MADE IN CANADA

EVOLUTION

Solid Carbide Endmills

SOLID CARBIDE END MILLS

2020-2021

ABOUT OUR END MILLS

Carbide End Mills engineered to the highest quality with the best raw material & coatings for demanding applications. High tech geometries manufactured on the most state of the art 5 Axis CNC Grinders in the world. Extremely rigid quality control to assure the tightest tolerances & consistency.

GOOD — *GENERAL PURPOSE*

- General Purpose
- 30 deg Helix Carbide with honed edges
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"

P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● GOOD ◒ OK ○ NOT OPTIMAL

BETTER — *HIGH PERFORMANCE*

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"

P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H		Hardened Steel

● BETTER ◒ OK ○ NOT OPTIMAL

BEST — *ULTRA HIGH PERFORMANCE*

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Ultra High Performance Micro Grain Carbide with extremely high Transverse Rupture strength
- Diameter Tolerances: +0.0000"/-0.0015"

P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	◒	High Temp. Alloys
H		Hardened Steel

● BEST ◒ OK ○ NOT OPTIMAL

BEST — *ULTRA HIGH PERFORMANCE - Aluminum*

- Special Helix Design with Cylindrical Margin for improved stability in Aluminum & Non-Ferrous materials
- Variable Pitch to reduce chatter with special core design & chip breaker flute geometry
- Ultra High Performance Micro Grain Carbide with extremely high Transverse Rupture strength
- Diameter Tolerances: +0.0000"/-0.0004"

P		Steel
M		Stainless Steel
K		Cast Iron
N	●	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● BEST

COATINGS:

- **TiALN** (Titanium Aluminum Nitride) - Violet Color; Provides the benefits of high abrasion & heat resistance to improve tool life
- **ALL4** (Aluminum Chromium Titanium Nitride) - Grey Color; Ultra High Performance coating with extreme heat, abrasion & wear resistance in ferrous applications
- **ZrN** (Zirconium Nitride) - Pale Gold Color; Provides high lubricity for machining aluminum & non-ferrous materials
- **DLC** (Diamond Like Carbon) - Black Color; Extremely hard with very high wear resistance for finish machining aluminum, non-ferrous & composite materials

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WALTER

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END MILL SERIES LISTING

Series	Description	Flutes		Pages	
001	Standard Carbide, **Stub Length**, Square, Single End Uncoated	2,3,4		1	GOOD
003	Standard Carbide, **Stub Length**, Square, Single End, TiALN coated	2,3,4		1	
004	Standard Carbide, **Regular Length**, Square, Single End Uncoated	2,3,4		1,2	
006	Standard Carbide, **Regular Length**, Square, Single End, TiALN coated	2,3,4		1,2	
007	Standard Carbide, **Long Length**, Square, Single End Uncoated	2,4		3	
009	Standard Carbide, **Long Length**, Square, Single End, TiALN coated	2,4		3	
010	Standard Carbide, **Extra Long Length**, Square, Single End Uncoated	2,4		3	
012	Standard Carbide, **Extra Long Length**, Square, Single End, TiALN coated	2,4		3	
013	Standard Carbide, **Stub Length**, Ball Nose, Single End Uncoated	2,3,4		5	
015	Standard Carbide, **Stub Length**, Ball Nose, Single End, TiALN coated	2,3,4		5	
016	Standard Carbide, **Regular Length**, Ball Nose, Single End Uncoated	2,3,4		5,6	
018	Standard Carbide, **Regular Length**, Ball Nose, Single End, TiALN coated	2,3,4		5,6	
019	Standard Carbide, **Long Length**, Ball Nose, Single End Uncoated	2,4		7	
021	Standard Carbide, **Long Length**, Ball Nose, Single End, TiALN coated	2,4		7	
022	Standard Carbide, **Extra Long Length**, Ball Nose, Single End Uncoated	2,4		7	
024	Standard Carbide, **Extra Long Length**, Ball Nose, Single End, TiALN coated	2,4		7	
025	Standard Carbide, **Stub Length**, Square, Double End Uncoated	2,4		8	
027	Standard Carbide, **Stub Length**, Square, Double End, TiALN coated	2,4		8	
028	Standard Carbide, **Stub Length**, Ball Nose, Double End Uncoated	2,4		9	
030	Standard Carbide, **Stub Length**, Ball Nose, Double End, TiALN coated	2,4		9	
031	Standard Carbide, **Regular Length**, Square, Double End Uncoated	2,4		8	
032	Standard Carbide, **Regular Length**, Square, Double End, TiALN coated	2,4		8	
033	Standard Carbide, **Regular Length**, Ball Nose, Double End Uncoated	2,4		9	
034	Standard Carbide, **Regular Length**, Ball Nose, Double End, TiALN coated	2,4		9	
041	**METRIC** - Standard Carbide, **Regular Length**, Square, Single End Uncoated	2,3,4		4	
042	**METRIC** - Standard Carbide, **Regular Length**, Square, Single End, TiALN coated	2,3,4		4	
045	**METRIC** - Standard Carbide, **Long Length**, Square, Single End Uncoated	2,4		4	
046	**METRIC** - Standard Carbide, **Long Length**, Square, Single End, TiALN coated	2,4		4	
047	**METRIC** - Standard Carbide, **Extra Long Length**, Square, Single End Uncoated	2,4		4	
048	**METRIC** - Standard Carbide, **Extra Long Length**, Square, Single End, TiALN coated	2,4		4	
043	**METRIC** - Standard Carbide, **Regular Length**, Ball Nose, Single End Uncoated	2,3,4		7	
044	**METRIC** - Standard Carbide, **Regular Length**, Ball Nose, Single End, TiALN coated	2,3,4		7	
104	Drill/Mill 90 Degree - Standard Carbide Uncoated	2,4		3	
106	Drill/Mill 90 Degree - Standard Carbide TiALN coated	2,4		3	
108	Engraving Tool - Standard Carbide TiALN coated, 30 Degree	1	NEW	8	
110	Spot Drill - Standard Carbide TiALN coated, 145 Degree Point	2	NEW	9	
	Speeds & Feed Chart - GENERAL PURPOSE			10	
190	High Performance Variable Pitch, **Stub Length**, Round Shk- TiALN	4		11	BETTER
191	High Performance Variable Pitch, **Stub Length**, Weldon Shk- TiALN	4		11	
090	High Performance Variable Pitch, **Regular Length**, Round Shk- TiALN	4		11	
091	High Performance Variable Pitch, **Regular Length**, Round Shk- TiALN	4		11	
092	High Performance Variable Pitch, **Long Length**, Round Shk- TiALN	4		12	
093	High Performance Variable Pitch, **Long Length**, Weldon Shk- TiALN	4		12	
098	High Performance Variable Pitch, **Extra Long Length**, Round Shk- TiALN	4		12	

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Series	Description	Flutes		Pages	
094	High Performance Variable Pitch, **Regular Length**, Ball Nose, Round Shk- TiALN	4		13	BETTER
095	High Performance Variable Pitch, **Regular Length**, Ball Nose, Weldon Shk- TiALN	4		13	
096	High Performance Variable Pitch, **Long Length**, Ball Nose, Round Shk- TiALN	4		13	
097	High Performance Variable Pitch, **Long Length**, Ball Nose, Weldon Shk- TiALN	4		13	
099	High Performance Variable Pitch, **Extra Long Length**, Ball Nose, Round Shk- TiALN	4		13	
290	High Performance Variable Pitch, **Long Reach Neck Relief**, Round Shk- TiALN	4		14	
294	High Performance Variable Pitch, **Long Reach Neck Relief**, Ball Nose, Round Shk- TiALN	4		14	
	Speeds & Feed Chart - HIGH PERFORMANCE			15	
180	ULTRA High Performance Variable Pitch, **Stub Length**, Round Shk- TiALN	4		16	BEST
181	ULTRA High Performance Variable Pitch, **Stub Length**, Weldon Shk- TiALN	4		16	
080	ULTRA High Performance Variable Pitch, **Regular Length**, Round Shk- TiALN	4,5		16	
081	ULTRA High Performance Variable Pitch, **Regular Length**, Weldon Shk- TiALN	4		16	
082	ULTRA High Performance Variable Pitch, **Long Length**, Round Shk- TiALN	4		17	
083	ULTRA High Performance Variable Pitch, **Long Length**, Weldon Shk- TiALN	4		17	
088	ULTRA High Performance Variable Pitch, **Extra Long Length**, Round Shk- TiALN	4		17	
084	ULTRA High Performance Variable Pitch, **Regular Length**, Ball Nose, Round Shk- TiALN	4		18	
085	ULTRA High Performance Variable Pitch, **Regular Length**, Ball Nose, Weldon Shk- TiALN	4		18	
086	ULTRA High Performance Variable Pitch, **Long Length**, Ball Nose, Round Shk- TiALN	4		18	
087	ULTRA High Performance Variable Pitch, **Long Length**, Ball Nose, Weldon Shk- TiALN	4		18	
089	ULTRA High Performance Variable Pitch, **Extra Long Length**, Ball Nose, Round Shk- TiALN	4		18	
380	ULTRA High Performance Variable Pitch, **Regular Length Finishers**, Round Shk- TiALN	6,7		19	
	Speeds & Feed Chart - ULTRA HIGH PERFORMANCE			20	
170	Medium/Finishing Var. Pitch & Helix, **Regular Length**, Uncoated - **ALUMINUM**	2,3		21	BEST-Aluminum
070	Medium/Finishing Var. Pitch & Helix, **Regular Length**, ZrN Coated - **ALUMINUM**	2,3		21	
270	Medium/Finishing Var. Pitch & Helix, **Regular Length**, DLC Coated - **ALUMINUM**	2,3		21	
172	Medium/Finishing Var. Pitch & Helix, **Long Length**, Uncoated - **ALUMINUM**	2,3		21	
072	Medium/Finishing Var. Pitch & Helix, **Long Length**, ZrN Coated - **ALUMINUM**	2,3		21	
178	Medium/Finishing Var. Pitch & Helix, **Extra Long Length**, Uncoated - **ALUMINUM**	2,3		21	
078	Medium/Finishing Var. Pitch & Helix, **Extra Long Length**, ZrN Coated - **ALUMINUM**	2,3		21	
174	Medium/Finishing Var. Pitch & Helix, **Regular Length**, Ball Nose Uncoated - **ALUMINUM**	2,3		22	
074	Medium/Finishing Var. Pitch & Helix , **Regular Length**, Ball Nose ZrN Coated - **ALUMINUM**	2,3		22	
176	Medium/Finishing Var. Pitch & Helix, **Long Length**, Ball Nose Uncoated - **ALUMINUM**	2,3		22	
076	Medium/Finishing Var. Pitch & Helix, **Long Length**, Ball Nose ZrN Coated - **ALUMINUM**	2,3		22	
179	Medium/Finishing Var. Pitch & Helix, **Extra Long Length**, Ball Nose Uncoated - **ALUMINUM**	2,3		22	
079	Medium/Finishing Var. Pitch & Helix, **Extra Long Length**, Ball Nose ZrN Coated - **ALUMINUM**	2,3		22	
370	Medium/Roughing Var. Pitch, **Regular Length**, Uncoated - **ALUMINUM**	3	NEW	23	
470	Medium/Roughing Var. Pitch, **Regular Length**, ZrN Coated - **ALUMINUM**	3		23	
372	Medium/Roughing Var. Pitch, **Long Length**, Uncoated - **ALUMINUM**	3	NEW	23	
472	Medium/Roughing Var. Pitch, **Long Length**, ZrN Coated - **ALUMINUM**	3		23	
570	Medium/Roughing Var. Pitch, **Regular Length**, Uncoated Chipbreaker - **ALUMINUM**	3	NEW	23	
670	Medium/Roughing Var. Pitch, **Regular Length**, ZrN Coated Chipbreaker - **ALUMINUM**	3		23	
572	Medium/Roughing Var. Pitch, **Long Length**, Uncoated Chipbreaker - **ALUMINUM**	3	NEW	23	
672	Medium/Roughing Var. Pitch, **Long Length**, ZrN Coated Chipbreaker - **ALUMINUM**	3		23	
	Speeds & Feed Chart - ULTRA HIGH PERFORMANCE - Aluminum			24	

GENERAL PURPOSE

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S		High Temp. Alloys
H		Hardened Steel

● GOOD ◒ OK ○ NOT OPTIMAL

- General Purpose
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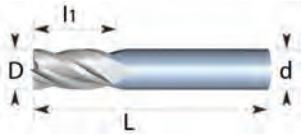
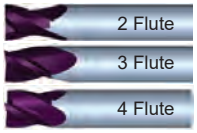
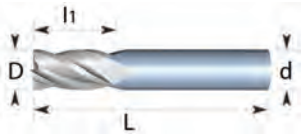
- Diameter Tolerances: +0.0000"/-0.0020"

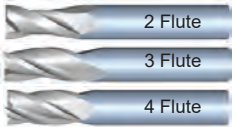




Square End, Standard Carbide, Stub Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Uncoated Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	TiALN Coated Price
1/32	1/8	1/16	1-1/2	001-031-2	001-031-3	001-031-4	Call For Pricing	003-031-2	003-031-3	003-031-4	Call For Pricing
3/64	1/8	3/32	1-1/2	001-046-2	001-046-3	001-046-4		003-046-2	003-046-3	003-046-4	
1/16	1/8	1/8	1-1/2	001-062-2	001-062-3	001-062-4		003-062-2	003-062-3	003-062-4	
3/32	1/8	3/16	1-1/2	001-093-2	001-093-3	001-093-4		003-093-2	003-093-3	003-093-4	
1/8	1/8	1/4	1-1/2	001-125-2	001-125-3	001-125-4		003-125-2	003-125-3	003-125-4	
5/32	3/16	5/16	2	001-156-2	001-156-3	001-156-4		003-156-2	003-156-3	003-156-4	
3/16	3/16	3/8	2	001-187-2	001-187-3	001-187-4		003-187-2	003-187-3	003-187-4	
7/32	1/4	7/16	2	001-218-2	001-218-3	001-218-4		003-218-2	003-218-3	003-218-4	
1/4	1/4	1/2	2	001-250-2	001-250-3	001-250-4		003-250-2	003-250-3	003-250-4	
5/16	5/16	1/2	2	001-312-2	001-312-3	001-312-4		003-312-2	003-312-3	003-312-4	
3/8	3/8	5/8	2	001-375-2	001-375-3	001-375-4		003-375-2	003-375-3	003-375-4	
7/16	7/16	5/8	2-1/2	001-437-2	001-437-3	001-437-4		003-437-2	003-437-3	003-437-4	
1/2	1/2	5/8	2-1/2	001-500-2	001-500-3	001-500-4		003-500-2	003-500-3	003-500-4	
5/8	5/8	3/4	3	001-625-2	001-625-3	001-625-4		003-625-2	003-625-3	003-625-4	
3/4	3/4	1	3	001-750-2	001-750-3	001-750-4		003-750-2	003-750-3	003-750-4	
1	1	1	3	001-100-2	001-100-3	001-100-4		003-100-2	003-100-3	003-100-4	





