

GP END MILLS

GP High Performance 4 Flute End Mills

TyCarb GP High Performance end mills feature Differential flute spacing to achieve virtually chatter free machining in a wide range of materials. Excellent results can be achieved on all steels from carbon to alloy as well as stainless and even exotic materials. With the unique design of these tools as well as the superior TiAlN coating you can expect excellent levels of performance in your machining applications.

- Differential flute spacing
- Superior TiAlN PVD coating
- Available with Cylindrical or Weldon style shanks
- Available with square end as well as wide range of radius choices



GP High Performance 4 Flute Ball Nose End Mills

TyCarb GP High Performance 4 flute ball nose end mills feature Differential flute spacing to achieve virtually chatter free machining in a wide range of materials. Excellent results can be achieved on all steels from carbon to alloy as well as stainless and even exotic materials. With the unique design of these tools as well as the superior TiAlN coating you can expect excellent levels of performance in your machining applications.

- Differential flute spacing
- Superior TiAlN PVD coating
- Available with Cylindrical or Weldon style shanks

GP 2 Flute End Mills

TyCarb two flute end mills are designed for plunging, slotting and applications where increased chip clearance at higher feed rates are required in heavy peripheral machining applications. TyCarb 2 Flute GP end mills are used in general milling application in low to medium carbon steels, cast iron, easy to machine stainless steels, composites, plastics, aluminum, aluminum and copper alloys as well as brass and bronze.

- Available with Cylindrical or Weldon style shanks
- Superior TiAlN PVD coating

Recommended Cutting Parameters

Work Material	Type of Cut	Axial DOC	Radial DOC	Speed (SFM)	Feed (Inches Per Tooth)						
					1/8	1/4	3/8	1/2	5/8	3/4	1
Low Carbon Steels <= 38 Rc 1018, 12L14, 8620	Slotting Peripheral - Rough	1 x D	1 x D	350	0.0008	0.0016	0.0024	0.0032	0.0040	0.0048	0.0064
		1.5 x D	.5 x D	425	0.0010	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080
Medium Carbon Steels <= 38 Rc 4140, 4340	Slotting Peripheral - Rough	1 x D	1 x D	325	0.0006	0.0013	0.0020	0.0027	0.0034	0.0040	0.0054
		1.5 x D	.5 x D	375	0.0008	0.0017	0.0026	0.0035	0.0044	0.0053	0.0070
Tool and Die Steels <= 38 Rc A2, D2, O1, S7, P20, H13	Slotting Peripheral - Rough	1 x D	1 x D	325	0.0006	0.0013	0.0020	0.0027	0.0034	0.0040	0.0054
		1.5 x D	.5 x D	375	0.0008	0.0017	0.0026	0.0035	0.0044	0.0053	0.0070
Tool Steels 39 Rc to 48 Rc	Slotting Peripheral - Rough	.75 x D	1 x D	225	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040
		1 x D	.5 x D	275	0.0006	0.0012	0.0017	0.0023	0.0029	0.0035	0.0046
Easy to machine stainless steel 416, 410, 302, 303	Slotting Peripheral - Rough	1 x D	1 x D	300	0.0006	0.0012	0.0018	0.0025	0.0031	0.0037	0.0050
		1.5 x D	.5 x D	375	0.0008	0.0016	0.0024	0.0032	0.0040	0.0048	0.0064
Moderately difficult stainless steels 304, 316, Invar, Kovar	Slotting Peripheral - Rough	.75 x D	1 x D	275	0.0005	0.0011	0.0016	0.0022	0.0027	0.0033	0.0044
		1.5 x D	.5 x D	350	0.0007	0.0015	0.0023	0.0032	0.0037	0.0045	0.0064
Difficult to machine stainless steels 316L, 17-4 PH, 15-5 PH, 13-8 PH	Slotting Peripheral - Rough	.5 x D	1 x D	250	0.0004	0.0009	0.0012	0.0018	0.0022	0.0027	0.0036
		1 x D	.5 x D	300	0.0005	0.0011	0.0016	0.0022	0.0028	0.0033	0.0044
Cast Iron Grey	Slotting Peripheral - Rough	1 x D	1 x D	400	0.0006	0.0012	0.0019	0.0025	0.0031	0.0038	0.0050
		1.5 x D	.5 x D	500	0.0007	0.0015	0.0023	0.0030	0.0037	0.0046	0.0060
Cast Iron Ductile	Slotting Peripheral - Rough	1 x D	1 x D	300	0.0006	0.0012	0.0018	0.0023	0.0029	0.0035	0.0046
		1.5 x D	.5 x D	400	0.0007	0.0014	0.0021	0.0028	0.0035	0.0042	0.0056
Cast Iron Malleable	Slotting Peripheral - Rough	.75 x D	1 x D	250	0.0004	0.0008	0.0012	0.0015	0.0019	0.0023	0.0030
		1 x D	.75 x D	325	0.0005	0.0011	0.0016	0.0022	0.0027	0.0033	0.0044
Titanium Alloys	Slotting Peripheral - Rough	.5 x D	1 x D	250	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040
		1 x D	.5 x D	300	0.0006	0.0012	0.0017	0.0023	0.0029	0.0035	0.0046
High Temperature Alloys Inconel, Haynes, Stellite, Hastalloy	Slotting Peripheral - Rough	.25 x D	1 x D	70	0.0004	0.0008	0.0012	0.0015	0.0019	0.0024	0.0030
		1 x D	.25 x D	95	0.0005	0.0009	0.0014	0.0018	0.0022	0.0028	0.0036



