute Solid Carbide End Mills (Center Cutting)

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UK20 Uncoated
OR2RC-SQ0125	1/8	1/8	3/8	1.1/2	---	●
OR2EC-SQ0125	1/8	1/8	1/2	1.1/2	---	●
OR2LC-SQ0125	1/8	1/8	3/4	2.1/2	---	●
OR2RC-SQ0187	3/16	3/16	5/16	2	---	●
OR2EC-SQ0187	3/16	3/16	9/16	2	---	●
OR2RC-SQ0250	1/4	1/4	1/2	2.1/2	---	●
OR2RC-SQ0250-015	1/4	1/4	1/2	2.1/2	.015	●
OR2RC-SQ0250-030	1/4	1/4	1/2	2.1/2	.030	●
OR2RC-SQ0250-060	1/4	1/4	1/2	2.1/2	.060	●
OR2EC-SQ0250	1/4	1/4	3/4	2.1/2	---	●
OR2EC-SQ0250-015	1/4	1/4	3/4	2.1/2	.015	●
OR2EC-SQ0250-030	1/4	1/4	3/4	2.1/2	.030	●
OR2LC-SQ0250	1/4	1/4	1.1/8	2.1/2	---	●
OR2LC-SQ0250-015	1/4	1/4	1.1/8	2.1/2	.015	●
OR2LC-SQ0250-030	1/4	1/4	1.1/8	2.1/2	.030	●
OR2RC-SQ0312	5/16	5/16	5/8	2.1/2	---	●
OR2RC-SQ0312-030	5/16	5/16	5/8	2.1/2	.030	●
OR2LC-SQ0312	5/16	5/16	1.1/8	3	---	●
OR2LC-SQ0312-030	5/16	5/16	1.1/8	3	.030	●
OR2RC-SQ0375	3/8	3/8	3/4	2.1/2	---	●
OR2RC-SQ0375-030	3/8	3/8	3/4	2.1/2	.030	●
OR2RC-SQ0375-060	3/8	3/8	3/4	2.1/2	.060	●
OR2EC-SQ0375	3/8	3/8	1.1/8	3	---	●
OR2EC-SQ0375-030	3/8	3/8	1.1/8	3	.030	●
OR2LC-SQ0375	3/8	3/8	2	4	---	●
OR2LC-SQ0375-030	3/8	3/8	2	4	.030	●
OR2RC-SQ0500	1/2	1/2	1	3	---	●
OR2RC-SQ0500-030	1/2	1/2	1	3	.030	●
OR2RC-SQ0500-060	1/2	1/2	1	3	.060	●
OR2EC-SQ0500	1/2	1/2	1.1/4	3	---	●
OR2EC-SQ0500-030	1/2	1/2	1.1/4	3	.030	●
OR2EC-SQ0500-060	1/2	1/2	1.1/4	3	.060	●
OR2LC-SQ0500	1/2	1/2	2	4	---	●
OR2LC-SQ0500-030	1/2	1/2	2	4	.030	●
OR2LC-SQ0500-060	1/2	1/2	2	4	.060	●
OR2RC-SQ0625	5/8	5/8	1.1/4	3.1/2	---	●
OR2RC-SQ0625-030	5/8	5/8	1.1/4	3.1/2	.030	●
OR2RC-SQ0625-060	5/8	5/8	1.1/4	3.1/2	.060	●
OR2EC-SQ0625	5/8	5/8	1.5/8	3.1/2	---	●
OR2EC-SQ0625-030	5/8	5/8	1.5/8	3.1/2	.030	●
OR2EC-SQ0625-060	5/8	5/8	1.5/8	3.1/2	.060	●
OR2LC-SQ0625	5/8	5/8	2	4	---	●
OR2LC-SQ0625-030	5/8	5/8	2	4	.030	●
OR2LC-SQ0625-060	5/8	5/8	2	4	.060	●
OR2RC-SQ0750	3/4	3/4	1.1/2	4	---	●
OR2RC-SQ0750-030	3/4	3/4	1.1/2	4	.030	●
OR2RC-SQ0750-060	3/4	3/4	1.1/2	4	.060	●
OR2EC-SQ0750	3/4	3/4	1.3/4	4	---	●
OR2EC-SQ0750-030	3/4	3/4	1.3/4	4	.030	●
OR2EC-SQ0750-060	3/4	3/4	1.3/4	4	.060	●
OR2LC-SQ0750	3/4	3/4	3	6	---	●
OR2LC-SQ0750-030	3/4	3/4	3	6	.030	●
OR2LC-SQ0750-060	3/4	3/4	3	6	.060	●
OR2RC-SQ1000	1	1	1.1/2	4	---	●
OR2RC-SQ1000-030	1	1	1.1/2	4	.030	●
OR2RC-SQ1000-060	1	1	1.1/2	4	.060	●
OR2EC-SQ1000	1	1	2	4.1/2	---	●
OR2EC-SQ1000-030	1	1	2	4.1/2	.030	●
OR2EC-SQ1000-060	1	1	2	4.1/2	.060	●
OR2LC-SQ1000	1	1	3	6	---	●
OR2LC-SQ1000-030	1	1	3	6	.030	●
OR2LC-SQ1000-060	1	1	3	6	.060	●