Square End, Standard Carbide, Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Uncoated Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	TiALN Coated Price
1/64	1/8	1/16	1-1/2	004-015-2	004-015-3	004-015-4	Call For Pricing	006-015-2	006-015-3	006-015-4	Call For Pricing
1/32	1/8	3/32	1-1/2	004-031-2	004-031-3	004-031-4		006-031-2	006-031-3	006-031-4	
3/64	1/8	1/8	1-1/2	004-046-2	004-046-3	004-046-4		006-046-2	006-046-3	006-046-4	
1/16	1/8	3/16	1-1/2	004-062-2	004-062-3	004-062-4		006-062-2	006-062-3	006-062-4	
5/64	1/8	1/4	1-1/2	004-078-2	004-078-3	004-078-4		006-078-2	006-078-3	006-078-4	
3/32	1/8	3/8	1-1/2	004-093-2	004-093-3	004-093-4		006-093-2	006-093-3	006-093-4	
7/64	1/8	3/8	1-1/2	004-109-2	004-109-3	004-109-4		006-109-2	006-109-3	006-109-4	
1/8	1/8	1/2	1-1/2	004-125-2	004-125-3	004-125-4		006-125-2	006-125-3	006-125-4	
9/64	3/16	9/16	2	004-140-2	004-140-3	004-140-4		006-140-2	006-140-3	006-140-4	
5/32	3/16	9/16	2	004-156-2	004-156-3	004-156-4		006-156-2	006-156-3	006-156-4	
11/64	3/16	9/16	2	004-171-2	004-171-3	004-171-4		006-171-2	006-171-3	006-171-4	
3/16	3/16	5/8	2	004-187-2	004-187-3	004-187-4		006-187-2	006-187-3	006-187-4	
13/64	1/4	5/8	2-1/2	004-203-2	004-203-3	004-203-4		006-203-2	006-203-3	006-203-4	
7/32	1/4	5/8	2-1/2	004-218-2	004-218-3	004-218-4		006-218-2	006-218-3	006-218-4	
15/64	1/4	3/4	2-1/2	004-234-2	004-234-3	004-234-4		006-234-2	006-234-3	006-234-4	
1/4	1/4	3/4	2-1/2	004-250-2	004-250-3	004-250-4		006-250-2	006-250-3	006-250-4	

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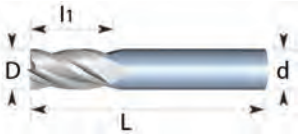
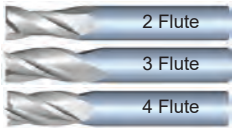
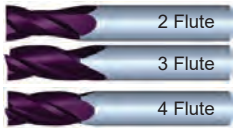






Square End, Standard Carbide, Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
17/64	5/16	7/8	2-1/2	004-265-2	004-265-3	004-265-4	Call For Pricing	006-265-2	006-265-3	006-265-4	Call For Pricing
9/32	5/16	7/8	2-1/2	004-281-2	004-281-3	004-281-4		006-281-2	006-281-3	006-281-4	
19/64	5/16	7/8	2-1/2	004-296-2	004-296-3	004-296-4		006-296-2	006-296-3	006-296-4	
5/16	5/16	7/8	2-1/2	004-312-2	004-312-3	004-312-4		006-312-2	006-312-3	006-312-4	
21/64	3/8	7/8	2-1/2	004-328-2	004-328-3	004-328-4		006-328-2	006-328-3	006-328-4	
11/32	3/8	7/8	2-1/2	004-343-2	004-343-3	004-343-4		006-343-2	006-343-3	006-343-4	
23/64	3/8	7/8	2-1/2	004-359-2	004-359-3	004-359-4		006-359-2	006-359-3	006-359-4	
3/8	3/8	1	2-1/2	004-375-2	004-375-3	004-375-4		006-375-2	006-375-3	006-375-4	
25/64	7/16	1	2-1/2	004-390-2	004-390-3	004-390-4		006-390-2	006-390-3	006-390-4	
13/32	7/16	1	2-1/2	004-406-2	004-406-3	004-406-4		006-406-2	006-406-3	006-406-4	
27/64	7/16	1	2-1/2	004-421-2	004-421-3	004-421-4		006-421-2	006-421-3	006-421-4	
7/16	7/16	1	2-1/2	004-437-2	004-437-3	004-437-4		006-437-2	006-437-3	006-437-4	
29/64	1/2	1	3	004-453-2	004-453-3	004-453-4		006-453-2	006-453-3	006-453-4	
15/32	1/2	1	3	004-468-2	004-468-3	004-468-4		006-468-2	006-468-3	006-468-4	
31/64	1/2	1	3	004-484-2	004-484-3	004-484-4		006-484-2	006-484-3	006-484-4	
1/2	1/2	1	3	004-500-2	004-500-3	004-500-4		006-500-2	006-500-3	006-500-4	
33/64	9/16	1-1/4	3-1/2	004-515-2	004-515-3	004-515-4		006-515-2	006-515-3	006-515-4	
17/32	9/16	1-1/4	3-1/2	004-531-2	004-531-3	004-531-4		006-531-2	006-531-3	006-531-4	
35/64	9/16	1-1/4	3-1/2	004-546-2	004-546-3	004-546-4		006-546-2	006-546-3	006-546-4	
9/16	9/16	1-1/4	3-1/2	004-562-2	004-562-3	004-562-4		006-562-2	006-562-3	006-562-4	
37/64	5/8	1-1/4	3-1/2	004-578-2	004-578-3	004-578-4		006-578-2	006-578-3	006-578-4	
19/32	5/8	1-1/4	3-1/2	004-593-2	004-593-3	004-593-4		006-593-2	006-593-3	006-593-4	
39/64	5/8	1-1/4	3-1/2	004-609-2	004-609-3	004-609-4		006-609-2	006-609-3	006-609-4	
5/8	5/8	1-1/4	3-1/2	004-625-2	004-625-3	004-625-4		006-625-2	006-625-3	006-625-4	
41/64	3/4	1-1/2	4	004-640-2	004-640-3	004-640-4		006-640-2	006-640-3	006-640-4	
21/32	3/4	1-1/2	4	004-656-2	004-656-3	004-656-4		006-656-2	006-656-3	006-656-4	
43/64	3/4	1-1/2	4	004-671-2	004-671-3	004-671-4		006-671-2	006-671-3	006-671-4	
11/16	3/4	1-1/2	4	004-687-2	004-687-3	004-687-4		006-687-2	006-687-3	006-687-4	
45/64	3/4	1-1/2	4	004-703-2	004-703-3	004-703-4		006-703-2	006-703-3	006-703-4	
23/32	3/4	1-1/2	4	004-718-2	004-718-3	004-718-4		006-718-2	006-718-3	006-718-4	
47/64	3/4	1-1/2	4	004-734-2	004-734-3	004-734-4		006-734-2	006-734-3	006-734-4	
3/4	3/4	1-1/2	4	004-750-2	004-750-3	004-750-4		006-750-2	006-750-3	006-750-4	
49/64	7/8	1-1/2	4	004-765-2	004-765-3	004-765-4		006-765-2	006-765-3	006-765-4	
25/32	7/8	1-1/2	4	004-781-2	004-781-3	004-781-4		006-781-2	006-781-3	006-781-4	
51/64	7/8	1-1/2	4	004-796-2	004-796-3	004-796-4		006-796-2	006-796-3	006-796-4	
13/16	7/8	1-1/2	4	004-812-2	004-812-3	004-812-4		006-812-2	006-812-3	006-812-4	
53/64	7/8	1-1/2	4	004-828-2	004-828-3	004-828-4		006-828-2	006-828-3	006-828-4	
27/32	7/8	1-1/2	4	004-843-2	004-843-3	004-843-4		006-843-2	006-843-3	006-843-4	
55/64	7/8	1-1/2	4	004-859-2	004-859-3	004-859-4		006-859-2	006-859-3	006-859-4	
7/8	7/8	1-1/2	4	004-875-2	004-875-3	004-875-4		006-875-2	006-875-3	006-875-4	
57/64	1	1-1/2	4	004-890-2	004-890-3	004-890-4		006-890-2	006-890-3	006-890-4	
29/32	1	1-1/2	4	004-906-2	004-906-3	004-906-4		006-906-2	006-906-3	006-906-4	
59/64	1	1-1/2	4	004-921-2	004-921-3	004-921-4		006-921-2	006-921-3	006-921-4	
15/16	1	1-1/2	4	004-937-2	004-937-3	004-937-4		006-937-2	006-937-3	006-937-4	
61/64	1	1-1/2	4	004-953-2	004-953-3	004-953-4		006-953-2	006-953-3	006-953-4	
31/32	1	1-1/2	4	004-968-2	004-968-3	004-968-4		006-968-2	006-968-3	006-968-4	
63/64	1	1-1/2	4	004-984-2	004-984-3	004-984-4		006-984-2	006-984-3	006-984-4	
1	1	1-1/2	4	004-100-2	004-100-3	004-100-4		006-100-2	006-100-3	006-100-4	

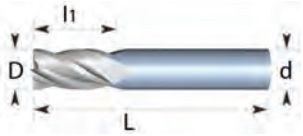
GENERAL PURPOSE

EVOLUTION
Solid Carbide Endmills

P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● GOOD ◒ OK ○ NOT OPTIMAL

- General Purpose
- 30 deg Helix Carbide with honed edges
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"

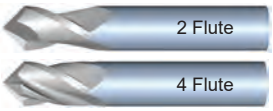


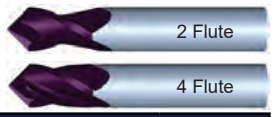
Square End, Standard Carbide, Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
1/8	1/8	3/4	2-1/2	007-125-2	--	007-125-4	Call For Pricing	009-125-2	--	009-125-4	Call For Pricing
3/16	3/16	3/4	2-1/2	007-187-2	--	007-187-4		009-187-2	--	009-187-4	
1/4	1/4	1-1/8	3	007-250-2	--	007-250-4		009-250-2	--	009-250-4	
5/16	5/16	1-1/8	3	007-312-2	--	007-312-4		009-312-2	--	009-312-4	
3/8	3/8	1-1/8	3	007-375-2	--	007-375-4		009-375-2	--	009-375-4	
7/16	7/16	2	4	007-437-2	--	007-437-4		009-437-2	--	009-437-4	
1/2	1/2	2	4	007-500-2	--	007-500-4		009-500-2	--	009-500-4	
5/8	5/8	2-1/4	5	007-625-2	--	007-625-4		009-625-2	--	009-625-4	
3/4	3/4	2-1/4	5	007-750-2	--	007-750-4		009-750-2	--	009-750-4	
1	1	2-1/4	5	007-100-2	--	007-100-4		009-100-2	--	009-100-4	

Square End, Standard Carbide, Extra Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
1/8	1/8	1	3	010-125-2	--	010-125-4	Call For Pricing	012-125-2	--	012-125-4	Call For Pricing
3/16	3/16	1-1/8	3	010-187-2	--	010-187-4		012-187-2	--	012-187-4	
1/4	1/4	1-1/2	4	010-250-2	--	010-250-4		012-250-2	--	012-250-4	
5/16	5/16	1-5/8	4	010-312-2	--	010-312-4		012-312-2	--	012-312-4	
3/8	3/8	1-3/4	4	010-375-2	--	010-375-4		012-375-2	--	012-375-4	
1/2	1/2	3	6	010-500-2	--	010-500-4		012-500-2	--	012-500-4	
5/8	5/8	3	6	010-625-2	--	010-625-4		012-625-2	--	012-625-4	
3/4	3/4	3	6	010-750-2	--	010-750-4		012-750-2	--	012-750-4	
1	1	3	6	010-100-2	--	010-100-4		012-100-2	--	012-100-4	



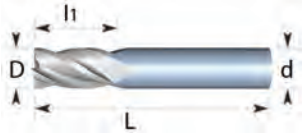


Drill/Mill 90 Degree, Standard Carbide, Regular Length

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
1/8	1/8	1/2	1-1/2	104-125-2	--	104-125-4	Call For Pricing	106-125-2	--	106-125-4	Call For Pricing
3/16	3/16	5/8	2	104-187-2	--	104-187-4		106-187-2	--	106-187-4	
1/4	1/4	3/4	2-1/2	104-250-2	--	104-250-4		106-250-2	--	106-250-4	
5/16	5/16	7/8	2-1/2	104-312-2	--	104-312-4		106-312-2	--	106-312-4	
3/8	3/8	1	2-1/2	104-375-2	--	104-375-4		106-375-2	--	106-375-4	
7/16	7/16	1	2-3/4	104-437-2	--	104-437-4		106-437-2	--	106-437-4	
1/2	1/2	1	3	104-500-2	--	104-500-4		106-500-2	--	106-500-4	
5/8	5/8	1-1/4	3-1/2	104-625-2	--	104-625-4		106-625-2	--	106-625-4	
3/4	3/4	1-1/2	4	104-750-2	--	104-750-4		106-750-2	--	106-750-4	

GENERAL PURPOSE

EVOLUTION
Solid Carbide Endmills



P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● GOOD ◒ OK ○ NOT OPTIMAL

- General Purpose
- 30 deg Helix Carbide with honed edges
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"

METRIC - Square End, Standard Carbide, Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
1	1	3	38	041-010-2	041-010-3	041-010-4	Call For Pricing	042-010-2	042-010-3	042-010-4	Call For Pricing
1.5	2	5	38	041-015-2	041-015-3	041-015-4		042-015-2	042-015-3	042-015-4	
2	2	6	38	041-020-2	041-020-3	041-020-4		042-020-2	042-020-3	042-020-4	
3	3	12	38	041-030-2	041-030-3	041-030-4		042-030-2	042-030-3	042-030-4	
3.5	4	12	50	041-035-2	041-035-3	041-035-4		042-035-2	042-035-3	042-035-4	
4	4	14	50	041-040-2	041-040-3	041-040-4		042-040-2	042-040-3	042-040-4	
4.5	5	14	50	041-045-2	041-045-3	041-045-4		042-045-2	042-045-3	042-045-4	
5	5	16	50	041-050-2	041-050-3	041-050-4		042-050-2	042-050-3	042-050-4	
6	6	19	63	041-060-2	041-060-3	041-060-4		042-060-2	042-060-3	042-060-4	
7	7	19	63	041-070-2	041-070-3	041-070-4		042-070-2	042-070-3	042-070-4	
8	8	19	63	041-080-2	041-080-3	041-080-4		042-080-2	042-080-3	042-080-4	
9	9	22	70	041-090-2	041-090-3	041-090-4		042-090-2	042-090-3	042-090-4	
10	10	22	70	041-100-2	041-100-3	041-100-4		042-100-2	042-100-3	042-100-4	
11	11	25	70	041-110-2	041-110-3	041-110-4		042-110-2	042-110-3	042-110-4	
12	12	25	75	041-120-2	041-120-3	041-120-4		042-120-2	042-120-3	042-120-4	
14	14	30	88	041-140-2	041-140-3	041-140-4		042-140-2	042-140-3	042-140-4	
16	16	32	88	041-160-2	041-160-3	041-160-4		042-160-2	042-160-3	042-160-4	
18	18	36	100	041-180-2	041-180-3	041-180-4		042-180-2	042-180-3	042-180-4	
20	20	38	100	041-200-2	041-200-3	041-200-4		042-200-2	042-200-3	042-200-4	
22	22	38	100	041-220-2	041-220-3	041-220-4		042-220-2	042-220-3	042-220-4	
25	25	38	100	041-250-2	041-250-3	041-250-4		042-250-2	042-250-3	042-250-4	

METRIC

METRIC - Square End, Standard Carbide, Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
3	3	25	75	045-030-2	--	045-030-4	Call For Pricing	046-030-2	--	046-030-4	Call For Pricing
4	4	25	75	045-040-2	--	045-040-4		046-040-2	--	046-040-4	
5	5	25	75	045-050-2	--	045-050-4		046-050-2	--	046-050-4	
6	6	25	75	045-060-2	--	045-060-4		046-060-2	--	046-060-4	
8	8	30	100	045-080-2	--	045-080-4		046-080-2	--	046-080-4	
10	10	38	100	045-100-2	--	045-100-4		046-100-2	--	046-100-4	
12	12	50	100	045-120-2	--	045-120-4		046-120-2	--	046-120-4	
14	14	50	125	045-140-2	--	045-140-4		046-140-2	--	046-140-4	
16	16	75	150	045-160-2	--	045-160-4		046-160-2	--	046-160-4	
18	18	75	150	045-180-2	--	045-180-4		046-180-2	--	046-180-4	
20	20	75	150	045-200-2	--	045-200-4		046-200-2	--	046-200-4	
25	25	75	150	045-250-2	--	045-250-4		046-250-2	--	046-250-4	