The TyCarb GP Series of 4 flute end mills have been specifically designed for today's difficult materials as well as the modern machinery now available. From Sub-Micron Carbide Rod to differential fluting and superior PVD coating the GP Series excels in difficult materials and applications.

The Unique design enables true chatter-free machining. Excellent performance is achievable in slotting as well as profiling applications. The GP family is ideal for heavily interrupted cuts and when machining stainless, titanium as well as other materials that generate high temperatures.



4 Flute End Mills

(Variable Flute / Center Cutting)

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UP25	TL25
GP4R-SQ0125	1/8	1/8	1/4	1-1/2	--	●	●
GP4R-SQ0125-015	1/8	1/8	1/4	1-1/2	.015	●	●
GP4R-SQ0187	3/16	3/16	5/8	2	--	●	●
GP4R-SQ0187-015	3/16	3/16	5/8	2	.015	●	●
GP4R-SQ0250	1/4	1/4	3/4	2-1/2	--	●	●
GP4R-SQ0250-020	1/4	1/4	3/4	2-1/2	.020	●	●
GP4R-SQ0312	5/16	5/16	13/16	2-1/2	--	●	●
GP4R-SQ0312-020	5/16	5/16	13/16	2-1/2	.020	●	●
GP4R-SQ0375	3/8	3/8	7/8	2-1/2	--	●	●
GP4R-SQ0375-020	3/8	3/8	7/8	2-1/2	.020	●	●
GP4E-SQ0375	3/8	3/8	1-1/8	3	--	●	●
GP4E-SQ0375-020	3/8	3/8	1-1/8	3	.020	●	●
GP4R-SQ0437	7/16	7/16	1	2-3/4	--	●	●
GP4R-SQ0500	1/2	1/2	1	3	--	●	●
GP4R-SQ0500-030	1/2	1/2	1	3	.030	●	●
GP4E-SQ0500	1/2	1/2	1-1/4	3	--	●	●
GP4E-SQ0500-030	1/2	1/2	1-1/4	3	.030	●	●
GP4R-SQ0562	9/16	9/16	1-1/4	3-1/2	--	●	●
GP4R-SQ0625	5/8	5/8	1-1/4	3-1/2	--	●	●
GP4R-SQ0625-030	5/8	5/8	1-1/4	3-1/2	.030	●	●
GP4R-SQ0625-060	5/8	5/8	1-1/4	3-1/2	.060	●	●
GP4E-SQ0625	5/8	5/8	1-5/8	3-1/2	--	●	●
GP4E-SQ0625-030	5/8	5/8	1-5/8	3-1/2	.030	●	●
GP4S-SQ0750	3/4	3/4	7/8	3	--	●	●
GP4S-SQ0750-030	3/4	3/4	7/8	3	.030	●	●
GP4R-SQ0750	3/4	3/4	1-1/2	4	--	●	●
GP4R-SQ0750-030	3/4	3/4	1-1/2	4	.030	●	●
GP4R-SQ0750-060	3/4	3/4	1-1/2	4	.060	●	●
GP4R-SQ0750-125	3/4	3/4	1-1/2	4	.125	●	●
GP4R-SQ1000	1	1	1-1/2	4	--	●	●
GP4R-SQ1000-030	1	1	1-1/2	4	.030	●	●
GP4R-SQ1000-060	1	1	1-1/2	4	.060	●	●
GP4R-SQ1000-125	1	1	1-1/2	4	.125	●	●

4 Flute End Mills

(Variable Flute / Center Cutting / Weldon)