UK20 This uncoated carbide grade is made from high quality micro grain material. Due to it's exceptional balance of wear and toughness this grade maintains sharp cutting edges and consistent controlled wear rates. UK20 is used for general purpose to high speed machining of aluminum and non-ferrous materials.

ORION 3 Flute End Mills for Machining Aluminum

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- For Side or profile milling capable of 0.5xD radial and 1.5xD axial depth
- Cutting speeds only limited by your machine (Tool Balancing for Higher speeds recommended)
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ORION 3 Flute Solid Carbide End Mills (Center Cutting)

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UK20 Uncoated
OR3RC-SQ0125	1/8	1/8	3/8	1.1/2	---	●
OR3EC-SQ0125	1/8	1/8	1/2	1.1/2	---	●
OR3LC-SQ0125	1/8	1/8	3/4	2.1/2	---	●
OR3RC-SQ0187	3/16	3/16	5/16	2	---	●
OR3EC-SQ0187	3/16	3/16	9/16	2	---	●
OR3RC-SQ0250	1/4	1/4	1/2	2.1/2	---	●
OR3RC-SQ0250-015	1/4	1/4	1/2	2.1/2	.015	●
OR3RC-SQ0250-030	1/4	1/4	1/2	2.1/2	.030	●
OR3RC-SQ0250-060	1/4	1/4	1/2	2.1/2	.060	●
OR3EC-SQ0250	1/4	1/4	3/4	2.1/2	---	●
OR3EC-SQ0250-015	1/4	1/4	3/4	2.1/2	.015	●
OR3EC-SQ0250-030	1/4	1/4	3/4	2.1/2	.030	●
OR3LC-SQ0250	1/4	1/4	1.1/8	2.1/2	---	●
OR3LC-SQ0250-015	1/4	1/4	1.1/8	2.1/2	.015	●
OR3LC-SQ0250-030	1/4	1/4	1.1/8	2.1/2	.030	●
OR3RC-SQ0312	5/16	5/16	5/8	2.1/2	---	●
OR3RC-SQ0312-030	5/16	5/16	5/8	2.1/2	.030	●
OR3LC-SQ0312	5/16	5/16	1.1/8	3	---	●
OR3LC-SQ0312-030	5/16	5/16	1.1/8	3	.030	●
OR3RC-SQ0375	3/8	3/8	3/4	2.1/2	---	●
OR3RC-SQ0375-030	3/8	3/8	3/4	2.1/2	.030	●
OR3RC-SQ0375-060	3/8	3/8	3/4	2.1/2	.060	●
OR3EC-SQ0375	3/8	3/8	1.1/8	3	---	●
OR3EC-SQ0375-030	3/8	3/8	1.1/8	3	.030	●
OR3EC-SQ0375-060	3/8	3/8	1.1/8	3	.060	●
OR3LC-SQ0375	3/8	3/8	2	4	---	●
OR3LC-SQ0375-030	3/8	3/8	2	4	.030	●
OR3LC-SQ0375-060	3/8	3/8	2	4	.060	●
OR3RC-SQ0500	1/2	1/2	1	3	---	●
OR3RC-SQ0500-030	1/2	1/2	1	3	.030	●
OR3RC-SQ0500-060	1/2	1/2	1	3	.060	●
OR3EC-SQ0500	1/2	1/2	1.1/4	3	---	●
OR3EC-SQ0500-030	1/2	1/2	1.1/4	3	.030	●
OR3EC-SQ0500-060	1/2	1/2	1.1/4	3	.060	●
OR3EC-SQ0500-090	1/2	1/2	1.1/4	3	.090	●