METRIC

METRIC - Square End, Standard Carbide, Extra-Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
3	3	25	100	047-030-2	--	047-030-4	Call For Pricing	048-030-2	--	048-030-4	Call For Pricing
4	4	50	100	047-040-2	--	047-040-4		048-040-2	--	048-040-4	
5	5	30	100	047-050-2	--	047-050-4		048-050-2	--	048-050-4	
6	6	50	100	047-060-2	--	047-060-4		048-060-2	--	048-060-4	
8	8	50	150	047-080-2	--	047-080-4		048-080-2	--	048-080-4	
10	10	75	150	047-100-2	--	047-100-4		048-100-2	--	048-100-4	
12	12	75	150	047-120-2	--	047-120-4		048-120-2	--	048-120-4	
14	14	75	150	047-140-2	--	047-140-4		048-140-2	--	048-140-4	

METRIC

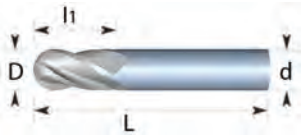
EVOLUTION
Solid Carbide Endmills

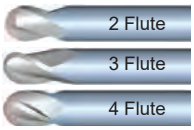
P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

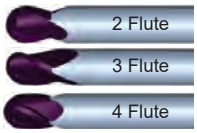
● GOOD ◒ OK ○ NOT OPTIMAL

- General Purpose
- 30 deg Helix Carbide with honed edges
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"

GENERAL PURPOSE

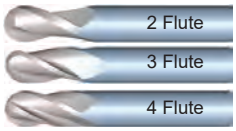


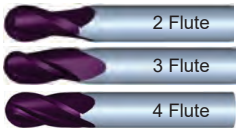




Ball Nose, Standard Carbide, Stub Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Uncoated Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	TiALN Coated Price
1/32	1/8	1/16	1-1/2	013-031-2	013-031-3	013-031-4	Call For Pricing	015-031-2	015-031-3	015-031-4	Call For Pricing
3/64	1/8	3/32	1-1/2	013-046-2	013-046-3	013-046-4		015-046-2	015-046-3	015-046-4	
1/16	1/8	1/8	1-1/2	013-062-2	013-062-3	013-062-4		015-062-2	015-062-3	015-062-4	
3/32	1/8	3/16	1-1/2	013-093-2	013-093-3	013-093-4		015-093-2	015-093-3	015-093-4	
1/8	1/8	1/4	1-1/2	013-125-2	013-125-3	013-125-4		015-125-2	015-125-3	015-125-4	
5/32	3/16	5/16	2	013-156-2	013-156-3	013-156-4		015-156-2	015-156-3	015-156-4	
3/16	3/16	3/8	2	013-187-2	013-187-3	013-187-4		015-187-2	015-187-3	015-187-4	
7/32	1/4	7/16	2	013-218-2	013-218-3	013-218-4		015-218-2	015-218-3	015-218-4	
1/4	1/4	1/2	2	013-250-2	013-250-3	013-250-4		015-250-2	015-250-3	015-250-4	
5/16	3/8	1/2	2	013-312-2	013-312-3	013-312-4		015-312-2	015-312-3	015-312-4	
3/8	3/8	5/8	2	013-375-2	013-375-3	013-375-4		015-375-2	015-375-3	015-375-4	
7/16	7/16	5/8	2-1/2	013-437-2	013-437-3	013-437-4		015-437-2	015-437-3	015-437-4	
1/2	1/2	5/8	2-1/2	013-500-2	013-500-3	013-500-4		015-500-2	015-500-3	015-500-4	
5/8	5/8	3/4	3	013-625-2	013-625-3	013-625-4		015-625-2	015-625-3	015-625-4	
3/4	3/4	1	3	013-750-2	013-750-3	013-750-4		015-750-2	015-750-3	015-750-4	
1	1	1	3	013-100-2	013-100-3	013-100-4		015-100-2	015-100-3	015-100-4	





Ball Nose, Standard Carbide, Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Uncoated Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	TiALN Coated Price
1/64	1/8	1/16	1-1/2	016-015-2	016-015-3	016-015-4	Call For Pricing	018-015-2	018-015-3	018-015-4	Call For Pricing
1/32	1/8	3/32	1-1/2	016-031-2	016-031-3	016-031-4		018-031-2	018-031-3	018-031-4	
3/64	1/8	1/8	1-1/2	016-046-2	016-046-3	016-046-4		018-046-2	018-046-3	018-046-4	
1/16	1/8	3/16	1-1/2	016-062-2	016-062-3	016-062-4		018-062-2	018-062-3	018-062-4	
5/64	1/8	1/4	1-1/2	016-078-2	016-078-3	016-078-4		018-078-2	018-078-3	018-078-4	
3/32	1/8	3/8	1-1/2	016-093-2	016-093-3	016-093-4		018-093-2	018-093-3	018-093-4	
7/64	1/8	3/8	1-1/2	016-109-2	016-109-3	016-109-4		018-109-2	018-109-3	018-109-4	
1/8	1/8	1/2	1-1/2	016-125-2	016-125-3	016-125-4		018-125-2	018-125-3	018-125-4	
9/64	3/16	9/16	2	016-140-2	016-140-3	016-140-4		018-140-2	018-140-3	018-140-4	
5/32	3/16	9/16	2	016-156-2	016-156-3	016-156-4		018-156-2	018-156-3	018-156-4	
11/64	3/16	9/16	2	016-171-2	016-171-3	016-171-4		018-171-2	018-171-3	018-171-4	
3/16	3/16	5/8	2	016-187-2	016-187-3	016-187-4		018-187-2	018-187-3	018-187-4	
13/64	1/4	5/8	2-1/2	016-203-2	016-203-3	016-203-4		018-203-2	018-203-3	018-203-4	
7/32	1/4	5/8	2-1/2	016-218-2	016-218-3	016-218-4		018-218-2	018-218-3	018-218-4	
15/64	1/4	3/4	2-1/2	016-234-2	016-234-3	016-234-4		018-234-2	018-234-3	018-234-4	
1/4	1/4	3/4	2-1/2	016-250-2	016-250-3	016-250-4		018-250-2	018-250-3	018-250-4	

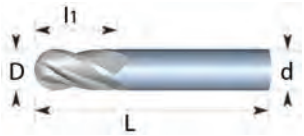
GENERAL PURPOSE

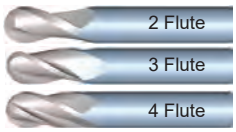
EVOLUTION
Solid Carbide Endmills

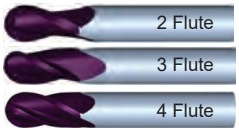
P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● GOOD ◒ OK ○ NOT OPTIMAL

- General Purpose
- 30 deg Helix Carbide with honed edges
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"







Ball Nose, Standard Carbide, Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
17/64	5/16	7/8	2-1/2	016-265-2	016-265-3	016-265-4	Call For Pricing	018-265-2	018-265-3	018-265-4	Call For Pricing
9/32	5/16	7/8	2-1/2	016-281-2	016-281-3	016-281-4		018-281-2	018-281-3	018-281-4	
19/64	5/16	7/8	2-1/2	016-296-2	016-296-3	016-296-4		018-296-2	018-296-3	018-296-4	
5/16	5/16	7/8	2-1/2	016-312-2	016-312-3	016-312-4		018-312-2	018-312-3	018-312-4	
21/64	3/8	7/8	2-1/2	016-328-2	016-328-3	016-328-4		018-328-2	018-328-3	018-328-4	
11/32	3/8	7/8	2-1/2	016-343-2	016-343-3	016-343-4		018-343-2	018-343-3	018-343-4	
23/64	3/8	7/8	2-1/2	016-359-2	016-359-3	016-359-4		018-359-2	018-359-3	018-359-4	
3/8	3/8	1	2-1/2	016-375-2	016-375-3	016-375-4		018-375-2	018-375-3	018-375-4	
25/64	7/16	1	2-1/2	016-390-2	016-390-3	016-390-4		018-390-2	018-390-3	018-390-4	
13/32	7/16	1	2-1/2	016-406-2	016-406-3	016-406-4		018-406-2	018-406-3	018-406-4	
27/64	7/16	1	2-1/2	016-421-2	016-421-3	016-421-4		018-421-2	018-421-3	018-421-4	
7/16	7/16	1	2-1/2	016-437-2	016-437-3	016-437-4		018-437-2	018-437-3	018-437-4	
29/64	1/2	1	3	016-453-2	016-453-3	016-453-4		018-453-2	018-453-3	018-453-4	
15/32	1/2	1	3	016-468-2	016-468-3	016-468-4		018-468-2	018-468-3	018-468-4	
31/64	1/2	1	3	016-484-2	016-484-3	016-484-4		018-484-2	018-484-3	018-484-4	
1/2	1/2	1	3	016-500-2	016-500-3	016-500-4		018-500-2	018-500-3	018-500-4	
33/64	9/16	1-1/4	3-1/2	016-515-2	016-515-3	016-515-4		018-515-2	018-515-3	018-515-4	
17/32	9/16	1-1/4	3-1/2	016-531-2	016-531-3	016-531-4		018-531-2	018-531-3	018-531-4	
35/64	9/16	1-1/4	3-1/2	016-546-2	016-546-3	016-546-4		018-546-2	018-546-3	018-546-4	
9/16	9/16	1-1/4	3-1/2	016-562-2	016-562-3	016-562-4		018-562-2	018-562-3	018-562-4	
37/64	5/8	1-1/4	3-1/2	016-578-2	016-578-3	016-578-4		018-578-2	018-578-3	018-578-4	
19/32	5/8	1-1/4	3-1/2	016-593-2	016-593-3	016-593-4		018-593-2	018-593-3	018-593-4	
39/64	5/8	1-1/4	3-1/2	016-609-2	016-609-3	016-609-4		018-609-2	018-609-3	018-609-4	
5/8	5/8	1-1/4	3-1/2	016-625-2	016-625-3	016-625-4		018-625-2	018-625-3	018-625-4	
41/64	3/4	1-1/2	4	016-640-2	016-640-3	016-640-4		018-640-2	018-640-3	018-640-4	
21/32	3/4	1-1/2	4	016-656-2	016-656-3	016-656-4		018-656-2	018-656-3	018-656-4	
43/64	3/4	1-1/2	4	016-671-2	016-671-3	016-671-4		018-671-2	018-671-3	018-671-4	
11/16	3/4	1-1/2	4	016-687-2	016-687-3	016-687-4		018-687-2	018-687-3	018-687-4	
45/64	3/4	1-1/2	4	016-703-2	016-703-3	016-703-4		018-703-2	018-703-3	018-703-4	
23/32	3/4	1-1/2	4	016-718-2	016-718-3	016-718-4		018-718-2	018-718-3	018-718-4	
47/64	3/4	1-1/2	4	016-734-2	016-734-3	016-734-4		018-734-2	018-734-3	018-734-4	
3/4	3/4	1-1/2	4	016-750-2	016-750-3	016-750-4		018-750-2	018-750-3	018-750-4	
49/64	7/8	1-1/2	4	016-765-2	016-765-3	016-765-4		018-765-2	018-765-3	018-765-4	
25/32	7/8	1-1/2	4	016-781-2	016-781-3	016-781-4		018-781-2	018-781-3	018-781-4	
51/64	7/8	1-1/2	4	016-796-2	016-796-3	016-796-4		018-796-2	018-796-3	018-796-4	
13/16	7/8	1-1/2	4	016-812-2	016-812-3	016-812-4		018-812-2	018-812-3	018-812-4	
53/64	7/8	1-1/2	4	016-828-2	016-828-3	016-828-4		018-828-2	018-828-3	018-828-4	
27/32	7/8	1-1/2	4	016-843-2	016-843-3	016-843-4		018-843-2	018-843-3	018-843-4	
55/64	7/8	1-1/2	4	016-859-2	016-859-3	016-859-4		018-859-2	018-859-3	018-859-4	
7/8	7/8	1-1/2	4	016-875-2	016-875-3	016-875-4		018-875-2	018-875-3	018-875-4	
57/64	1	1-1/2	4	016-890-2	016-890-3	016-890-4		018-890-2	018-890-3	018-890-4	
29/32	1	1-1/2	4	016-906-2	016-906-3	016-906-4		018-906-2	018-906-3	018-906-4	
59/64	1	1-1/2	4	016-921-2	016-921-3	016-921-4		018-921-2	018-921-3	018-921-4	
15/16	1	1-1/2	4	016-937-2	016-937-3	016-937-4		018-937-2	018-937-3	018-937-4	
61/64	1	1-1/2	4	016-953-2	016-953-3	016-953-4		018-953-2	018-953-3	018-953-4	
31/32	1	1-1/2	4	016-968-2	016-968-3	016-968-4		018-968-2	018-968-3	018-968-4	
63/64	1	1-1/2	4	016-984-2	016-984-3	016-984-4		018-984-2	018-984-3	018-984-4	
1	1	1-1/2	4	016-100-2	016-100-3	016-100-4		018-100-2	018-100-3	018-100-4	

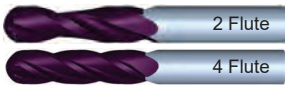
GENERAL PURPOSE

EVOLUTION
Solid Carbide Endmills

P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● GOOD ◒ OK ○ NOT OPTIMAL

- General Purpose
- 30 deg Helix Carbide with honed edges
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"



Ball Nose, Standard Carbide, Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
1/8	1/8	3/4	2-1/2	019-125-2	--	019-125-4	Call For Pricing	021-125-2	--	021-125-4	Call For Pricing
3/16	3/16	3/4	2-1/2	019-187-2	--	019-187-4		021-187-2	--	021-187-4	
1/4	1/4	1-1/8	3	019-250-2	--	019-250-4		021-250-2	--	021-250-4	
5/16	5/16	1-1/8	3	019-312-2	--	019-312-4		021-312-2	--	021-312-4	
3/8	3/8	1-1/8	3	019-375-2	--	019-375-4		021-375-2	--	021-375-4	
7/16	7/16	2	4	019-437-2	--	019-437-4		021-437-2	--	021-437-4	
1/2	1/2	2	4	019-500-2	--	019-500-4		021-500-2	--	021-500-4	
5/8	5/8	2-1/4	5	019-625-2	--	019-625-4		021-625-2	--	021-625-4	
3/4	3/4	2-1/4	5	019-750-2	--	019-750-4		021-750-2	--	021-750-4	
1	1	2-1/4	5	019-100-2	--	019-100-4		021-100-2	--	021-100-4	

Ball Nose, Standard Carbide, Extra Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
1/8	1/8	1	3	022-125-2	--	022-125-4	Call For Pricing	024-125-2	--	024-125-4	Call For Pricing
3/16	3/16	1-1/8	3	022-187-2	--	022-187-4		024-187-2	--	024-187-4	
1/4	1/4	1-1/2	4	022-250-2	--	022-250-4		024-250-2	--	024-250-4	
5/16	5/16	1-5/8	4	022-312-2	--	022-312-4		024-312-2	--	024-312-4	
3/8	3/8	1-3/4	4	022-375-2	--	022-375-4		024-375-2	--	024-375-4	
1/2	1/2	3	6	022-500-2	--	022-500-4		024-500-2	--	024-500-4	
5/8	5/8	3	6	022-625-2	--	022-625-4		024-625-2	--	024-625-4	
3/4	3/4	3	6	022-750-2	--	022-750-4		024-750-2	--	024-750-4	
1	1	3	6	022-100-2	--	022-100-4		024-100-2	--	024-100-4	