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	UP25	TL25
GP4RW-SQ0500	1/2	1/2	1	3	--	●	●
GP4RW-SQ0500-030	1/2	1/2	1	3	.030	●	●
GP4EW-SQ0500	1/2	1/2	1-1/4	3	--	●	●
GP4EW-SQ0500-030	1/2	1/2	1-1/4	3	.030	●	●
GP4RW-SQ0625	5/8	5/8	1-1/4	3-1/2	--	●	●
GP4RW-SQ0625-030	5/8	5/8	1-1/4	3-1/2	.030	●	●
GP4RW-SQ0625-060	5/8	5/8	1-1/4	3-1/2	.060	●	●
GP4EW-SQ0625	5/8	5/8	1-5/8	3-1/2	--	●	●
GP4EW-SQ0625-030	5/8	5/8	1-5/8	3-1/2	.030	●	●
GP4SW-SQ0750	3/4	3/4	7/8	3	--	●	●
GP4SW-SQ0750-030	3/4	3/4	7/8	3	.030	●	●
GP4RW-SQ0750	3/4	3/4	1-1/2	4	--	●	●
GP4RW-SQ0750-030	3/4	3/4	1-1/2	4	.030	●	●
GP4RW-SQ0750-060	3/4	3/4	1-1/2	4	.060	●	●
GP4RW-SQ0750-125	3/4	3/4	1-1/2	4	.125	●	●
GP4RW-SQ1000	1	1	1-1/2	4	--	●	●
GP4RW-SQ1000-030	1	1	1-1/2	4	.030	●	●
GP4RW-SQ1000-060	1	1	1-1/2	4	.060	●	●
GP4RW-SQ1000-125	1	1	1-1/2	4	.125	●	●

TL25 Grade has a thick titanium aluminum nitride (TiAlN) PVD coating designed for the most demanding, dry machining applications. Due to its exceptional balance of wear and toughness this grade enables sharp edges and consistent controlled wear rates.

UP25 This uncoated carbide grade is made from high quality fine grade materials. UP25 is used for general purpose machining of all steels including stainless.



GP Ball Nose Series End Mills are manufactured to the same stringent standards as our regular 4 flute cutters. Differential pitch and superior PVD coatings ensure trouble free performance on even the most difficult materials. These end mills are available with either Cylindrical or Weldon shanks

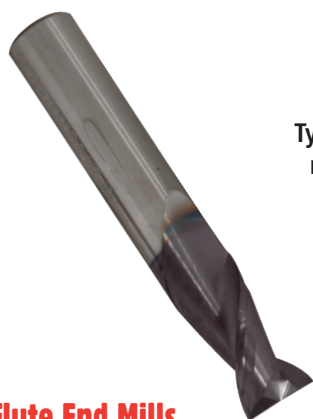


4 Flute Ball Nose End Mills (Variable Flute)

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	TL25
GP4RC-BN0250	1/4	1/4	3/4	2-1/2	-	●
GP4RC-BN0312	5/16	5/16	13/16	2-1/2	-	●
GP4RC-BN0375	3/8	3/8	7/8	2-1/2	-	●
GP4RC-BN0500	1/2	1/2	1	3	-	●
GP4RC-BN0625	5/8	5/8	1-1/4	3-1/2	-	●
GP4RC-BN0750	3/4	3/4	1-1/2	4	-	●
GP4RC-BN1000	1	1	1-1/2	4	-	●

4 Flute Ball Nose End Mills (Variable Flute/Weldon)

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	TL25
GP4RW-BN0500	1/2	1/2	1	3	-	●
GP4RW-BN0625	5/8	5/8	1-1/4	3-1/2	-	●
GP4RW-BN0750	3/4	3/4	1-1/2	4	-	●
GP4RW-BN1000	1	1	1-1/2	4	-	●



TyCarb GP Series 2 flute end mills are designed for general milling applications in low to medium carbon steels, cast iron, easy to machine stainless steels as well as aluminum, brass, bronze and copper alloys. Manufactured with square corners they are available with either cylindrical or Weldon shanks.



2 Flute End Mills (Center Cutting)

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	TL25
GP2R-SQ0250	1/4	1/4	3/4	2-1/2	-	●
GP2R-SQ0312	5/16	5/16	13/16	2-1/2	-	●
GP2R-SQ0375	3/8	3/8	7/8	2-1/2	-	●
GP2R-SQ0437	7/16	7/16	1	2-3/4	-	●
GP2R-SQ0500	1/2	1/2	1	3	-	●
GP2R-SQ0562	9/16	9/16	1-1/4	3-1/2	-	●
GP2R-SQ0625	5/8	5/8	1-1/4	3-1/2	-	●
GP2R-SQ0750	3/4	3/4	1-1/2	4	-	●
GP2R-SQ0875	7/8	7/8	1-1/2	4	-	●
GP2R-SQ1000	1	1	1-1/2	4	-	●

2 Flute End Mills (Center Cutting/Weldon)

Designation	Cutter Dia.	Shank Dia.	Length of Cut	OAL	Corner Radius	TL25
GP2RW-SQ0500	1/2	1/2	1	3	-	●
GP2RW-SQ0625	5/8	5/8	1-1/4	3-1/2	-	●
GP2RW-SQ0750	3/4	3/4	1-1/2	4	-	●
GP2RW-SQ0875	7/8	7/8	1-1/2	4	-	●
GP2RW-SQ1000	1	1	1-1/2	4	-	●

Orion End Mills for Aluminum



Orion End Mills are ideal for high performance milling in all types of Aluminum including high silicon, extruded as well as 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



UK20 This uncoated carbide grade is made from high quality fine grade materials. Due to its exceptional balance of wear and toughness this grade enables sharp edges and consistent controlled wear rates. UK20 is used for general purpose machining of aluminum and non-ferrous materials.