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UK20 Uncoated
OR3EC-SQ0500-120	1/2	1/2	1.1/4	3	.120	●
OR3LC-SQ0500	1/2	1/2	2	4	---	●
OR3LC-SQ0500-030	1/2	1/2	2	4	.030	●
OR3LC-SQ0500-060	1/2	1/2	2	4	.060	●
OR3RC-SQ0625	5/8	5/8	1.1/4	3.1/2	---	●
OR3RC-SQ0625-030	5/8	5/8	1.1/4	3.1/2	.030	●
OR3RC-SQ0625-060	5/8	5/8	1.1/4	3.1/2	.060	●
OR3EC-SQ0625	5/8	5/8	1.5/8	3.1/2	---	●
OR3EC-SQ0625-030	5/8	5/8	1.5/8	3.1/2	.030	●
OR3EC-SQ0625-060	5/8	5/8	1.5/8	3.1/2	.060	●
OR3LC-SQ0625	5/8	5/8	2	4	---	●
OR3LC-SQ0625-030	5/8	5/8	2	4	.030	●
OR3LC-SQ0625-060	5/8	5/8	2	4	.060	●
OR3RC-SQ0750	3/4	3/4	1.1/2	4	---	●
OR3RC-SQ0750-030	3/4	3/4	1.1/2	4	.030	●
OR3RC-SQ0750-060	3/4	3/4	1.1/2	4	.060	●
OR3RC-SQ0750-090	3/4	3/4	1.1/2	4	.090	●
OR3RC-SQ0750-120	3/4	3/4	1.1/2	4	.120	●
OR3EC-SQ0750	3/4	3/4	1.3/4	4	---	●
OR3EC-SQ0750-030	3/4	3/4	1.3/4	4	.030	●
OR3EC-SQ0750-060	3/4	3/4	1.3/4	4	.060	●
OR3LC-SQ0750	3/4	3/4	3	6	---	●
OR3LC-SQ0750-030	3/4	3/4	3	6	.030	●
OR3LC-SQ0750-060	3/4	3/4	3	6	.060	●
OR3RC-SQ1000	1	1	1.1/2	4	---	●
OR3RC-SQ1000-030	1	1	1.1/2	4	.030	●
OR3RC-SQ1000-060	1	1	1.1/2	4	.060	●
OR3RC-SQ1000-090	1	1	1.1/2	4	.090	●
OR3RC-SQ1000-120	1	1	1.1/2	4	.120	●
OR3EC-SQ1000	1	1	2	4.1/2	---	●
OR3EC-SQ1000-030	1	1	2	4.1/2	.030	●
OR3EC-SQ1000-060	1	1	2	4.1/2	.060	●
OR3LC-SQ1000	1	1	3	6	---	●
OR3LC-SQ1000-030	1	1	3	6	.030	●
OR3LC-SQ1000-060	1	1	3	6	.060	●

ORION 2 & 3 Flute Ball Nose End Mills for Machining Aluminum

The unique design characteristics of the ORION End Mills provide exceptional performance & outstanding tool life. These end mills are available as uncoated UK20 or with a Zirconium or DLC coating on request.