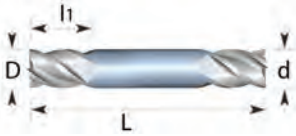
METRIC - Ball End, Standard Carbide, Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
1	1	3	38	043-010-2	043-010-3	043-010-4	Call For Pricing	044-010-2	044-010-3	044-010-4	Call For Pricing
1.5	2	5	38	043-015-2	043-015-3	043-015-4		044-015-2	044-015-3	044-015-4	
2	2	6	38	043-020-2	043-020-3	043-020-4		044-020-2	044-020-3	044-020-4	
3	3	12	38	043-030-2	043-030-3	043-030-4		044-030-2	044-030-3	044-030-4	
3.5	4	12	50	043-035-2	043-035-3	043-035-4		044-035-2	044-035-3	044-035-4	
4	4	14	50	043-040-2	043-040-3	043-040-4		044-040-2	044-040-3	044-040-4	
4.5	5	14	50	043-045-2	043-045-3	043-045-4		044-045-2	044-045-3	044-045-4	
5	5	16	50	043-050-2	043-050-3	043-050-4		044-050-2	044-050-3	044-050-4	
6	6	19	63	043-060-2	043-060-3	043-060-4		044-060-2	044-060-3	044-060-4	
7	7	19	63	043-070-2	043-070-3	043-070-4		044-070-2	044-070-3	044-070-4	
8	8	19	63	043-080-2	043-080-3	043-080-4		044-080-2	044-080-3	044-080-4	
9	9	22	70	043-090-2	043-090-3	043-090-4		044-090-2	044-090-3	044-090-4	
10	10	22	70	043-100-2	043-100-3	043-100-4		044-100-2	044-100-3	044-100-4	
11	11	25	70	043-110-2	043-110-3	043-110-4		044-110-2	044-110-3	044-110-4	
12	12	25	75	043-120-2	043-120-3	043-120-4		044-120-2	044-120-3	044-120-4	
14	14	30	88	043-140-2	043-140-3	043-140-4		044-140-2	044-140-3	044-140-4	
16	16	32	88	043-160-2	043-160-3	043-160-4		044-160-2	044-160-3	044-160-4	
18	18	36	100	043-180-2	043-180-3	043-180-4		044-180-2	044-180-3	044-180-4	
20	20	38	100	043-200-2	043-300-3	043-400-4		044-200-2	044-300-3	044-400-4	
22	22	38	100	043-220-2	043-320-3	043-420-4		044-220-2	044-320-3	044-420-4	
25	25	38	100	043-250-2	043-350-3	043-450-4		044-250-2	044-350-3	044-450-4	

METRIC

GENERAL PURPOSE

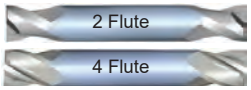
EVOLUTION
Solid Carbide Endmills

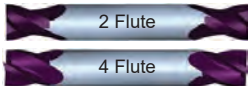


P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● GOOD ◒ OK ○ NOT OPTIMAL

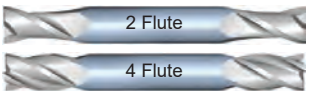
- General Purpose
- 30 deg Helix Carbide with honed edges
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"





Square End, Standard Carbide, Stub Length, Double End

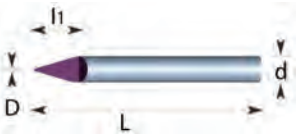
Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
1/32	1/8	1/16	1-1/2	025-031-2	--	025-031-4	Call For Pricing	027-031-2	--	027-031-4	Call For Pricing
3/64	1/8	3/32	1-1/2	025-046-2	--	025-046-4		027-046-2	--	027-046-4	
1/16	1/8	1/8	1-1/2	025-062-2	--	025-062-4		027-062-2	--	027-062-4	
3/32	1/8	3/16	1-1/2	025-093-2	--	025-093-4		027-093-2	--	027-093-4	
7/64	1/8	7/32	1-1/2	025-109-2	--	025-109-4		027-109-2	--	027-109-4	
1/8	1/8	1/4	1-1/2	025-125-2	--	025-125-4		027-125-2	--	027-125-4	
5/32	3/16	5/16	2	025-156-2	--	025-156-4		027-156-2	--	027-156-4	
3/16	3/16	5/16	2	025-187-2	--	025-187-4		027-187-2	--	027-187-4	
7/32	1/4	3/8	2-1/2	025-218-2	--	025-218-4		027-218-2	--	027-218-4	
1/4	1/4	1/2	2-1/2	025-250-2	--	025-250-4		027-250-2	--	027-250-4	
9/32	5/16	1/2	2-1/2	025-281-2	--	025-281-4		027-281-2	--	027-281-4	
5/16	5/16	1/2	2-1/2	025-312-2	--	025-312-4		027-312-2	--	027-312-4	
3/8	3/8	9/16	2-1/2	025-375-2	--	025-375-4		027-375-2	--	027-375-4	
7/16	1/2	9/16	2-3/4	025-437-2	--	025-437-4		027-437-2	--	027-437-4	
1/2	1/2	5/8	3	025-500-2	--	025-500-4		027-500-2	--	027-500-4	
9/16	5/8	11/16	3-1/2	025-562-2	--	025-562-4		027-562-2	--	027-562-4	
5/8	5/8	11/16	3-1/2	025-625-2	--	025-625-4		027-625-2	--	027-625-4	
3/4	3/4	7/8	4	025-750-2	--	025-750-4		027-750-2	--	027-750-4	



Square End, Standard Carbide, Regular Length, Double End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
3/32	1/8	5/16	3	031-093-2	--	031-093-4	Call For Pricing	032-093-2	--	032-093-4	Call For Pricing
1/8	1/8	3/8	3-1/16	031-125-2	--	031-125-4		032-125-2	--	032-125-4	
5/32	3/16	7/16	3-1/8	031-156-2	--	031-156-4		032-156-2	--	032-156-4	
3/16	3/16	1/2	3-1/4	031-187-2	--	031-187-4		032-187-2	--	032-187-4	
7/32	1/4	9/16	3-1/2	031-218-2	--	031-218-4		032-218-2	--	032-218-4	
1/4	1/4	5/8	3-1/2	031-250-2	--	031-250-4		032-250-2	--	032-250-4	
5/16	5/16	3/4	3-1/2	031-312-2	--	031-312-4		032-312-2	--	032-312-4	
3/8	3/8	3/4	3-1/2	031-375-2	--	031-375-4		032-375-2	--	032-375-4	
7/16	1/2	7/8	4	031-437-2	--	031-437-4		032-437-2	--	032-437-4	
1/2	1/2	1	4	031-500-2	--	031-500-4		032-500-2	--	032-500-4	
5/8	5/8	1-1/2	6	031-625-2	--	031-625-4		032-625-2	--	032-625-4	
3/4	3/4	1-1/2	6	031-750-2	--	031-750-4		032-750-2	--	032-750-4	

* Double Ended tools under 1/4" Diamater have Round Shanks. 1/4" diamater & larger have Weldon Shanks.



NEW

- Engraving Tools with 30 Degree angle
- 3 tip sizes to choose from
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"

Engraving Tools 30 Degree Tip

Tip Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	TiALN Coated Part#	TiALN Coated Price
.005	1/4	1/2	2-1/2	108-250-005	Call For Pricing
.010	1/4	1/2	2-1/2	108-250-010	
.020	1/4	1/2	2-1/2	108-250-020	

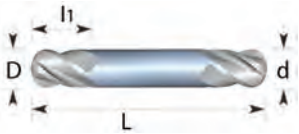
GENERAL PURPOSE

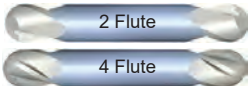
EVOLUTION
Solid Carbide Endmills

P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● GOOD ◒ OK ○ NOT OPTIMAL

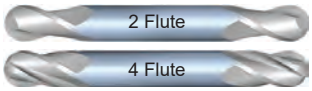
- General Purpose
- 30 deg Helix Carbide with honed edges
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"





Ball Nose, Standard Carbide, Stub Length, Double End

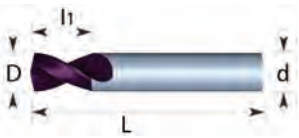
Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
1/32	1/8	1/16	1-1/2	028-031-2	--	028-031-4	Call For Pricing	030-031-2	--	030-031-4	Call For Pricing
3/64	1/8	3/32	1-1/2	028-046-2	--	028-046-4		030-046-2	--	030-046-4	
1/16	1/8	1/8	1-1/2	028-062-2	--	028-062-4		030-062-2	--	030-062-4	
3/32	1/8	3/16	1-1/2	028-093-2	--	028-093-4		030-093-2	--	030-093-4	
7/64	1/8	7/32	1-1/2	028-109-2	--	028-109-4		030-109-2	--	030-109-4	
1/8	1/8	1/4	1-1/2	028-125-2	--	028-125-4		030-125-2	--	030-125-4	
5/32	3/16	5/16	2	028-156-2	--	028-156-4		030-156-2	--	030-156-4	
3/16	3/16	5/16	2	028-187-2	--	028-187-4		030-187-2	--	030-187-4	
7/32	1/4	3/8	2-1/2	028-218-2	--	028-218-4		030-218-2	--	030-218-4	
1/4	1/4	1/2	2-1/2	028-250-2	--	028-250-4		030-250-2	--	030-250-4	
9/32	5/16	1/2	2-1/2	028-281-2	--	028-281-4		030-281-2	--	030-281-4	
5/16	5/16	1/2	2-1/2	028-312-2	--	028-312-4		030-312-2	--	030-312-4	
3/8	3/8	9/16	2-1/2	028-375-2	--	028-375-4		030-375-2	--	030-375-4	
7/16	1/2	9/16	2-3/4	028-437-2	--	028-437-4		030-437-2	--	030-437-4	
1/2	1/2	5/8	3	028-500-2	--	028-500-4		030-500-2	--	030-500-4	
9/16	5/8	11/16	3-1/2	028-562-2	--	028-562-4		030-562-2	--	030-562-4	
5/8	5/8	11/16	3-1/2	028-625-2	--	028-625-4		030-625-2	--	030-625-4	
3/4	3/4	7/8	4	028-750-2	--	028-750-4		030-750-2	--	030-750-4	



Ball Nose, Standard Carbide, Regular Length, Double End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated 4 Flute Part#	Price	TiALN Coated 2 Flute Part#	TiALN Coated 3 Flute Part#	TiALN Coated 4 Flute Part#	Price
3/32	1/8	5/16	3	033-093-2	--	033-093-4	Call For Pricing	034-093-2	--	034-093-4	Call For Pricing
1/8	1/8	3/8	3-1/16	033-125-2	--	033-125-4		034-125-2	--	034-125-4	
5/32	3/16	7/16	3-1/8	033-156-2	--	033-156-4		034-156-2	--	034-156-4	
3/16	3/16	1/2	3-1/4	033-187-2	--	033-187-4		034-187-2	--	034-187-4	
7/32	1/4	9/16	3-1/2	033-218-2	--	033-218-4		034-218-2	--	034-218-4	
1/4	1/4	5/8	3-1/2	033-250-2	--	033-250-4		034-250-2	--	034-250-4	
5/16	5/16	3/4	3-1/2	033-312-2	--	033-312-4		034-312-2	--	034-312-4	
3/8	3/8	3/4	3-1/2	033-375-2	--	033-375-4		034-375-2	--	034-375-4	
7/16	1/2	7/8	4	033-437-2	--	033-437-4		034-437-2	--	034-437-4	
1/2	1/2	1	4	033-500-2	--	033-500-4		034-500-2	--	034-500-4	
5/8	5/8	1-1/2	6	033-625-2	--	033-625-4		034-625-2	--	034-625-4	
3/4	3/4	1-1/2	6	033-750-2	--	033-750-4		034-750-2	--	034-750-4	

* Double Ended tools under 1/4" Diamater have Round Shanks. 1/4" diamater & larger have Weldon Shanks.



NEW

- Allows High Performance drills to center properly without damaging their outside edge
- 145 Degree Point Carbide with honed edges
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0004"

Spot Drills 145 Degree Point

Drill Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	TiALN Coated Part#	TiALN Coated Price
1/4	1/4	1/2	3	110-250-2	Call For Pricing
3/8	3/8	3/4	3	110-375-2	
1/2	1/2	1	4	110-500-2	
5/8	5/8	1	4	110-625-2	
3/4	3/4	1-1/8	4	110-750-2	

EVOLUTION
Solid Carbide Endmills

SPEED & FEED RECOMMENDATIONS

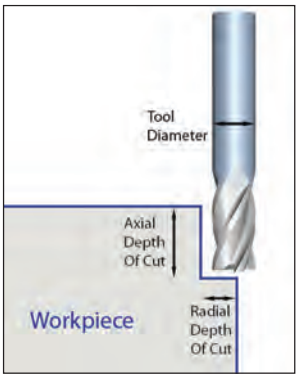
GENERAL PURPOSE

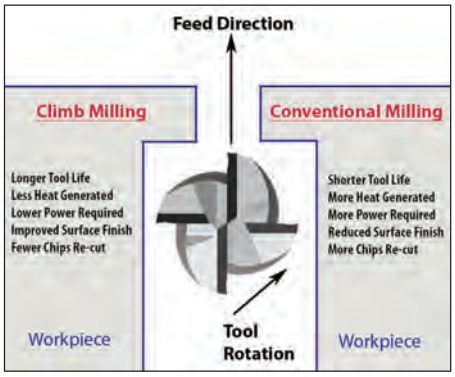
Material		Speed (SFM)		Feed Per Tooth By End Mill Diameter							
		Uncoated	TiALN Coated	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
Aluminum & Aluminum Alloys	N	600-1200	900-1800	.0020	.0025	.0030	.0035	.0040	.0050	.0060	.0080
Copper & Copper Alloys	N	350-850	525-1275	.0020	.0025	.0025	.0030	.0030	.0035	.0040	.0060
Brass & Bronze	N	250-400	375-600	.0020	.0025	.0025	.0030	.0030	.0035	.0040	.0050
Graphite	N	500-800	500-1200	.0030	.0035	.0025	.0030	.0030	.0040	.0050	.0070
Plastics	N	600-1100	600-1650	.0030	.0035	.0040	.0050	.0060	.0080	.0100	.0150
Iron, Cast (soft)	K	250-450	375-650	.0020	.0022	.0025	.0027	.0030	.0045	.0060	.0080
Iron, Cast (hard)	K	100-250	100-375	.0008	.0010	.0015	.0017	.0020	.0025	.0030	.0040
Iron, Ductile	K	80-400	100-600	.0010	.0012	.0015	.0017	.0020	.0030	.0040	.0060
Iron, Malleable	K	150-500	225-650	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0070
Carbon Steels, Low	P	200-400	300-600	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0070
Carbon Steels, Medium	P	100-250	150-375	.0015	.0016	.0017	.0018	.0020	.0030	.0040	.0050
Carbon Steels Hardened to 35 Rc	P	130-230	130-345	.0010	.0011	.0012	.0013	.0015	.0017	.0020	.0030
Carbon Steels Hardened to 50 Rc	P	70-130	70-160	.0007	.0007	.0008	.0009	.0010	.0015	.0020	.0030
Carbon Steels Hardened to 60 Rc	P	30-70	30-90	.0005	.0006	.0007	.0009	.0010	.0012	.0015	.0020
Steels, Mold	P	200-350	300-525	.0010	.0012	.0015	.0017	.0020	.0025	.0030	.0040
Steels, Tool	P	100-250	150-375	.0010	.0012	.0015	.0017	.0020	.0025	.0030	.0040
Stainless Steels, Soft	M	200-350	300-450	.0010	.0012	.0015	.0012	.0020	.0030	.0040	.0060
Stainless Steels, Hard	M	100-200	150-300	.0005	.0006	.0007	.0008	.0010	.0020	.0030	.0050
Monel & High Nickel Steel	S	75-175	75-200	.0010	.0012	.0015	.0017	.0020	.0025	.0030	.0040
Titanium, Soft	S	125-300	125-375	.0010	.0012	.0015	.0017	.0020	.0030	.0040	.0060
Titanium, Hard	S	50-150	50-175	.0005	.0006	.0007	.0008	.0010	.0015	.0020	.0020
Nickel Based High Temp Alloys	S	50-100	50-125	.0008	.0008	.0009	.0009	.0010	.0012	.0015	.0020