Recommended Cutting Parameters		Application			Uncoated & Coated	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



Orion 2 flute End Mills for 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



ORION 2 Flute Solid Carbide End Mills (Center Cutting)

Designation	Cutter Diameter	Length of Cut	OAL	Corner Radius	UK20 Uncoated
OR2RC-SQ0125	1/8	3/8	1-1/2	-	●
OR2EC-SQ0125	1/8	1/2	1-1/2	-	●
OR2LC-SQ0125	1/8	3/4	2-1/2	-	●
OR2RC-SQ0187	3/16	5/16	2	-	●
OR2EC-SQ0187	3/16	9/16	2	-	●
OR2RC-SQ0250	1/4	1/2	2-1/2	-	●
OR2RC-SQ0250-015	1/4	1/2	2-1/2	.015	●
OR2RC-SQ0250-030	1/4	1/2	2-1/2	.030	●
OR2RC-SQ0250-060	1/4	1/2	2-1/2	.060	●
OR2EC-SQ0250	1/4	3/4	2-1/2	-	●
OR2EC-SQ0250-015	1/4	3/4	2-1/2	.015	●
OR2LC-SQ0250	1/4	1-1/8	2-1/2	-	●
OR2LC-SQ0250-015	1/4	1-1/8	2-1/2	.015	●
OR2RC-SQ0312	5/16	5/8	2-1/2	-	●
OR2RC-SQ0312-030	5/16	5/8	2-1/2	.030	●
OR2LC-SQ0312	5/16	1-1/8	3	-	●
OR2RC-SQ0375	3/8	3/4	2-1/2	-	●
OR2RC-SQ0375-030	3/8	3/4	2-1/2	.030	●
OR2EC-SQ0375	3/8	1-1/8	3	-	●
OR2EC-SQ0375-030	3/8	1-1/8	3	.030	●
OR2LC-SQ0375	3/8	2	4	-	●
OR2LC-SQ0375-030	3/8	2	4	.030	●

Designation	Cutter Diameter	Length of Cut	OAL	Corner Radius	UK20 Uncoated
OR2RC-SQ0500	1/2	1	3	-	●
OR2RC-SQ0500-030	1/2	1	3	.030	●
OR2EC-SQ0500	1/2	1-1/4	3	-	●
OR2EC-SQ0500-030	1/2	1-1/4	3	.030	●
OR2EC-SQ0500-060	1/2	1-1/4	3	.060	●
OR2LC-SQ0500	1/2	2	4	-	●
OR2LC-SQ0500-030	1/2	2	4	.030	●
OR2RC-SQ0625	5/8	1-1/4	3-1/2	-	●
OR2RC-SQ0625-030	5/8	1-1/4	3-1/2	.030	●
OR2RC-SQ0625-060	5/8	1-1/4	3-1/2	.060	●
OR2EC-SQ0625	5/8	1-5/8	3-1/2	-	●
OR2EC-SQ0625-030	5/8	1-5/8	3-1/2	.030	●
OR2LC-SQ0625	5/8	2	4	-	●
OR2RC-SQ0750	3/4	1-1/2	4	-	●
OR2RC-SQ0750-030	3/4	1-1/2	4	.030	●
OR2EC-SQ0750	3/4	1-3/4	4	-	●
OR2EC-SQ0750-030	3/4	1-3/4	4	.030	●
OR2LC-SQ0750	3/4	3	6	-	●
OR2RC-SQ1000	1	1-1/2	4	-	●
OR2EC-SQ1000	1	2	4	-	●
OR2EC-SQ1000-030	1	2	4	.030	●
OR2LC-SQ1000	1	3	6	-	●

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



Orion 3 flute End Mills for Aluminum

- Orion 3 flute End Mills specifically designed for Aluminum
- Differential flute spacing for chatter free performance
- 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)



ORION 3 Flute Solid Carbide End Mills (Variable Flute / Center Cutting)