- Highly polished design
- 3 Flute end mill has differential pitch
- Premium Micro-Grain Carbide
- Special Diameters or lengths available on request

MADE IN CANADA
FABRIQUÉ AU CANADA

ORION 2 Flute Ball Nose End Mills

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UK20 Uncoated
OR2RC-BN0250	1/4	1/4	3/4	2.1/2	.125	●
OR2RC-BN0312	5/16	5/16	13/16	2.1/2	.156	●
OR2RC-BN0375	3/8	3/8	3/4	2.1/2	.188	●
OR2EC-BN0500	1/2	1/2	1.1/4	3	-	●
OR2RC-BN0625	5/8	5/8	1.1/4	3.1/2	.313	●
OR2RC-BN0750	3/4	3/4	1.1/2	4	.375	●

ORION 3 Flute Ball Nose End Mills

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UK20 Uncoated
OR3RC-BN0250	1/4	1/4	3/4	2.1/2	.125	●
OR3RC-BN0312	5/16	5/16	13/16	2.1/2	.156	●
OR3RC-BN0375	3/8	3/8	3/4	2.1/2	.188	●
OR3EC-BN0500	1/2	1/2	1.1/4	3	.250	●
OR3RC-BN0625	5/8	5/8	1.1/4	3.1/2	.313	●
OR3RC-BN0750	3/4	3/4	1.1/2	4	.375	●

Recommended Cutting Parameters		Application			Uncoated UK20	Cutting Speed (Vc) Maximum Feed per Tooth for Side Milling Operations* Cutting Diameter						
		Side Milling		Slotting								
		Axial Depth	Radial Depth	Max. Axial Depth								
Tool Series	Material	ap	ae	ap	SFM	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
ORION	Aluminum Alloys	1.5 x D	0.5 x D	1 x D	1000 - 2000 SFM	.0023 - .0043	.0028 - .0055	.0034 - .006	.0045 - .008	.0056 - .0095	.0068 - .011	.0090 - .013
	Aluminum with High Silicon	1.5 x D	0.5 x D	1 x D	700 - 2000 SFM	.0018 - .0043	.0023 - .0050	.0027 - .0052	.0036 - .0061	.0045 - .0075	.0054 - .0081	.0072 - .0110
	other Non-Ferrous materials	1.5 x D	0.5 x D	1 x D	750 - 1500 SFM	.0018 - .0043	.0023 - .0050	.0027 - .0052	.0036 - .0061	.0045 - .0075	.0054 - .0081	.0072 - .0110

* Feed per tooth in slotting applications should not exceed 80% of feed per tooth for side milling

PLOR 3 Flute End Mills for Machining Aluminum

The re-engineered 3 flute TyCarb Orion PLOR series takes a significant leap forward in cutter performance in aluminum and non-ferrous materials. The unique design characteristics incorporates center cutting of all three flutes directly to the center-point of the tools (both end mill and ball nose) which expands application versatility to plunging, ramping, and even drilling. The revised tools improve feed rates, overall cutter balance at high spindle speeds and lower cutting forces versus traditionally designed 3 flute end mills. The square corner end mills also incorporate an improved dish for increased ramping angles. The combined performance gains of the improved design simply translates into better workpiece finishes and enhanced machine spindle life.