- Higher Feed Per Tooth should be used to start for radial depths of cut less than 25% of the tool diameter. Lower Feed Per Tooth should be used to start for radial depths of cut greater than 25% of the tool diameter.
- The above recommendations are for axial lengths of cut not to exceed 1 times the tool diameter for profiling and .5 times the diameter for full slotting.
- The above parameters are recommended starting points only. If the tool is working well, without vibrations or significant noise, increase the SFM and/or Feed Per Tooth in 5-10% increments.
- Optimum speeds & feeds will depend upon material, setup, machine conditions & tool deflection. Higher or lower parameters may be required to achieve optimum machining conditions.
- For Light Radial Depths of cut, make certain to increase the feed rate to compensate for Radial Chip Thinning Factor (RCTF). Consult a formula or app to calculate.
- Climb Milling is preferred to Conventional Milling

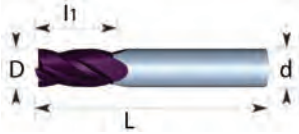
$$\text{RPM} = \frac{SFM}{(3.146 * \text{Cutter Diam.}) / 12}$$

$$\text{IPM} = RPM * \text{Feed Per Tooth} * \#\text{ of Teeth}$$





EVOLUTION
Solid Carbide Endmills



P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H		Hardened Steel

● BETTER ◒ OK ○ NOT OPTIMAL

HIGH PERFORMANCE

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"

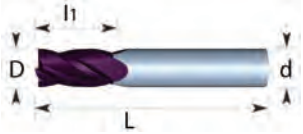
HIGH PERFORMANCE Variable Pitch Carbide, Stub Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	3/8	2	SQ	190-188-4	Call For Pricing	--	
3/16	3/16	3/8	2	.015CR	190-188-4-015R		--	
1/4	1/4	3/8	2	SQ	190-250-4		--	
1/4	1/4	3/8	2	.015CR	190-250-4-015R		--	
5/16	5/16	3/8	2	SQ	190-312-4		--	
5/16	5/16	3/8	2	.020CR	190-312-4-020R		--	
3/8	3/8	1/2	2	SQ	190-375-4		--	
3/8	3/8	1/2	2	.020CR	190-375-4-020R		--	
1/2	1/2	5/8	2-1/2	SQ	190-500-4		191-500-4	Call For Pricing
1/2	1/2	5/8	2-1/2	.030CR	190-500-4-030R		191-500-4-030R	
5/8	5/8	3/4	3	SQ	190-625-4		191-625-4	
5/8	5/8	3/4	3	.030CR	190-625-4-030R		191-625-4-030R	
3/4	3/4	1	3	SQ	190-750-4		191-750-4	
3/4	3/4	1	3	.030CR	190-750-4-030R		191-750-4-030R	

HIGH PERFORMANCE Variable Pitch Carbide, Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	5/8	2	SQ	090-188-4	Call For Pricing	--	
3/16	3/16	5/8	2	.015CR	090-188-4-015R		--	
1/4	1/4	3/4	2-1/2	SQ	090-250-4		091-250-4	Call For Pricing
1/4	1/4	3/4	2-1/2	.020CR	090-250-4-020R		091-250-4-020R	
5/16	5/16	13/16	2-1/2	SQ	090-312-4		091-312-4	
5/16	5/16	13/16	2-1/2	.020CR	090-312-4-020R		091-312-4-020R	
3/8	3/8	7/8	2-1/2	SQ	090-375-4		091-375-4	
3/8	3/8	7/8	2-1/2	.020CR	090-375-4-020R		091-375-4-020R	
7/16	7/16	1	2-3/4	SQ	090-437-4		091-437-4	
1/2	1/2	1-1/4	3	SQ	090-500-4		091-500-4	
1/2	1/2	1-1/4	3	.015CR	090-500-4-015R		091-500-4-015R	
1/2	1/2	1-1/4	3	.030CR	090-500-4-030R		091-500-4-030R	
1/2	1/2	1-1/4	3	.060CR	090-500-4-060R		091-500-4-060R	
5/8	5/8	1-1/4	3-1/2	SQ	090-625-4		091-625-4	
5/8	5/8	1-1/4	3-1/2	.030CR	090-625-4-030R		091-625-4-030R	
5/8	5/8	1-1/4	3-1/2	.060CR	090-625-4-060R		091-625-4-060R	
5/8	5/8	1-1/4	3-1/2	.125CR	090-625-4-125R		091-625-4-125R	
3/4	3/4	1-1/2	4	SQ	090-750-4		091-750-4	
3/4	3/4	1-1/2	4	.030CR	090-750-4-030R		091-750-4-030R	
3/4	3/4	1-1/2	4	.060CR	090-750-4-060R		091-750-4-060R	
3/4	3/4	1-1/2	4	.125CR	090-750-4-125R		091-750-4-125R	
1	1	1-1/2	4	SQ	090-100-4		091-100-4	
1	1	1-1/2	4	.030CR	090-100-4-030R		091-100-4-030R	
1	1	1-1/2	4	.060CR	090-100-4-060R		091-100-4-060R	
1	1	1-1/2	4	.125CR	090-100-4-125R		091-100-4-125R	

EVOLUTION
Solid Carbide Endmills



P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H		Hardened Steel

● BETTER ◒ OK ○ NOT OPTIMAL

HIGH PERFORMANCE

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"

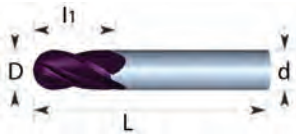
HIGH PERFORMANCE Variable Pitch Carbide, Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	3/4	2-1/2	SQ	092-188-4	Call For Pricing	--	
3/16	3/16	3/4	2-1/2	.015CR	092-188-4-015R		--	
1/4	1/4	1-1/8	3	SQ	092-250-4		093-250-4	Call For Pricing
1/4	1/4	1-1/8	3	.020CR	092-250-4-020R		093-250-4-020R	
5/16	5/16	1-1/8	3	SQ	092-312-4		093-312-4	
5/16	5/16	1-1/8	3	.020CR	092-312-4-020R		093-312-4-020R	
3/8	3/8	1-1/8	3	SQ	092-375-4		093-375-4	
3/8	3/8	1-1/8	3	.020CR	092-375-4-020R		093-375-4-020R	
7/16	7/16	2	4	SQ	092-437-4		093-437-4	
1/2	1/2	2	4	SQ	092-500-4		093-500-4	
1/2	1/2	2	4	.015CR	092-500-4-015R		093-500-4-015R	
1/2	1/2	2	4	.030CR	092-500-4-030R		093-500-4-030R	
1/2	1/2	2	4	.060CR	092-500-4-060R		093-500-4-060R	
5/8	5/8	2-1/4	5	SQ	092-625-4		093-625-4	
5/8	5/8	2-1/4	5	.030CR	092-625-4-030R		093-625-4-030R	
5/8	5/8	2-1/4	5	.060CR	092-625-4-060R		093-625-4-060R	
5/8	5/8	2-1/4	5	.125CR	092-625-4-125R		093-625-4-125R	
3/4	3/4	2-1/4	5	SQ	092-750-4		093-750-4	
3/4	3/4	2-1/4	5	.030CR	092-750-4-030R		093-750-4-030R	
3/4	3/4	2-1/4	5	.060CR	092-750-4-060R		093-750-4-060R	
3/4	3/4	2-1/4	5	.125CR	092-750-4-125R		093-750-4-125R	
1	1	2-1/4	5	SQ	092-100-4		093-100-4	
1	1	2-1/4	5	.030CR	092-100-4-030R		093-100-4-030R	
1	1	2-1/4	5	.060CR	092-100-4-060R		093-100-4-060R	
1	1	2-1/4	5	.125CR	092-100-4-125R		093-100-4-125R	

HIGH PERFORMANCE Variable Pitch Carbide,Extra Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	1-1/8	3	SQ	098-188-4	Call For Pricing	--	
1/4	1/4	1-1/2	4	SQ	098-250-4		--	
5/16	5/16	1-5/8	4	SQ	098-312-4		--	
3/8	3/8	1-3/4	4	SQ	098-375-4		--	
1/2	1/2	3	6	SQ	098-500-4		--	
5/8	5/8	3	6	SQ	098-625-4		--	
3/4	3/4	3	6	SQ	098-750-4		--	
1	1	3	6	SQ	098-100-4		--	

EVOLUTION
Solid Carbide Endmills



P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H		Hardened Steel

● BETTER ◒ OK ○ NOT OPTIMAL

HIGH PERFORMANCE

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"

HIGH PERFORMANCE Variable Pitch Carbide, Ball Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	5/8	2	094-188-4	Call For Pricing	--	Call For Pricing
1/4	1/4	3/4	2-1/2	094-250-4		095-250-4	
5/16	5/16	13/16	2-1/2	094-312-4		095-312-4	
3/8	3/8	7/8	2-1/2	094-375-4		095-375-4	
7/16	7/16	1	2-3/4	094-437-4		095-437-4	
1/2	1/2	1	3	094-500-4		095-500-4	
5/8	5/8	1-1/4	3-1/2	094-625-4		095-625-4	
3/4	3/4	1-1/2	4	094-750-4		095-750-4	
1	1	1-1/2	4	094-100-4		095-100-4	

HIGH PERFORMANCE Variable Pitch Carbide, Ball Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	3/4	2-1/2	096-188-4	Call For Pricing	--	Call For Pricing
1/4	1/4	1-1/8	3	096-250-4		097-250-4	
5/16	5/16	1-1/8	3	096-312-4		097-312-4	
3/8	3/8	1-1/8	3	096-375-4		097-375-4	
7/16	7/16	2	4	096-437-4		097-437-4	
1/2	1/2	2	4	096-500-4		097-500-4	
5/8	5/8	2-1/4	5	096-625-4		097-625-4	
3/4	3/4	2-1/4	5	096-750-4		097-750-4	
1	1	2-1/4	5	096-100-4		097-100-4	

HIGH PERFORMANCE Variable Pitch Carbide, Ball Extra Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	1-1/8	3	099-188-4	Call For Pricing	--	Call For Pricing
1/4	1/4	1-1/2	4	099-250-4		--	
5/16	5/16	1-5/8	4	099-312-4		--	
3/8	3/8	1-3/4	4	099-375-4		--	
1/2	1/2	3	6	099-500-4		--	
5/8	5/8	3	6	099-625-4		--	
3/4	3/4	3	6	099-750-4		--	
1	1	3	6	099-100-4		--	

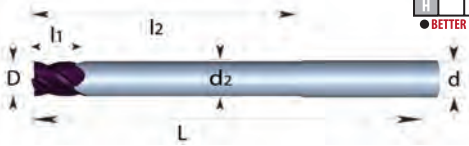
EVOLUTION
Solid Carbide Endmills

P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H		Hardened Steel

● BETTER ◒ OK ○ NOT OPTIMAL

HIGH PERFORMANCE

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0020"



HIGH PERFORMANCE Variable Pitch Carbide, Long Reach Neck Relief, Single End

Cutter Diam. D	Shank Diam. d	Necked Diam. d_1	Length Of Cut l_1	Length Below Shk. l_2	O.A.L. L	Corner Radius	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	.1775	3/8	2-1/2	4	SQ	290-188-4	Call For Pricing	--	Call For Pricing
3/16	3/16	.1775	3/8	2-1/2	4	.015CR	290-188-4-015R		--	
1/4	1/4	.2400	3/8	2-1/2	4	SQ	290-250-4		--	
1/4	1/4	.2400	3/8	2-1/2	4	.015CR	290-250-4-015R		--	
5/16	5/16	.3025	7/16	2-1/2	4	SQ	290-312-4		--	
5/16	5/16	.3025	7/16	2-1/2	4	.015CR	290-312-4-015R		--	
3/8	3/8	.3650	1/2	2-1/2	4	SQ	290-375-4		--	
3/8	3/8	.3650	1/2	2-1/2	4	.015CR	290-375-4-015R		--	
1/2	1/2	.4800	5/8	3	5	SQ	290-500-4		--	
1/2	1/2	.4800	5/8	3	5	.020CR	290-500-4-020R		--	
1/2	1/2	.4800	5/8	4	6	SQ	290-500-4-L		--	
1/2	1/2	.4800	5/8	4	6	.020CR	290-500-4-020R-L		--	
5/8	5/8	.6050	3/4	3	5	SQ	290-625-4		--	
5/8	5/8	.6050	3/4	3	5	.020CR	290-625-4-020R		--	
5/8	5/8	.6050	3/4	4	6	SQ	290-625-4-L		--	
5/8	5/8	.6050	3/4	4	6	.020CR	290-625-4-020R-L		--	
3/4	3/4	.7300	1	3	5	SQ	290-750-4		--	
3/4	3/4	.7300	1	3	5	.020CR	290-750-4-020R		--	
3/4	3/4	.7300	1	4	6	SQ	290-750-4-L		--	
3/4	3/4	.7300	1	4	6	.020CR	290-750-4-020R-L		--	
3/4	3/4	.7300	1	5	7	SQ	290-750-4-LL		--	
3/4	3/4	.7300	1	5	7	.020CR	290-750-4-020R-LL		--	
1	1	.9800	1-1/4	3	5	SQ	290-100-4		--	
1	1	.9800	1-1/4	3	5	.020CR	290-100-4-020R		--	
1	1	.9800	1-1/4	4	6	SQ	290-100-4-L		--	
1	1	.9800	1-1/4	4	6	.020CR	290-100-4-020R-L		--	
1	1	.9800	1-1/4	5	7	SQ	290-100-4-LL		--	
1	1	.9800	1-1/4	5	7	.020CR	290-100-4-020R-LL		--	

HIGH PERFORMANCE Variable Pitch Carbide, Ball Long Reach Neck Relief, Single End

Cutter Diam. D	Shank Diam. d	Necked Diam. d_1	Length Of Cut l_1	Length Below Shk. l_2	O.A.L. L	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	.1775	3/8	2-1/2	4	294-188-4	Call For Pricing	--	Call For Pricing
1/4	1/4	.2400	3/8	2-1/2	4	294-250-4		--	
5/16	5/16	.3025	7/16	2-1/2	4	294-312-4		--	
3/8	3/8	.3650	1/2	2-1/2	4	294-375-4		--	
1/2	1/2	.4800	5/8	3	5	294-500-4		--	
1/2	1/2	.4800	5/8	4	6	294-500-4-L		--	
5/8	5/8	.6050	3/4	3	5	294-625-4		--	
5/8	5/8	.6050	3/4	4	6	294-625-4-L		--	
3/4	3/4	.7300	1	3	5	294-750-4		--	
3/4	3/4	.7300	1	4	6	294-750-4-L		--	
3/4	3/4	.7300	1	5	7	294-750-4-LL		--	
1	1	.9800	1-1/4	3	5	294-100-4		--	
1	1	.9800	1-1/4	4	6	294-100-4-L		--	
1	1	.9800	1-1/4	5	7	294-100-4-LL		--	