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

Designation	Cutter Diameter	Length of Cut	OAL	Corner Radius	UK20 Uncoated
OR3EC-SQ0500	1/2	1-1/4	3	-	●
OR3EC-SQ0500-030	1/2	1-1/4	3	.030	●
OR3LC-SQ0500	1/2	2	4	-	●
OR3LC-SQ0500-030	1/2	2	4	.030	●
OR3RC-SQ0625	5/8	1-1/4	3-1/2	-	●
OR3RC-SQ0625-030	5/8	1-1/4	3-1/2	.030	●
OR3EC-SQ0625	5/8	1-5/8	3-1/2	-	●
OR3EC-SQ0625-030	5/8	1-5/8	3-1/2	.030	●
OR3LC-SQ0625	5/8	2	4	-	●
OR3LC-SQ0625-030	5/8	2	4	.030	●
OR3RC-SQ0750	3/4	1-1/2	4	-	●
OR3RC-SQ0750-030	3/4	1-1/2	4	.030	●
OR3EC-SQ0750	3/4	1-3/4	4	-	●
OR3EC-SQ0750-030	3/4	1-3/4	4	.030	●
OR3LC-SQ0750	3/4	3	6	-	●
OR3LC-SQ0750-030	3/4	3	6	.030	●
OR3RC-SQ1000	1	1-1/2	4	-	●
OR3RC-SQ1000-030	1	1-1/2	4	.030	●
OR3EC-SQ1000	1	2	4	-	●
OR3EC-SQ1000-030	1	2	4	.030	●
OR3LC-SQ1000	1	3	6	-	●
OR3LC-SQ1000-030	1	3	6	.030	●



3 Flute Roughing End Mills (Variable Flute / Center Cutting)

Cylindrical Shank	Weldon Shank	Cutter Diameter	Shank Diameter	Length of Cut	OAL	Chamfer	UK20 Uncoated
RCOR3RC-SQ0250-C10	-	1/4	1/4	3/4	2-1/2	.010	●
RCOR3RC-SQ0375-C10	-	3/8	3/8	7/8	2-1/2	.010	●
RCOR3EC-SQ0500-C20	RCOR3EW-SQ0500-C20	1/2	1/2	1-1/4	3	.020	●
RCOR3RC-SQ0625-C30	RCOR3RW-SQ0625-C30	5/8	5/8	1-1/4	3-1/2	.030	●
RCOR3RC-SQ0750-C30	RCOR3RW-SQ0750-C30	3/4	3/4	1-1/2	4	.030	●
RCOR3RC-SQ1000-C30	RCOR3RW-SQ1000-C30	1	1	1-1/2	4	.030	●

Orion 3 Flute Roughing End Mills for Aluminum

- Orion 3 flute Roughing End Mills specifically designed for Aluminum
- Orion 3 flute design feature differential flute spacing for chatter free performance
- New Polished flute design for effective chip evacuation
- Designed for aggressive feed rates while maintaining excellent surface finishes
- Specially designed chipbreaker creates smaller chips and reduces cutting loads on lighter duty machines



4 Flute Roughing End Mills

Rougher/Finisher

The New TyCarb Rougher / Finisher is recommended for use in most materials from carbon, tool, die, alloy steels as well as cast iron and even stainless steel. The unique chipbreaker and flute configuration achieves higher productivity with less H.P. than other High Performance end mills. The specially designed chipbreaker creates smaller chips, ensuring rapid evacuation and helping reduce potential tool chatter. Added features include Differential flute spacing to achieve even higher productivity.

- Differential flute spacing
- Cutting edges protected with 45 deg. chamfer
- Next generation AlCrN PVD coating
- Available with Cylindrical or Weldon style shanks



4 Flute Roughing End Mills

(Variable Flute / Center Cutting)

Designation	Cutter Diameter	Shank Diameter	Length of Cut	OAL	Chamfer	TL30 Coated
RC4RC-SQ0250-C10	1/4	1/4	3/4	2-1/2	.010	●
RC4RC-SQ0375-C10	3/8	3/8	7/8	2-1/2	.010	●
RC4EC-SQ0500-C20	1/2	1/2	1-1/4	3	.020	●
RC4RC-SQ0625-C30	5/8	5/8	1-1/4	3-1/2	.030	●
RC4RC-SQ0750-C30	3/4	3/4	1-1/2	4	.030	●
RC4RC-SQ1000-C30	1	1	1-1/2	4	.030	●

4 Flute Roughing End Mills

(Variable Flute / Center Cutting / Weldon)

Designation	Cutter Diameter	Shank Diameter	Length of Cut	OAL	Chamfer	TL30 Coated
RC4EW-SQ0500-C20	1/2	1/2	1-1/4	3	.020	●
RC4RW-SQ0625-C30	5/8	5/8	1-1/4	3-1/2	.030	●
RC4RW-SQ0750-C30	3/4	3/4	1-1/2	4	.030	●
RC4RW-SQ1000-C30	1	1	1-1/2	4	.030	●