- Highly Polished 3 flute design for Aluminum and Non Ferrous materials
- Balanced 3 flute to center design for improved ramping & drilling applications
- Differential pitch for vibration free machining
- Available as Square end or Ball Nose design
- Special diameters or lengths available on request
- Premium Micro-Grain carbide
- These end mills are available with a Zirconium or DLC coating on request

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ORION 3 Flute Balanced Center Cut Square End

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UK20 Uncoated
PLOR3RC-SQ0250	1/4	1/4	3/4	2.1/2	-	●
PLOR3RC-SQ0312	5/16	5/16	13/16	2.1/2	-	●
PLOR3RC-SQ0375	3/8	3/8	3/4	2.1/2	-	●
PLOR3EC-SQ0500	1/2	1/2	1.1/4	3	-	●
PLOR3RC-SQ0625	5/8	5/8	1.1/4	3.1/2	-	●
PLOR3RC-SQ0750	3/4	3/4	1.1/2	4	-	●

ORION 3 Flute Balanced Center Cut Ball Nose

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UK20 Uncoated
PLOR3RC-BN0250	1/4	1/4	3/4	2.1/2	.125	●
PLOR3RC-BN0312	5/16	5/16	13/16	2.1/2	.156	●
PLOR3RC-BN0375	3/8	3/8	3/4	2.1/2	.188	●
PLOR3EC-BN0500	1/2	1/2	1.1/4	3	.250	●
PLOR3RC-BN0625	5/8	5/8	1.1/4	3.1/2	.313	●
PLOR3RC-BN0750	3/4	3/4	1.1/2	4	.375	●

ORION 3 Flute Metric Square End

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UK20 Uncoated
PLOR3EC-SQ06MM	6	6	20	64	-	●
PLOR3EC-SQ08MM	8	8	20	64	-	●
PLOR3EC-SQ10MM	10	10	28	76	-	●
PLOR3EC-SQ12MM	12	12	32	76	-	●
PLOR3EC-SQ16MM	16	16	38	89	-	●

ORION 3 Flute Metric Ball Nose

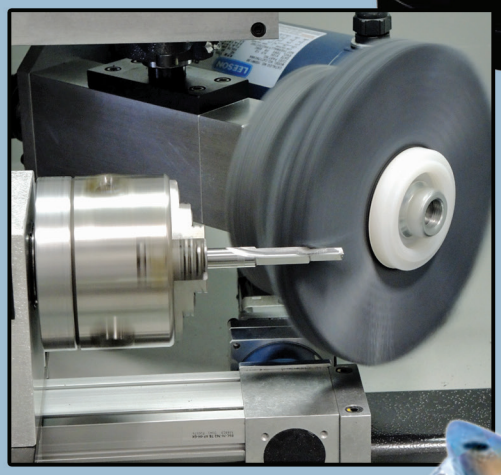
Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UK20 Uncoated
PLOR3EC-BN06MM	6	6	20	64	3.0	●
PLOR3EC-BN08MM	8	8	20	64	4.0	●
PLOR3EC-BN10MM	10	10	28	76	5.0	●
PLOR3EC-BN12MM	12	12	32	76	6.0	●
PLOR3EC-BN16MM	16	16	38	89	8.0	●