EVOLUTION
Solid Carbide Endmills

SPEED & FEED RECOMMENDATIONS

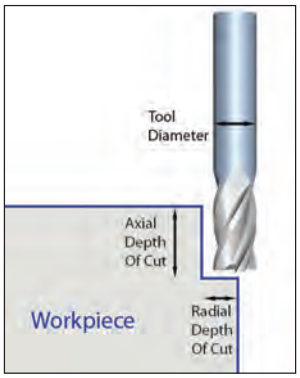
HIGH PERFORMANCE

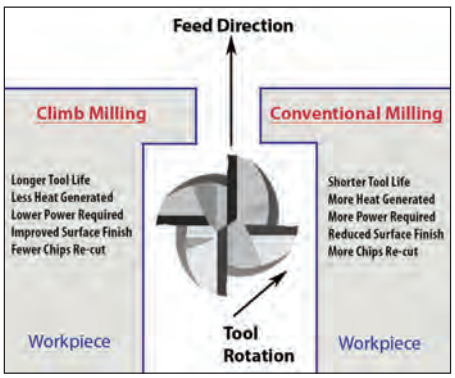
Material		Speed (SFM)	Feed Per Tooth By End Mill Diameter							
		TiALN Coated	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
Aluminum & Aluminum Alloys	N	900-1800	.0025	.0030	.0035	.0040	.0045	.0055	.0065	.0085
Copper & Copper Alloys	N	525-1275	.0025	.0030	.0030	.0035	.0035	.0040	.0045	.0065
Brass & Bronze	N	375-600	.0025	.0030	.0030	.0035	.0035	.0040	.0045	.0055
Graphite	N	--	--	--	--	--	--	--	--	--
Plastics	N	--	--	--	--	--	--	--	--	--
Iron, Cast (soft)	K	375-650	.0025	.0027	.0030	.0032	.0035	.0040	.0065	.0085
Iron, Cast (hard)	K	100-375	.0013	.0015	.0020	.0022	.0025	.0030	.0035	.0045
Iron, Ductile	K	100-600	.0015	.0017	.0020	.0022	.0025	.0035	.0045	.0065
Iron, Malleable	K	225-650	.0015	.0020	.0025	.0030	.0035	.0045	.0055	.0075
Carbon Steels, Low	P	300-600	.0015	.0020	.0025	.0030	.0035	.0045	.0055	.0075
Carbon Steels, Medium	P	150-375	.0020	.0021	.0022	.0023	.0025	.0035	.0045	.0055
Carbon Steels Hardened to 35 Rc	P	130-345	.0015	.0016	.0017	.0018	.0020	.0022	.0025	.0035
Carbon Steels Hardened to 50 Rc	P	70-160	.0012	.0012	.0013	.0014	.0015	.0020	.0025	.0035
Carbon Steels Hardened to 60 Rc	P	--	--	--	--	--	--	--	--	--
Steels, Mold	P	300-525	.0015	.0017	.0020	.0022	.0025	.0030	.0035	.0045
Steels, Tool	P	150-375	.0015	.0017	.0020	.0022	.0025	.0030	.0035	.0045
Stainless Steels, Soft	M	300-450	.0015	.0017	.0020	.0017	.0025	.0035	.0045	.0065
Stainless Steels, Hard	M	150-300	.0010	.0011	.0012	.0013	.0015	.0025	.0035	.0055
Monel & High Nickel Steel	S	75-200	.0015	.0017	.0020	.0021	.0025	.0030	.0035	.0045
Titanium, Soft	S	125-375	.0015	.0017	.0020	.0021	.0025	.0035	.0045	.0065
Titanium, Hard	S	50-175	.0010	.0011	.0012	.0012	.0014	.0017	.0022	.0023
Nickel Based High Temp Alloys	S	50-125	.0013	.0012	.0011	.0011	.0014	.0015	.0017	.0023

- Higher Feed Per Tooth should be used to start for radial depths of cut less than 25% of the tool diameter. Lower Feed Per Tooth should be used to start for radial depths of cut greater than 25% of the tool diameter.
- The above recommendations are for axial lengths of cut not to exceed 1.25 times the tool diameter for profiling and .75 times the diameter for full slotting.
- The above parameters are recommended starting points only. If the tool is working well, without vibrations or significant noise, increase the SFM and/or Feed Per Tooth in 5-10% increments.
- Optimum speeds & feeds will depend upon material, setup, machine conditions & tool deflection. Higher or lower parameters may be required to achieve optimum machining conditions.
- For Light Radial Depths of cut, make certain to increase the feed rate to compensate for Radial Chip Thinning Factor (RCTF). Consult a formula or app to calculate.
- Climb Milling is preferred to Conventional Milling

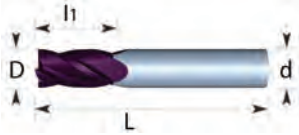
$$\text{RPM} = \frac{\text{SFM}}{(3.146 * \text{Cutter Diam.}) / 12}$$

$$\text{IPM} = \text{RPM} * \text{Feed Per Tooth} * \#\text{ of Teeth}$$





EVOLUTION
Solid Carbide Endmills



P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	◒	High Temp. Alloys
H		Hardened Steel

● BEST ◒ OK ○ NOT OPTIMAL

ULTRA HIGH PERFORMANCE

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Ultra High Performance Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0015"

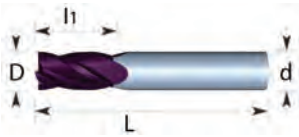
ULTRA HIGH PERFORMANCE Variable Pitch Carbide, Stub Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Corner Radius	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	3/8	2	SQ	180-188-4	Call For Pricing	--	
3/16	3/16	3/8	2	.015CR	180-188-4-015R		--	
1/4	1/4	3/8	2	SQ	180-250-4		--	
1/4	1/4	3/8	2	.015CR	180-250-4-015R		--	
5/16	5/16	3/8	2	SQ	180-312-4		--	
5/16	5/16	3/8	2	.020CR	180-312-4-020R		--	
3/8	3/8	1/2	2	SQ	180-375-4		--	
3/8	3/8	1/2	2	.020CR	180-375-4-020R		--	
1/2	1/2	5/8	2-1/2	SQ	180-500-4		181-500-4	Call For Pricing
1/2	1/2	5/8	2-1/2	.030CR	180-500-4-030R		181-500-4-030R	
5/8	5/8	3/4	3	SQ	180-625-4		181-625-4	
5/8	5/8	3/4	3	.030CR	180-625-4-030R		181-625-4-030R	
3/4	3/4	1	3	SQ	180-750-4		181-750-4	
3/4	3/4	1	3	.030CR	180-750-4-030R		181-750-4-030R	

ULTRA HIGH PERFORMANCE Variable Pitch Carbide, Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Corner Radius	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price	TiALN Coated 5 Flute - ROUND Shank Part#	Price
1/8	1/8	1/2	1-1/2	.010CR	080-125-4-010R	Call For Pricing	--		--	
3/16	3/16	5/8	2	SQ	080-188-4		--		--	
3/16	3/16	5/8	2	.015CR	080-188-4-015R		--		--	
1/4	1/4	3/4	2-1/2	SQ	080-250-4		081-250-4	Call For Pricing	080-250-5	Call For Pricing
1/4	1/4	3/4	2-1/2	.020CR	080-250-4-020R		081-250-4-020R		080-250-5-020R	
5/16	5/16	13/16	2-1/2	SQ	080-312-4		081-312-4		080-312-5	
5/16	5/16	13/16	2-1/2	.020CR	080-312-4-020R		081-312-4-020R		080-312-5-020R	
3/8	3/8	7/8	2-1/2	SQ	080-375-4		081-375-4		080-375-5	
3/8	3/8	7/8	2-1/2	.020CR	080-375-4-020R		081-375-4-020R		080-375-5-020R	
3/8	3/8	7/8	2-1/2	.030CR	080-375-4-030R		081-375-4-030R		080-375-5-030R	
7/16	7/16	1	2-3/4	SQ	080-437-4		081-437-4		--	
1/2	1/2	1-1/4	3	SQ	080-500-4		081-500-4		080-500-5	
1/2	1/2	1-1/4	3	.015CR	080-500-4-015R		081-500-4-015R		--	
1/2	1/2	1-1/4	3	.030CR	080-500-4-030R		081-500-4-030R		080-500-5-030R	
1/2	1/2	1-1/4	3	.060CR	080-500-4-060R		081-500-4-060R		--	
5/8	5/8	1-1/4	3-1/2	SQ	080-625-4		081-625-4		080-625-5	
5/8	5/8	1-1/4	3-1/2	.030CR	080-625-4-030R		081-625-4-030R		080-625-5-030R	
5/8	5/8	1-1/4	3-1/2	.060CR	080-625-4-060R		081-625-4-060R		--	
5/8	5/8	1-1/4	3-1/2	.125CR	080-625-4-125R		081-625-4-125R		--	
3/4	3/4	1-1/2	4	SQ	080-750-4		081-750-4		080-750-5	
3/4	3/4	1-1/2	4	.030CR	080-750-4-030R		081-750-4-030R		080-750-5-030R	
3/4	3/4	1-1/2	4	.060CR	080-750-4-060R		081-750-4-060R		--	
3/4	3/4	1-1/2	4	.125CR	080-750-4-125R		081-750-4-125R		--	
1	1	1-1/2	4	SQ	080-100-4		081-100-4		080-100-5	
1	1	1-1/2	4	.030CR	080-100-4-030R		081-100-4-030R		080-100-5-030R	
1	1	1-1/2	4	.060CR	080-100-4-060R		081-100-4-060R		--	
1	1	1-1/2	4	.125CR	080-100-4-125R		081-100-4-125R		--	

EVOLUTION
Solid Carbide Endmills



P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	◒	High Temp. Alloys
H		Hardened Steel

● BEST ◒ OK ○ NOT OPTIMAL

ULTRA HIGH PERFORMANCE

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Ultra High Performance Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0015"

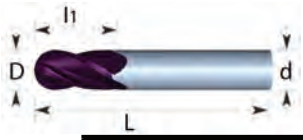
ULTRA HIGH PERFORMANCE Variable Pitch Carbide, Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Corner Radius	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	3/4	2-1/2	SQ	082-188-4	Call For Pricing	--	
3/16	3/16	3/4	2-1/2	.015CR	082-188-4-015R		--	
1/4	1/4	1-1/8	3	SQ	082-250-4		083-250-4	Call For Pricing
1/4	1/4	1-1/8	3	.020CR	082-250-4-020R		083-250-4-020R	
5/16	5/16	1-1/8	3	SQ	082-312-4		083-312-4	
5/16	5/16	1-1/8	3	.020CR	082-312-4-020R		083-312-4-020R	
3/8	3/8	1-1/8	3	SQ	082-375-4		083-375-4	
3/8	3/8	1-1/8	3	.020CR	082-375-4-020R		083-375-4-020R	
7/16	7/16	2	4	SQ	082-437-4		083-437-4	
1/2	1/2	2	4	SQ	082-500-4		083-500-4	
1/2	1/2	2	4	.015CR	082-500-4-015R		083-500-4-015R	
1/2	1/2	2	4	.030CR	082-500-4-030R		083-500-4-030R	
1/2	1/2	2	4	.060CR	082-500-4-060R		083-500-4-060R	
5/8	5/8	2-1/4	5	SQ	082-625-4		083-625-4	
5/8	5/8	2-1/4	5	.030CR	082-625-4-030R		083-625-4-030R	
5/8	5/8	2-1/4	5	.060CR	082-625-4-060R		083-625-4-060R	
5/8	5/8	2-1/4	5	.125CR	082-625-4-125R		083-625-4-125R	
3/4	3/4	2-1/4	5	SQ	082-750-4		083-750-4	
3/4	3/4	2-1/4	5	.030CR	082-750-4-030R		083-750-4-030R	
3/4	3/4	2-1/4	5	.060CR	082-750-4-060R		083-750-4-060R	
3/4	3/4	2-1/4	5	.125CR	082-750-4-125R		083-750-4-125R	
1	1	2-1/4	5	SQ	082-100-4		083-100-4	
1	1	2-1/4	5	.030CR	082-100-4-030R		083-100-4-030R	
1	1	2-1/4	5	.060CR	082-100-4-060R		083-100-4-060R	
1	1	2-1/4	5	.125CR	082-100-4-125R		083-100-4-125R	

ULTRA HIGH PERFORMANCE Variable Pitch Carbide,Extra Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Corner Radius	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	1-1/8	3	SQ	088-188-4	Call For Pricing	--	
1/4	1/4	1-1/2	4	SQ	088-250-4		--	
5/16	5/16	1-5/8	4	SQ	088-312-4		--	
3/8	3/8	1-3/4	4	SQ	088-375-4		--	
1/2	1/2	3	6	SQ	088-500-4		--	
5/8	5/8	3	6	SQ	088-625-4		--	
3/4	3/4	3	6	SQ	088-750-4		--	
1	1	3	6	SQ	088-100-4		--	

EVOLUTION
Solid Carbide Endmills



P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	◒	High Temp. Alloys
H		Hardened Steel

● BEST ◒ OK ○ NOT OPTIMAL

ULTRA HIGH PERFORMANCE

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Ultra High Performance Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0015"

ULTRA HIGH PERFORMANCE Variable Pitch Carbide, Ball Regular Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	5/8	2	084-188-4	Call For Pricing	--	Call For Pricing
1/4	1/4	3/4	2-1/2	084-250-4		085-250-4	
5/16	5/16	13/16	2-1/2	084-312-4		085-312-4	
3/8	3/8	7/8	2-1/2	084-375-4		085-375-4	
7/16	7/16	1	2-3/4	084-437-4		085-437-4	
1/2	1/2	1	3	084-500-4		085-500-4	
5/8	5/8	1-1/4	3-1/2	084-625-4		085-625-4	
3/4	3/4	1-1/2	4	084-750-4		085-750-4	
1	1	1-1/2	4	084-100-4		085-100-4	

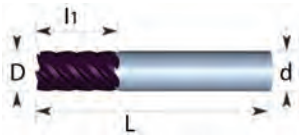
ULTRA HIGH PERFORMANCE Variable Pitch Carbide, Ball Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	3/4	2-1/2	086-188-4	Call For Pricing	--	Call For Pricing
1/4	1/4	1-1/8	3	086-250-4		087-250-4	
5/16	5/16	1-1/8	3	086-312-4		087-312-4	
3/8	3/8	1-1/8	3	086-375-4		087-375-4	
7/16	7/16	2	4	086-437-4		087-437-4	
1/2	1/2	2	4	086-500-4		087-500-4	
5/8	5/8	2-1/4	5	086-625-4		087-625-4	
3/4	3/4	2-1/4	5	086-750-4		087-750-4	
1	1	2-1/4	5	086-100-4		087-100-4	

ULTRA HIGH PERFORMANCE Variable Pitch Carbide, Ball Extra Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	TiALN Coated 4 Flute - ROUND Shank Part#	Price	TiALN Coated 4 Flute - WELDON Shank Part#	Price
3/16	3/16	1-1/8	3	089-188-4	Call For Pricing	--	
1/4	1/4	1-1/2	4	089-250-4		--	
5/16	5/16	1-5/8	4	089-312-4		--	
3/8	3/8	1-3/4	4	089-375-4		--	
1/2	1/2	3	6	089-500-4		--	
5/8	5/8	3	6	089-625-4		--	
3/4	3/4	3	6	089-750-4		--	
1	1	3	6	089-100-4		--	

EVOLUTION
Solid Carbide Endmills



P	●	Steel
M	◒	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	◒	High Temp. Alloys
H		Hardened Steel

● BEST ◒ OK ○ NOT OPTIMAL

ULTRA HIGH PERFORMANCE

- Special Helix Design with honed edges
- Variable Pitch to reduce chatter with special core design
- 10% Ultra High Performance Micro Grain Carbide
- Diameter Tolerances: +0.0000"/-0.0015"

6 & 7 Flute High Performance End Mills

- Full edge finishing with low radial engagement at high speeds & feeds
- Excellent for Trochoidal Milling
- Take advantage of Radial Chip Thinning Factor compensation (RCTF), to move at high velocities

ULTRA HIGH PERFORMANCE Variable Pitch Carbide, Finishers, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	TiALN Coated 6 Flute - ROUND Shank Part#	Price	TiALN Coated 7 Flute - ROUND Shank Part#	Price
1/4	1/4	3/4	2-1/2	SQ	380-250-6	Call For Pricing	--	
1/4	1/4	3/4	2-1/2	.030CR	380-250-6-030R		--	
3/8	3/8	7/8	2-1/2	SQ	380-375-6		--	
3/8	3/8	7/8	2-1/2	.030CR	380-375-6-030R		--	
1/2	1/2	1-1/4	3	SQ	380-500-6		--	Call For Pricing
1/2	1/2	1-1/4	3	.030CR	380-500-6-030R		380-500-7-030R	
5/8	5/8	1-1/4	3-1/2	SQ	380-625-6		--	
5/8	5/8	1-1/4	3-1/2	.030CR	380-625-6-030R		380-625-7-030R	
3/4	3/4	1-1/2	4	SQ	380-750-6		--	
3/4	3/4	1-1/2	4	.030CR	380-750-6-030R		380-750-7-030R	
1	1	1-1/2	4	SQ	380-100-6		--	
1	1	1-1/2	4	.030CR	380-100-6-030R		380-100-7-030R	