Recommended Cutting Parameters

Work Material	Type of Cut	Axial DOC	Radial DOC	Speed (SFM)	Feed (Inches Per Tooth)						
					1/8	1/4	3/8	1/2	5/8	3/4	1
Low Carbon Steels <= 38 Rc 1018, 12L14, 8620	Slotting Peripheral - Rough	1 x D	1 x D	350	0.0008	0.0016	0.0024	0.0032	0.0040	0.0048	0.0064
		1.5 x D	.5 x D	425	0.0010	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080
Medium Carbon Steels <= 38 Rc 4140, 4340	Slotting Peripheral - Rough	1 x D	1 x D	325	0.0006	0.0013	0.0020	0.0027	0.0034	0.0040	0.0054
		1.5 x D	.5 x D	375	0.0008	0.0017	0.0026	0.0035	0.0044	0.0053	0.0070
Tool and Die Steels <= 38 Rc A2, D2, O1, S7, P20, H13	Slotting Peripheral - Rough	1 x D	1 x D	325	0.0006	0.0013	0.0020	0.0027	0.0034	0.0040	0.0054
		1.5 x D	.5 x D	375	0.0008	0.0017	0.0026	0.0035	0.0044	0.0053	0.0070
Tool Steels 39 Rc to 48 Rc	Slotting Peripheral - Rough	.75 x D	1 x D	225	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040
		1 x D	.5 x D	275	0.0006	0.0012	0.0017	0.0023	0.0029	0.0035	0.0046
Easy to machine stainless steel 416, 410, 302, 303	Slotting Peripheral - Rough	1 x D	1 x D	300	0.0006	0.0012	0.0018	0.0025	0.0031	0.0037	0.0050
		1.5 x D	.5 x D	375	0.0008	0.0016	0.0024	0.0032	0.0040	0.0048	0.0064
Moderately difficult stainless steels 304, 316, Invar, Kovar	Slotting Peripheral - Rough	.75 x D	1 x D	275	0.0005	0.0011	0.0016	0.0022	0.0027	0.0033	0.0044
		1.5 x D	.5 x D	350	0.0007	0.0015	0.0023	0.0032	0.0037	0.0045	0.0064
Difficult to machine stainless steels 316L, 17-4 PH, 15-5 PH, 13-8 PH	Slotting Peripheral - Rough	.5 x D	1 x D	250	0.0004	0.0009	0.0012	0.0018	0.0022	0.0027	0.0036
		1 x D	.5 x D	300	0.0005	0.0011	0.0016	0.0022	0.0028	0.0033	0.0044
Cast Iron Grey	Slotting Peripheral - Rough	1 x D	1 x D	400	0.0006	0.0012	0.0019	0.0025	0.0031	0.0038	0.0050
		1.5 x D	.5 x D	500	0.0007	0.0015	0.0023	0.0030	0.0037	0.0046	0.0060
Cast Iron Ductile	Slotting Peripheral - Rough	1 x D	1 x D	300	0.0006	0.0012	0.0018	0.0023	0.0029	0.0035	0.0046
		1.5 x D	.5 x D	400	0.0007	0.0014	0.0021	0.0028	0.0035	0.0042	0.0056
Cast Iron Malleable	Slotting Peripheral - Rough	0.75 x D	1 x D	250	0.0004	0.0008	0.0012	0.0015	0.0019	0.0023	0.0030
		1 x D	.75 x D	325	0.0005	0.0011	0.0016	0.0022	0.0027	0.0033	0.0044
Titanium Alloys	Slotting Peripheral - Rough	.5 x D	1 x D	250	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040
		1 x D	.5 x D	300	0.0006	0.0012	0.0017	0.0023	0.0029	0.0035	0.0046
High Temperature Alloys Inconel, Haynes, Stellite, Hastalloy	Slotting Peripheral - Rough	.25 x D	1 x D	70	0.0004	0.0008	0.0012	0.0015	0.0019	0.0024	0.0030
		1 x D	.25 x D	95	0.0005	0.0009	0.0014	0.0018	0.0022	0.0028	0.0036

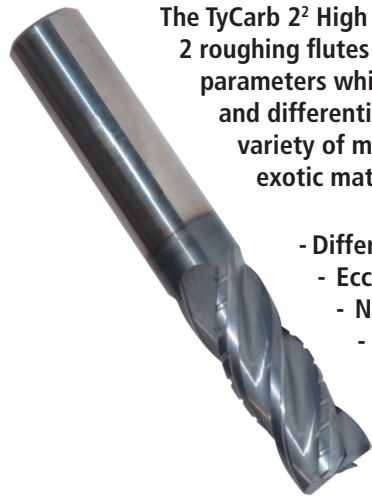
TyCarb 2² - 4 Flute Roughing/Finisher End Mills



TyCarb 2² End Mills

The TyCarb 2² High Performance end mills are specifically designed with 2 roughing flutes and 2 Finishing flutes to operate at roughing cutter parameters while achieving excellent surface finish. The eccentric relief and differential flute spacing design make this tool suitable for a wide variety of materials carbon, die, alloy and stainless steels as well as exotic materials.