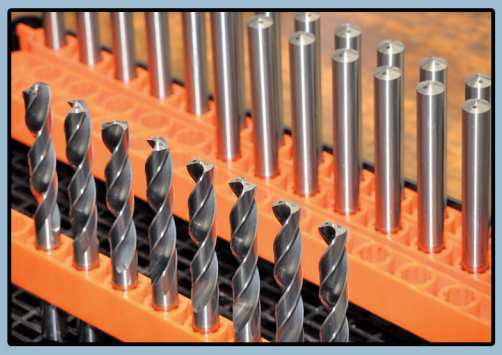
CUSTOM SOLUTIONS

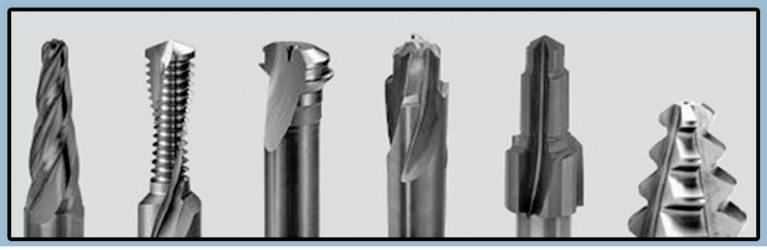
TYcarb

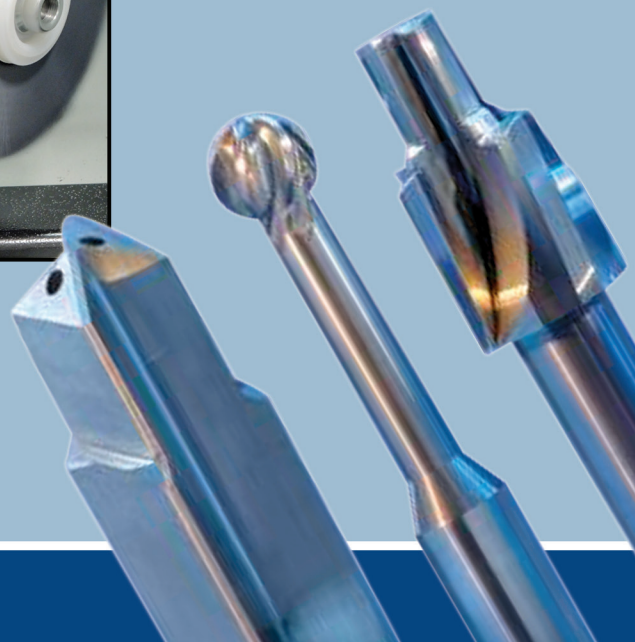
From simple modifications to standard lines of tooling, to completely engineered tooling solutions - we have the skill, knowledge and expertise to deliver quality products to increase productivity

- Solid Carbide Tooling
- Custom Drills & End Mills
- Custom Form Tools
- Coolant Through G-Drills, & Step Drills
- Special Radii Tooling
- Carbide Reamers
- Jig Boring Tools
- Dovetail Cutters
- Porting Tools
- Coolant Through End Mills
- Spherical End Mills









Custom Quote Request

Company: _____ Contact Name: _____

Address: _____ E-mail Address: _____

City: _____ P/Code: _____ Tel. No.: _____

Proposed Tool Designation: _____ Quantity: _____

End Mill Dia.: _____ Shank Dia.: _____ Overall Length: _____

Length of Cut: _____ Neck Dia.: _____ Neck Length: _____

No. of Flutes: _____ Helix Angle: _____ R/H or L/H: _____

End Type: Center Cutting: _____ Non-Center Cutting: _____

End Feature: Square End: _____ Ball End: _____ Corner Rad.: _____ Corner Chamfer: _____

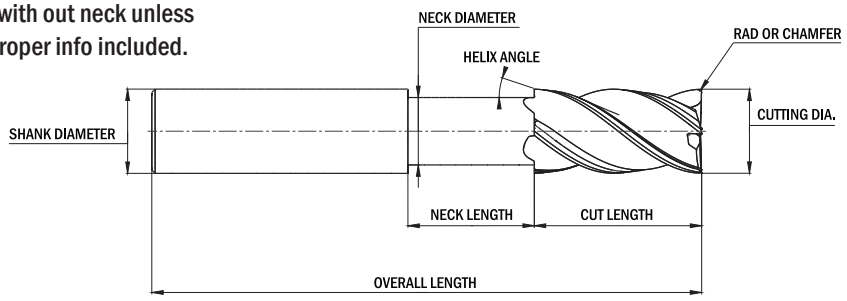
Shank Type: Cylindrical: _____ Weldon: _____ Whistle Notch: _____ Other: _____

Coating: Uncoated: _____ TiAlN: _____ AlCrN: _____ DLC: _____ Other: _____

Material Being Machined: _____ Condition: _____ Hardness: _____

Additional Information: _____

Note! End mills are supplied with out neck unless requested by customer and proper info included.



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