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www.duramill.ca

EVOLUTION
Solid Carbide Endmills

SPEED & FEED RECOMMENDATIONS

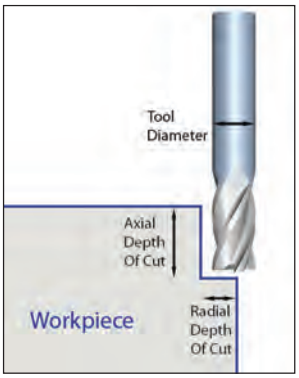
ULTRA HIGH PERFORMANCE

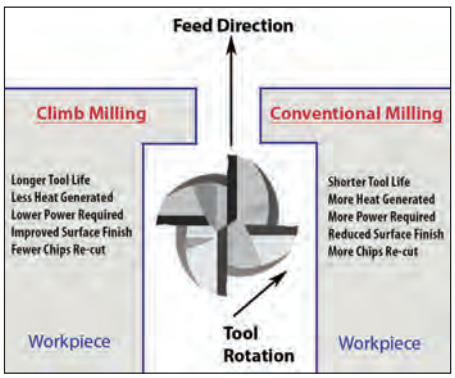
Material		Speed (SFM)	Feed Per Tooth By End Mill Diameter							
		TiALN Coated	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
Aluminum & Aluminum Alloys	N	900-1800	.0025	.0030	.0035	.0040	.0045	.0055	.0065	.0085
Copper & Copper Alloys	N	525-1275	.0025	.0030	.0030	.0035	.0035	.0040	.0045	.0065
Brass & Bronze	N	375-600	.0025	.0030	.0030	.0035	.0035	.0040	.0045	.0055
Graphite	N	--	--	--	--	--	--	--	--	--
Plastics	N	--	--	--	--	--	--	--	--	--
Iron, Cast (soft)	K	375-650	.0030	.0032	.0035	.0037	.0040	.0045	.0070	.0090
Iron, Cast (hard)	K	100-375	.0018	.0020	.0025	.0027	.0030	.0035	.0040	.0050
Iron, Ductile	K	100-600	.0020	.0022	.0025	.0027	.0030	.0040	.0050	.0070
Iron, Malleable	K	225-650	.0020	.0025	.0030	.0035	.0040	.0050	.0060	.0080
Carbon Steels, Low	P	300-600	.0020	.0025	.0030	.0035	.0040	.0050	.0060	.0080
Carbon Steels, Medium	P	150-375	.0025	.0026	.0027	.0028	.0030	.0040	.0050	.0060
Carbon Steels Hardened to 35 Rc	P	130-345	.0020	.0021	.0022	.0023	.0025	.0027	.0030	.0040
Carbon Steels Hardened to 50 Rc	P	70-160	.0012	.0012	.0013	.0014	.0015	.0026	.0030	.0035
Carbon Steels Hardened to 60 Rc	P	--	--	--	--	--	--	--	--	--
Steels, Mold	P	300-525	.0020	.0022	.0025	.0027	.0030	.0035	.0040	.0050
Steels, Tool	P	150-375	.0020	.0022	.0025	.0027	.0030	.0035	.0040	.0050
Stainless Steels, Soft	M	300-450	.0020	.0022	.0025	.0022	.0030	.0040	.0050	.0070
Stainless Steels, Hard	M	150-300	.0015	.0016	.0017	.0018	.0020	.0030	.0040	.0060
Monel & High Nickel Steel	S	75-200	.0015	.0022	.0025	.0027	.0030	.0035	.0040	.0050
Titanium, Soft	S	125-375	.0015	.0022	.0025	.0027	.0030	.0040	.0050	.0070
Titanium, Hard	S	50-175	.0010	.0016	.0017	.0018	.0020	.0022	.0026	.0030
Nickel Based High Temp Alloys	S	50-125	.0014	.0014	.0015	.0016	.0017	.0018	.0020	.0023

- Higher Feed Per Tooth should be used to start for radial depths of cut less than 25% of the tool diameter. Lower Feed Per Tooth should be used to start for radial depths of cut greater than 25% of the tool diameter.
- The above recommendations are for axial lengths of cut not to exceed 1.5 times the tool diameter for profiling and 1 times the diameter for full slotting.
- The above parameters are recommended starting points only. If the tool is working well, without vibrations or significant noise, increase the SFM and/or Feed Per Tooth in 5-10% increments.
- Optimum speeds & feeds will depend upon material, setup, machine conditions & tool deflection. Higher or lower parameters may be required to achieve optimum machining conditions.
- For Light Radial Depths of cut, make certain to increase the feed rate to compensate for Radial Chip Thinning Factor (RCTF). Consult a formula or app to calculate.
- Climb Milling is preferred to Conventional Milling

$$\text{RPM} = \frac{SFM}{(3.146 * \text{Cutter Diam.}) / 12}$$

$$\text{IPM} = \text{RPM} * \text{Feed Per Tooth} * \#\text{ of Teeth}$$





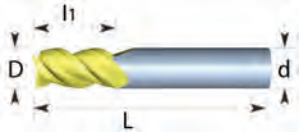
EVOLUTION
Solid Carbide Endmills

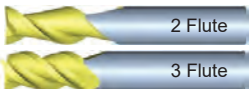
P		Steel
M		Stainless Steel
K		Cast Iron
N	●	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● BEST

ULTRA HIGH PERFORMANCE - Aluminum

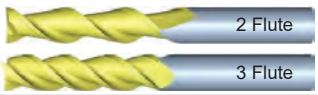
- Special 45 Degree Helix Design with Cylindrical Margin
- Variable Pitch & Special Core Design with Chipbreaker Flute Geometries
- Ultra High Performance Micro Grain Carbide with extremely high Transverse Rupture strength
- Diameter Tolerances: +0.0000"/-0.0004"





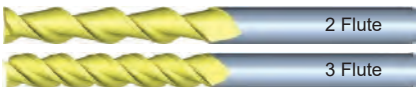
ULTRA HIGH PERFORMANCE Medium/Finishing, Regular Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated Price	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#	ZrN Coated Price	DLC Coated 2 Flute Part#	DLC Coated 3 Flute Part#	DLC Coated Price
1/8	1/8	1/2	1-1/2	SQ	170-125-2	170-125-3	Call For Pricing	--	--	Call For Pricing	--	--	Call For Pricing
3/16	3/16	5/8	2	SQ	170-188-2	170-188-3		070-188-2	070-188-3		270-188-2	270-188-3	
1/4	1/4	3/4	2-1/2	SQ	170-250-2	170-250-3		070-250-2	070-250-3		270-250-2	270-250-3	
1/4	1/4	3/4	2-1/2	.020CR	170-250-2-020R	170-250-3-020R		070-250-2-020R	070-250-3-020R		270-250-2-020R	270-250-3-020R	
5/16	5/16	13/16	2-1/2	SQ	170-312-2	170-312-3		070-312-2	070-312-3		270-312-2	270-312-3	
5/16	5/16	13/16	2-1/2	.020CR	170-312-2-020R	170-312-3-020R		070-312-2-020R	070-312-3-020R		270-312-2-020R	270-312-3-020R	
3/8	3/8	1	2-1/2	SQ	170-375-2	170-375-3		070-375-2	070-375-3		270-375-2	270-375-3	
3/8	3/8	1	2-1/2	.020CR	170-375-2-020R	170-375-3-020R		070-375-2-020R	070-375-3-020R		270-375-2-020R	270-375-3-020R	
1/2	1/2	1-1/4	3	SQ	170-500-2	170-500-3		070-500-2	070-500-3		270-500-2	270-500-3	
1/2	1/2	1-1/4	3	.030CR	170-500-2-030R	170-500-3-030R		070-500-2-030R	070-500-3-030R		270-500-2-030R	270-500-3-030R	
5/8	5/8	1-1/4	3-1/2	SQ	170-625-2	170-625-3		070-625-2	070-625-3		270-625-2	270-625-3	
5/8	5/8	1-1/4	3-1/2	.030CR	170-625-2-030R	170-625-3-030R		070-625-2-030R	070-625-3-030R		270-625-2-030R	270-625-3-030R	
3/4	3/4	1-1/2	4	SQ	170-750-2	170-750-3		070-750-2	070-750-3		270-750-2	270-750-3	
3/4	3/4	1-1/2	4	.030CR	170-750-2-030R	170-750-3-030R		070-750-2-030R	070-750-3-030R		270-750-2-030R	270-750-3-030R	
1	1	1-1/2	4	SQ	170-100-2	170-100-3		070-100-2	070-100-3		270-100-2	270-100-3	
1	1	1-1/2	4	.030CR	170-100-2-030R	170-100-3-030R		070-100-2-030R	070-100-3-030R		270-100-2-030R	270-100-3-030R	



ULTRA HIGH PERFORMANCE Medium/Finishing, Long Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated Price	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#	ZrN Coated Price
3/16	3/16	3/4	2-1/2	SQ	172-188-2	172-188-3	Call For Pricing	072-188-2	072-188-3	Call For Pricing
1/4	1/4	1-1/8	3	SQ	172-250-2	172-250-3		072-250-2	072-250-3	
5/16	5/16	1-1/8	3	SQ	172-312-2	172-312-3		072-312-2	072-312-3	
3/8	3/8	1-1/8	3	SQ	172-375-2	172-375-3		072-375-2	072-375-3	
1/2	1/2	2	4	SQ	172-500-2	172-500-3		072-500-2	072-500-3	
5/8	5/8	2-1/4	5	SQ	172-625-2	172-625-3		072-625-2	072-625-3	
3/4	3/4	2-1/4	5	SQ	172-750-2	172-750-3		072-750-2	072-750-3	
1	1	2-1/4	5	SQ	172-100-2	172-100-3		072-100-2	072-100-3	



ULTRA HIGH PERFORMANCE Medium/Finishing, Extra Long Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated Price	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#	ZrN Coated Price
3/16	3/16	1-1/8	3	SQ	178-188-2	178-188-3	Call For Pricing	078-188-2	078-188-3	Call For Pricing
1/4	1/4	1-1/2	4	SQ	178-250-2	178-250-3		078-250-2	078-250-3	
5/16	5/16	1-5/8	4	SQ	178-312-2	178-312-3		078-312-2	078-312-3	
3/8	3/8	1-3/4	4	SQ	178-375-2	178-375-3		078-375-2	078-375-3	
1/2	1/2	3	6	SQ	178-500-2	178-500-3		078-500-2	078-500-3	
5/8	5/8	3	6	SQ	178-625-2	178-625-3		078-625-2	078-625-3	
3/4	3/4	3	6	SQ	178-750-2	178-750-3		078-750-2	078-750-3	
1	1	3	6	SQ	178-100-2	178-100-3		078-100-2	078-100-3	

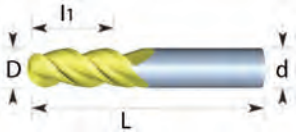
EVOLUTION
Solid Carbide Endmills

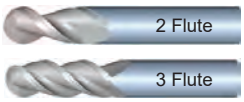
P		Steel
M		Stainless Steel
K		Cast Iron
N	●	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

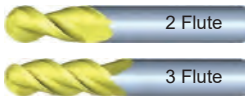
● BEST

ULTRA HIGH PERFORMANCE - Aluminum

- Special 45 Degree Helix Design with Cylindrical Margin
- Variable Pitch & Special Core Design with Chipbreaker Flute Geometries
- Ultra High Performance Micro Grain Carbide with extremely high Transverse Rupture strength
- Diameter Tolerances: +0.0000"/-0.0004"

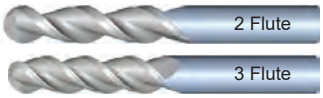


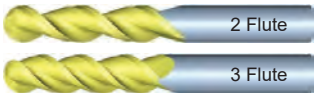




ULTRA HIGH PERFORMANCE Medium/Finishing, Ball Regular Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated Price	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#	ZrN Coated Price
3/16	3/16	5/8	2	BN	174-188-2	174-188-3	Call For Pricing	074-188-2	074-188-3	Call For Pricing
1/4	1/4	3/4	2-1/2	BN	174-250-2	174-250-3		074-250-2	074-250-3	
5/16	5/16	13/16	2-1/2	BN	174-312-2	174-312-3		074-312-2	074-312-3	
3/8	3/8	1	2-1/2	BN	174-375-2	174-375-3		074-375-2	074-375-3	
1/2	1/2	1-1/4	3	BN	174-500-2	174-500-3		074-500-2	074-500-3	
5/8	5/8	1-1/4	3-1/2	BN	174-625-2	174-625-3		074-625-2	074-625-3	
3/4	3/4	1-1/2	4	BN	174-750-2	174-750-3		074-750-2	074-750-3	
1	1	1-1/2	4	BN	174-100-2	174-100-3		074-100-2	074-100-3	





ULTRA HIGH PERFORMANCE Medium/Finishing, Ball Long Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated Price	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#	ZrN Coated Price
3/16	3/16	3/4	2-1/2	BN	176-188-2	176-188-3	Call For Pricing	076-188-2	076-188-3	Call For Pricing
1/4	1/4	1-1/8	3	BN	176-250-2	176-250-3		076-250-2	076-250-3	
5/16	5/16	1-1/8	3	BN	176-312-2	176-312-3		076-312-2	076-312-3	
3/8	3/8	1-1/8	3	BN	176-375-2	176-375-3		076-375-2	076-375-3	
1/2	1/2	2	4	BN	176-500-2	176-500-3		076-500-2	076-500-3	
5/8	5/8	2-1/4	5	BN	176-625-2	176-625-3		076-625-2	076-625-3	
3/4	3/4	2-1/4	5	BN	176-750-2	176-750-3		076-750-2	076-750-3	
1	1	2-1/4	5	BN	176-100-2	176-100-3		076-100-2	076-100-3	

ULTRA HIGH PERFORMANCE Medium/Finishing, Ball Extra Long Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	Uncoated Price	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#	ZrN Coated Price
3/16	3/16	1-1/8	3	BN	179-188-2	179-188-3	Call For Pricing	079-188-2	079-188-3	Call For Pricing
1/4	1/4	1-1/2	4	BN	179-250-2	179-250-3		079-250-2	079-250-3	
5/16	5/16	1-5/8	4	BN	179-312-2	179-312-3		079-312-2	079-312-3	
3/8	3/8	1-3/4	4	BN	179-375-2	179-375-3		079-375-2	079-375-3	
1/2	1/2	3	6	BN	179-500-2	179-500-3		079-500-2	079-500-3	
5/8	5/8	3	6	BN	179-625-2	179-625-3		079-625-2	079-625-3	
3/4	3/4	3	6	BN	179-750-2	179-750-3		079-750-2	079-750-3	
1	1	3	6	BN	179-100-2	179-100-3		079-100-2	079-100-3	

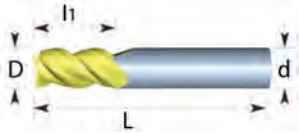
EVOLUTION
Solid Carbide Endmills

P		Steel
M		Stainless Steel
K		Cast Iron
N	●	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

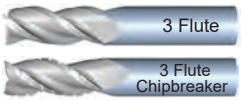
● BEST

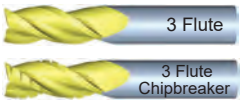
ULTRA HIGH PERFORMANCE - Aluminum

- Special 36 Degree Helix Design with Cylindrical Margin
- Variable Pitch & Special Core Design with Chipbreaker Flute Geometries
- Ultra High Performance Micro Grain Carbide with extremely high Transverse Rupture strength
- Diameter Tolerances: +0.0000"/-0.0004"