- Differential flute spacing
- Eccentric relief flute design
- Next generation AlCrN PVD coating
- Available with Cylindrical or Weldon style shanks
- Cutting edges protected with a 45 degree chamfer



4 Flute Rougher/Finisher End Mills (Variable Flute / Center Cutting)

Designation	Cutter Diameter	Shank Diameter	Length of Cut	OAL	Chamfer	TL30 Coated
SM4RC-SQ0250-C10	1/4	1/4	3/4	2-1/2	.010	●
SM4RC-SQ0375-C10	3/8	3/8	7/8	2-1/2	.010	●
SM4EC-SQ0500-C20	1/2	1/2	1-1/4	3	.020	●
SM4RC-SQ0625-C30	5/8	5/8	1-1/4	3-1/2	.030	●
SM4RC-SQ0750-C30	3/4	3/4	1-1/2	4	.030	●
SM4RC-SQ1000-C30	1	1	1-1/2	4	.030	●

4 Flute Rougher/Finisher End Mills (Variable Flute / Center Cutting / Weldon)

Designation	Cutter Diameter	Shank Diameter	Length of Cut	OAL	Chamfer	TL30 Coated
SM4EW-SQ0500-C20	1/2	1/2	1-1/4	3	.020	●
SM4RW-SQ0625-C30	5/8	5/8	1-1/4	3-1/2	.030	●
SM4RW-SQ0750-C30	3/4	3/4	1-1/2	4	.030	●
SM4RW-SQ1000-C30	1	1	1-1/2	4	.030	●

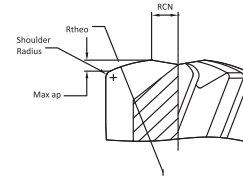
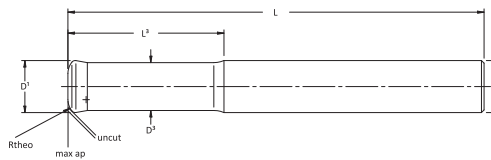
Recommended Cutting Parameters

Work Material	Type of Cut	Axial DOC	Radial DOC	Speed (SFM)	Feed (Inches Per Tooth)						
					1/8	1/4	3/8	1/2	5/8	3/4	1
Low Carbon Steels <= 38 Rc 1018, 12L14, 8620	Slotting	1 x D	1 x D	350	0.0008	0.0016	0.0024	0.0032	0.0040	0.0048	0.0064
	Peripheral - Rough	1.5 x D	.5 x D	425	0.0010	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080
Medium Carbon Steels <= 38 Rc 4140, 4340	Slotting	1 x D	1 x D	325	0.0006	0.0013	0.0020	0.0027	0.0034	0.0040	0.0054
	Peripheral - Rough	1.5 x D	.5 x D	375	0.0008	0.0017	0.0026	0.0035	0.0044	0.0053	0.0070
Tool and Die Steels <= 38 Rc A2, D2, O1, S7, P20, H13	Slotting	1 x D	1 x D	325	0.0006	0.0013	0.0020	0.0027	0.0034	0.0040	0.0054
	Peripheral - Rough	1.5 x D	.5 x D	375	0.0008	0.0017	0.0026	0.0035	0.0044	0.0053	0.0070
Tool Steels 39 Rc to 48 Rc	Slotting	.75 x D	1 x D	225	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040
	Peripheral - Rough	1 x D	.5 x D	275	0.0006	0.0012	0.0017	0.0023	0.0029	0.0035	0.0046
Easy to machine stainless steel 416, 410, 302, 303	Slotting	1 x D	1 x D	300	0.0006	0.0012	0.0018	0.0025	0.0031	0.0037	0.0050
	Peripheral - Rough	1.5 x D	.5 x D	375	0.0008	0.0016	0.0024	0.0032	0.0040	0.0048	0.0064
Moderately difficult stainless steels 304, 316, Invar, Kovar	Slotting	.75 x D	1 x D	275	0.0005	0.0011	0.0016	0.0022	0.0027	0.0033	0.0044
	Peripheral - Rough	1.5 x D	.5 x D	350	0.0007	0.0015	0.0023	0.0032	0.0037	0.0045	0.0064
Difficult to machine stainless steels 316L, 17-4 PH, 15-5 PH, 13-8 PH	Slotting	.5 x D	1 x D	250	0.0004	0.0009	0.0012	0.0018	0.0022	0.0027	0.0036
	Peripheral - Rough	1 x D	.5 x D	300	0.0005	0.0011	0.0016	0.0022	0.0028	0.0033	0.0044
Cast Iron Grey	Slotting	1 x D	1 x D	400	0.0006	0.0012	0.0019	0.0025	0.0031	0.0038	0.0050
	Peripheral - Rough	1.5 x D	.5 x D	500	0.0007	0.0015	0.0023	0.0030	0.0037	0.0046	0.0060
Cast Iron Ductile	Slotting	1 x D	1 x D	300	0.0006	0.0012	0.0018	0.0023	0.0029	0.0035	0.0046
	Peripheral - Rough	1.5 x D	.5 x D	400	0.0007	0.0014	0.0021	0.0028	0.0035	0.0042	0.0056
Cast Iron Malleable	Slotting	0.75 x D	1 x D	250	0.0004	0.0008	0.0012	0.0015	0.0019	0.0023	0.0030
	Peripheral - Rough	1 x D	.75 x D	325	0.0005	0.0011	0.0016	0.0022	0.0027	0.0033	0.0044
Titanium Alloys	Slotting	.5 x D	1 x D	250	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040
	Peripheral - Rough	1 x D	.5 x D	300	0.0006	0.0012	0.0017	0.0023	0.0029	0.0035	0.0046
High Temperature Alloys Inconel, Haynes, Stellite, Hastalloy	Slotting	.25 x D	1 x D	70	0.0004	0.0008	0.0012	0.0015	0.0019	0.0024	0.0030
	Peripheral - Rough	1 x D	.25 x D	95	0.0005	0.0009	0.0014	0.0018	0.0022	0.0028	0.0036