NEW





ULTRA HIGH PERFORMANCE 3Flute Medium/Roughing - ALUMINUM

Cutter Diam.	Shank Diam.	Length Of Cut	O.A.L.	Corner Radius	Uncoated			ZrN Coated		
D	d	l1	L		Part#	Chipbreaker Part#	Price	Part#	Chipbreaker Part#	Price
1/4	1/4	3/4	2-1/2	SQ	370-250-3	--	Call For Pricing	470-250-3	--	Call For Pricing
1/4	1/4	3/4	2-1/2	.015CR	370-250-3-015R	--		470-250-3-015R	--	
1/4	1/4	3/4	2-1/2	.030CR	370-250-3-030R	--		--	--	
1/4	1/4	3/4	2-1/2	.060CR	370-250-3-060R	--		--	--	
5/16	5/16	13/16	2-1/2	SQ	370-312-3	--		470-312-3	--	
5/16	5/16	13/16	2-1/2	.030CR	370-312-3-030R	--		470-312-3-030R	--	
5/16	5/16	13/16	2-1/2	.060CR	370-312-3-060R	--		--	--	
3/8	3/8	1	2-1/2	SQ	370-375-3	--		470-375-3	--	
3/8	3/8	1	2-1/2	.030CR	370-375-3-030R	570-375-3-030R		470-375-3-030R	670-375-3-030R	
3/8	3/8	1	2-1/2	.060CR	370-375-3-060R	--		--	--	
3/8	3/8	1-1/8	3	SQ	372-375-3	--		472-375-3	--	
3/8	3/8	1-1/8	3	.030CR	372-375-3-030R	572-375-3-030R		472-375-3-030R	672-375-3-030R	
1/2	1/2	1-1/4	3	SQ	370-500-3	--		470-500-3	--	
1/2	1/2	1-1/4	3	.030CR	370-500-3-030R	570-500-3-030R		470-500-3-030R	670-500-3-030R	
1/2	1/2	1-1/4	3	.060CR	370-500-3-060R	--		--	--	
1/2	1/2	1-1/4	3	.090CR	370-500-3-090R	--		--	--	
1/2	1/2	1-1/4	3	.120CR	370-500-3-120R	--		--	--	
1/2	1/2	2	4	SQ	372-500-3	--		472-500-3	--	
1/2	1/2	2	4	.030CR	372-500-3-030R	572-500-3-030R		472-500-3-030R	672-500-3-030R	
5/8	5/8	1-1/4	3-1/2	SQ	370-625-3	--		470-625-3	--	
5/8	5/8	1-1/4	3-1/2	.030CR	370-625-3-030R	570-625-3-030R		470-625-3-030R	670-625-3-030R	
5/8	5/8	1-1/4	3-1/2	.060CR	370-625-3-060R	--		--	--	
5/8	5/8	1-1/4	3-1/2	.090CR	370-625-3-090R	--		--	--	
5/8	5/8	1-1/4	3-1/2	.120CR	370-625-3-120R	--		--	--	
5/8	5/8	2-1/4	5	SQ	372-625-3	--		472-625-3	--	
5/8	5/8	2-1/4	5	.030CR	372-625-3-030R	572-625-3-030R		472-625-3-030R	672-625-3-030R	
3/4	3/4	1-5/8	4	SQ	370-750-3	--		470-750-3	--	
3/4	3/4	1-5/8	4	.030CR	370-750-3-030R	570-750-3-030R		470-750-3-030R	670-750-3-030R	
3/4	3/4	1-5/8	4	.060CR	370-750-3-060R	--		--	--	
3/4	3/4	1-5/8	4	.090CR	370-750-3-090R	--		--	--	
3/4	3/4	1-5/8	4	.120CR	370-750-3-120R	--		--	--	
3/4	3/4	2-1/4	5	SQ	372-750-3	--		472-750-3	--	
3/4	3/4	2-1/4	5	.030CR	372-750-3-030R	572-750-3-030R		472-750-3-030R	672-750-3-030R	
1	1	1-1/2	4	SQ	370-100-3	--		470-100-3	--	
1	1	1-1/2	4	.030CR	370-100-3-030R	570-100-3-030R		470-100-3-030R	670-100-3-030R	
1	1	1-1/2	4	.060CR	370-100-3-060R	--		--	--	
1	1	1-1/2	4	.120CR	370-100-3-120R	--		--	--	
1	1	2-1/4	5	SQ	372-100-3	--		472-100-3	--	
1	1	2-1/4	5	.030CR	372-100-3-030R	572-100-3-030R		472-100-3-030R	672-100-3-030R	

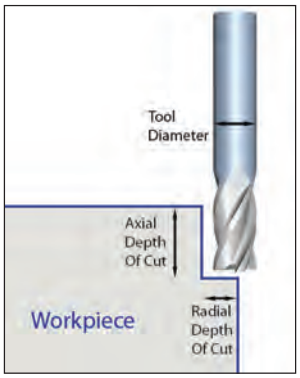
ULTRA HIGH PERFORMANCE - Aluminum

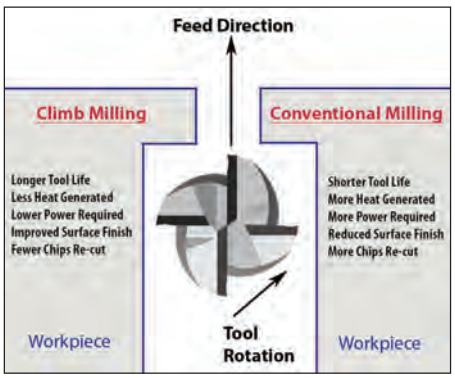
Material		Speed (SFM)	Feed Per Tooth By End Mill Diameter							
		ZrN Coated	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
Aluminum & Aluminum Alloys	N	900-1800	.0030	.0035	.0040	.0045	.0050	.0060	.0070	.0090
Copper & Copper Alloys	N	525-1275	.0030	.0035	.0035	.0040	.0040	.0045	.0050	.0070
Brass & Bronze	N	375-600	.0030	.0035	.0035	.0040	.0040	.0045	.0050	.0060
Graphite	N	500-1200	.0040	.0045	.0045	.0045	.0045	.0050	.0060	.0080
Plastics	N	600-1650	.0040	.0045	.0050	.0060	.0070	.0090	.0110	.0160
Iron, Cast (soft)	K	--	--	--	--	--	--	--	--	--
Iron, Cast (hard)	K	--	--	--	--	--	--	--	--	--
Iron, Ductile	K	--	--	--	--	--	--	--	--	--
Iron, Malleable	K	--	--	--	--	--	--	--	--	--
Carbon Steels, Low	P	--	--	--	--	--	--	--	--	--
Carbon Steels, Medium	P	--	--	--	--	--	--	--	--	--
Carbon Steels Hardened to 35 Rc	P	--	--	--	--	--	--	--	--	--
Carbon Steels Hardened to 50 Rc	P	--	--	--	--	--	--	--	--	--
Carbon Steels Hardened to 60 Rc	P	--	--	--	--	--	--	--	--	--
Steels, Mold	P	--	--	--	--	--	--	--	--	--
Steels, Tool	P	--	--	--	--	--	--	--	--	--
Stainless Steels, Soft	M	--	--	--	--	--	--	--	--	--
Stainless Steels, Hard	M	--	--	--	--	--	--	--	--	--
Monel & High Nickel Steel	S	--	--	--	--	--	--	--	--	--
Titanium, Soft	S	--	--	--	--	--	--	--	--	--
Titanium, Hard	S	--	--	--	--	--	--	--	--	--
Nickel Based High Temp Alloys	S	--	--	--	--	--	--	--	--	--

- Higher Feed Per Tooth should be used to start for radial depths of cut less than 25% of the tool diameter. Lower Feed Per Tooth should be used to start for radial depths of cut greater than 25% of the tool diameter.
- The above recommendations are for axial lengths of cut not to exceed 1.5 times the tool diameter for profiling and 1 times the diameter for full slotting.
- The above parameters are recommended starting points only. If the tool is working well, without vibrations or significant noise, increase the SFM and/or Feed Per Tooth in 5-10% increments.
- Optimum speeds & feeds will depend upon material, setup, machine conditions & tool deflection. Higher or lower parameters may be required to achieve optimum machining conditions.
- For Light Radial Depths of cut, make certain to increase the feed rate to compensate for Radial Chip Thinning Factor (RCTF). Consult a formula or app to calculate.
- Climb Milling is preferred to Conventional Milling

$$\text{RPM} = \frac{\text{SFM}}{(3.146 * \text{Cutter Diam.}) / 12}$$

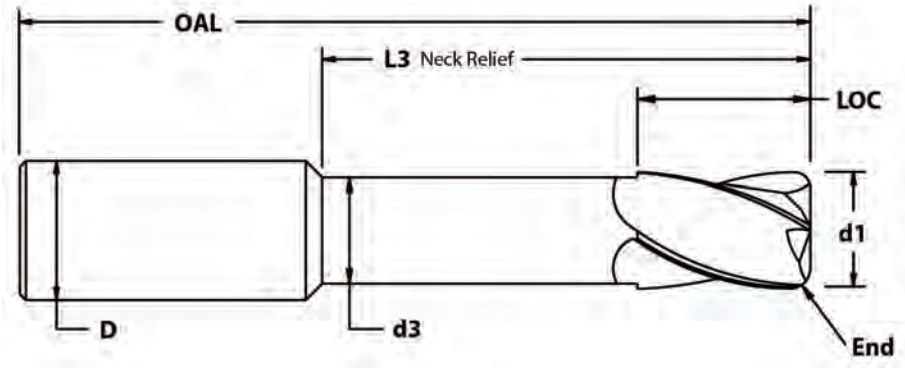
$$\text{IPM} = \text{RPM} * \text{Feed Per Tooth} * \text{\# of Teeth}$$





EVOLUTION
Solid Carbide Endmills

CUSTOM CARBIDE END MILL FORM



End:

- ☐ Square
- ☐ Ball Nose
- ☐ Corner Radius (Size:_____)
- ☐ Chamfer (Size:_____)

Dimensions:

OAL (Overall Length): _____

D (Shank Diameter): _____

LOC (Length of Cut): _____

d1 (Tool Diameter): _____

Number of Flutes: _____

Series:

- ☐ General Purpose (Good)
- ☐ High Performance (Better)
- ☐ Ultra High Performance (Best)
- ☐ Aluminum UHP (Best Aluminum)

Quantities To Quote On:

_____

OPTIONAL:

Neck Relief:

- ☐ No
- ☐ Yes

d3 (Neck Relief Diameter): _____

L3 (Length from Tip): _____

Shank Type:

- ☐ Cylindrical
- ☐ Weldon Flat
- ☐ Other:_____

Tapered:

- ☐ No
- ☐ Yes

Taper Angle (Indicate if angle is per side or included): _____

d1 (Tip Diameter): _____

Coating:

- ☐ Uncoated
- ☐ ALL4 (Aluminum Chromium Titanium Nitride)
- ☐ ZrN (Zirconium Nitride)
- ☐ DLC (Diamond Like Carbon)

OTHER INFORMATION:

Material(s) being machined:

End User Company Name:

End User Contact:

Sales Representative:

Other Information:

PRINT

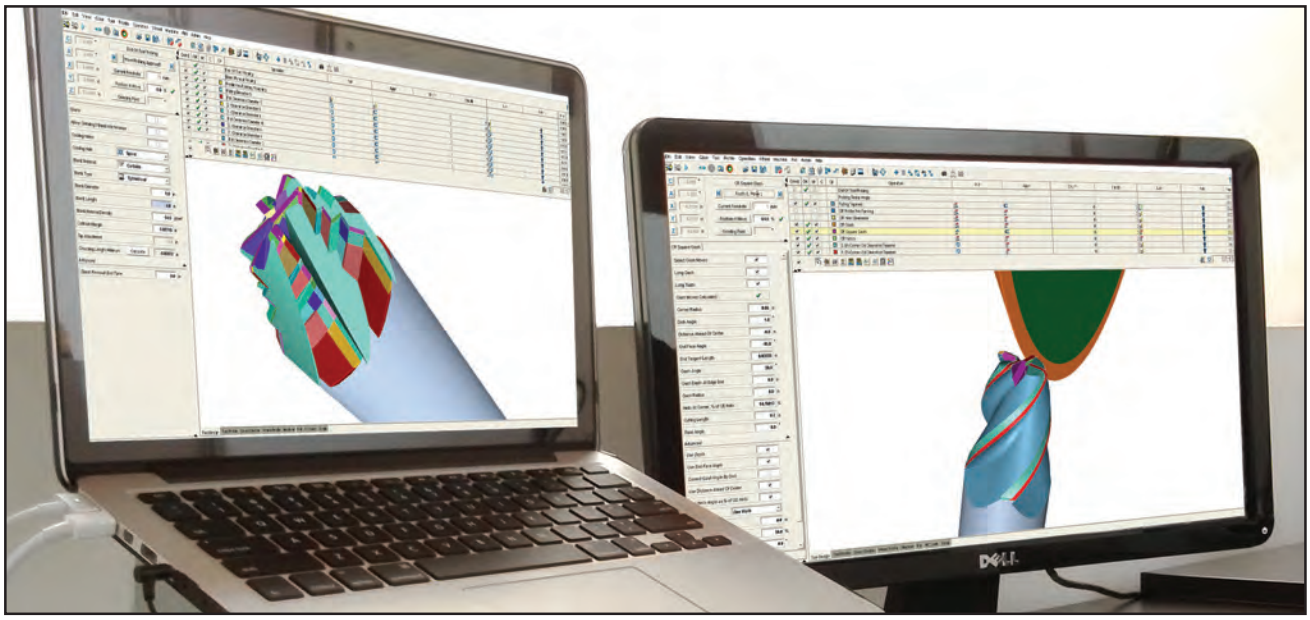
SAVE PDF FORM

Interactive PDF form works best AFTER downloaded and saved on your computer

SPECIALS & ENGINEERED SOLUTIONS

ADDITIONAL SERVICES

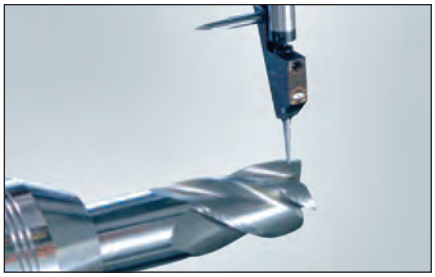
- Don't see what you need? Let us know what you would like and we would be happy to quote on it!
- Engineered solutions based on your applications. Allow our technical experience to design the tool that works best for your unique application.
- From concept to your spindle with quick turnaround times.



REGRINDING SERVICES:

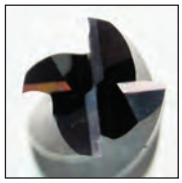
- Extremely high precision work on 5 Axis CNC Tool & Cutter Grinders, allowing your used tools to be brought back to better-than-new condition in many cases.
- Quick turnaround times.
- Tools are measured, labelled with new size, and repackaged in new plastic tubes.
- Tools reground include HSS & Carbide:

- Endmills	**- Counterbores**
- HSS Drills	**- High Performance Carbide Drills**
- Reamers	**- Annular Cutters**
- Countersinks	**- Spot Drills**



BEFORE

AFTER



COMPLETE COATING SERVICES:

- The most state of the art PVD coatings on the World's Leading Equipment
- Ultra High Performance Coatings on new tools & regrinds
- Extremely quick turn around times

EVOLUTION

Solid Carbide Endmills

OMNITOOL INDUSTRIAL SALES

Email: sales@omnitool.ca
Tel: (519) 622-3065 | Fax: (519) 622-3270
www.omnitool.ca

284 Pinebush Rd, Unit 1, Cambridge ON N1T 1Z6

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Email: sales@duramill.ca
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