High Feed End Mills

- TyCarb High Feed end mills are designed for roughing to semi-finish applications
- Significantly reduces machining time in hardened materials
- TyCarb High Feed end mills are capable of feed rates up to 0.029 IPT
- Effective for Z axis machining including pocketing, face milling, helical ramping as well as circular interpolation
- Now available with next generation AlCrN PVD coating
- Excellent in long reach applications



High Feed End Mills

Designation	D ¹	D	Rtheo	Uncut	Max ap	L	L ³	D ³	Flutes	TL30 Coated
HF4RC-DR0250-034	1/4	1/4	.034	.006	.013	2.50	.750	.210	4	●
HF4RC-DR0312-042	5/16	5/16	.042	.008	.017	3.00	1.00	.270	4	●
HF4RC-DR0375-051	3/8	3/8	.051	.010	.020	3.50	1.25	.340	4	●
HF4RC-DR0500-070	1/2	1/2	.070	.013	.028	4.00	1.50	.460	4	●
HF4RC-DR0625-085	5/8	5/8	.085	.016	.033	4.00	1.50	.590	4	●
HF5RC-DR0625-085	5/8	5/8	.085	.016	.033	4.00	1.50	.590	5	●
HF5RC-DR0750-100	3/4	3/4	.100	.019	.040	5.00	2.00	.710	5	●

High Feed End Mills - Technical Programming Information

Cutter Dia.	Max ap	Rtheo	Shoulder	RCN	Material Uncut	Circular Interpolation		Length of travel to max ap per deg		
INCH						Smallest	Largest	deg	2 deg	3 deg
1/4	.013	.034	.020	.064	.006	.378	.500	.762	.381	.254
5/16	.017	.042	.024	.080	.008	.472	.625	.953	.476	.317
3/8	.020	.051	.030	.096	.010	.567	.750	1.143	.572	.381
1/2	.027	.070	.040	.126	.013	.752	1.000	1.525	.762	.508
5/8	.033	.085	.049	.160	.016	.945	1.250	1.906	.953	.635
3/4	.040	.100	.059	.192	.019	1.134	1.500	2.287	1.143	.762
All dimensions are shown in inch						Feed % Reduction:		100%	70%	50%

	Work Material	Axial DOC	Radial DOC	Speed SFM		Recommended Feed Inches per Tooth					
				Min	Max	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
P	Medium Carbon Steels ≤ 38 Rc 4140, 4340	0.05 x D	0.50 x D	500	650	.010" - .014"	.012" - .016"	.016" - .020"	.020" - .025"	.022" - .027"	.024" - .029"
	Tool and Die Steels ≤ 38 Rc A2, D2, O1, S7, P20, H13	0.05 x D	0.50 x D	480	600	.010" - .014"	.012" - .016"	.016" - .020"	.020" - .025"	.022" - .027"	.024" - .029"
	Tool Steels 39 Rc to 48 Rc	0.05 x D	0.50 x D	375	525	.006" - .010"	.008" - .012"	.012" - .014"	.016" - .020"	.017" - .022"	.018" - .024"
	Easy to machine stainless steel 416, 410, PH Stainless	0.05 x D	0.50 x D	250	375	.006" - .010"	.008" - .012"	.012" - .014"	.016" - .020"	.017" - .022"	.018" - .024"
H	Hardened Tool Steels 48 - 53 Rc	0.05 x D	0.50 x D	350	500	.008" - .012"	.010" - .014"	.014" - .018"	.018" - .022"	.020" - .024"	.020" - .027"

*When using Max ap, please use lower end of feed range

SPECIALS

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

- Solid Carbide Tooling
- Custom Drills & Taper Mills
- Virtually Unlimited Form Tools
- Coolant Through G-Drills, Step Drills & Ball Tools
- Special Radii
- Reamers
- Jig Boring Tools
- Forming Tools
- Dovetail Cutters
- Porting Tools
- Coolant Through
- Advanced Coating Capability

TV  **carb**

