



TUFFY SOLUTIONS

SOLID CARBIDE END MILLS

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
- 30 deg Helix Carbide
- 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

- Special Helix Design
- Variable Pitch to reduce chatter
- 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

- Special Helix Design
- Variable Pitch to reduce chatter
- 10% Extra Fine Sub-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

P		Steel
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K	●	Cast Iron
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● BEST

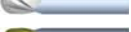
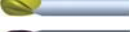
COATINGS:

- **TiN** (Titanium Nitride) - Gold Color; Provides added abrasion resistance & reduced friction for chips
- **TiAlN** (Titanium Aluminum Nitride) - Blue-Grey Color; Provides the benefits of TiN plus higher heat resistance to improve tool life
- **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 resistant for machining aluminum & non-ferrous materials





END MILL SERIES LISTING

Series	Description	Flutes		Pages
5001	Standard Carbide, Stub Length , Square, Single End Uncoated	2,3,4		1
5002	Standard Carbide, Stub Length , Square, Single End, TiN coated	2,3,4		1
5003	Standard Carbide, Stub Length , Square, Single End, TiALN coated	2,3,4		1
5004	Standard Carbide, Regular Length , Square, Single End Uncoated	2,3,4		2
5005	Standard Carbide, Regular Length , Square, Single End, TiN coated	2,3,4		2
5006	Standard Carbide, Regular Length , Square, Single End, TiALN coated	2,3,4		2
5007	Standard Carbide, Long Length , Square, Single End Uncoated	2,4		3
5008	Standard Carbide, Long Length , Square, Single End, TiN coated	2,4		3
5009	Standard Carbide, Long Length , Square, Single End, TiALN coated	2,4		3
5010	Standard Carbide, Extra Long Length , Square, Single End Uncoated	2,4		3
5011	Standard Carbide, Extra Long Length , Square, Single End, TiN coated	2,4		3
5012	Standard Carbide, Extra Long Length , Square, Single End, TiALN coated	2,4		3
5013	Standard Carbide, Stub Length , Ball Nose, Single End Uncoated	2,3,4		4
5014	Standard Carbide, Stub Length , Ball Nose, Single End, TiN coated	2,3,4		4
5015	Standard Carbide, Stub Length , Ball Nose, Single End, TiALN coated	2,3,4		4
5016	Standard Carbide, Regular Length , Ball Nose, Single End Uncoated	2,3,4		5
5017	Standard Carbide, Regular Length , Ball Nose, Single End, TiN coated	2,3,4		5
5018	Standard Carbide, Regular Length , Ball Nose, Single End, TiALN coated	2,3,4		5
5019	Standard Carbide, Long Length , Ball Nose, Single End Uncoated	2,4		6
5020	Standard Carbide, Long Length , Ball Nose, Single End, TiN coated	2,4		6
5021	Standard Carbide, Long Length , Ball Nose, Single End, TiALN coated	2,4		6
5022	Standard Carbide, Extra Long Length , Ball Nose, Single End Uncoated	2,4		6
5023	Standard Carbide, Extra Long Length , Ball Nose, Single End, TiN coated	2,4		6
5024	Standard Carbide, Extra Long Length , Ball Nose, Single End, TiALN coated	2,4		6
5025	Standard Carbide, Stub Length , Square, Double End Uncoated	2,4		7
5026	Standard Carbide, Stub Length , Square, Double End, TiN coated	2,4		7
5027	Standard Carbide, Stub Length , Square, Double End, TiALN coated	2,4		7
5028	Standard Carbide, Stub Length , Ball Nose, Double End Uncoated	2,4		7
5029	Standard Carbide, Stub Length , Ball Nose, Double End, TiN coated	2,4		7
5030	Standard Carbide, Stub Length , Ball Nose, Double End, TiALN coated	2,4		7
5031	Standard Carbide, Regular Length , Square, Double End Uncoated	2,4		8
5032	Standard Carbide, Regular Length , Square, Double End, TiALN coated	2,4		8
5033	Standard Carbide, Regular Length , Ball Nose, Double End Uncoated	2,4		8
5034	Standard Carbide, Regular Length , Ball Nose, Double End, TiALN coated	2,4		8
5041	METRIC - Standard Carbide, Regular Length , Square, Single End Uncoated	2,3,4		9
5042	METRIC - Standard Carbide, Regular Length , Square, Single End, TiALN coated	2,3,4		9
5043	METRIC - Standard Carbide, Long Length , Square, Single End Uncoated	2,4		9
5044	METRIC - Standard Carbide, Long Length , Square, Single End, TiALN coated	2,4		9
5045	METRIC - Standard Carbide, Extra Long Length , Square, Single End Uncoated	2,4		9
5046	METRIC - Standard Carbide, Extra Long Length , Square, Single End, TiALN coated	2,4		9
5047	METRIC - Standard Carbide, Regular Length , Ball Nose, Single End Uncoated	2,4		10
5048	METRIC - Standard Carbide, Regular Length , Ball Nose, Single End, TiALN coated	2,4		10

GOOD



END MILL SERIES LISTING

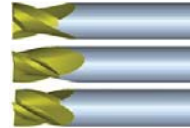
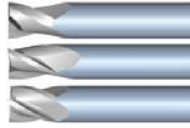
Series	Description	Flutes		Pages	
5090	High Performance Variable Pitch, Regular Length , Round Shk- TiALN	4		11	BETTER
5091	High Performance Variable Pitch, Regular Length , Weldon Shk- TiALN	4		11	
5092	High Performance Variable Pitch, Long Length , Round Shk- TiALN	4		11	
5093	High Performance Variable Pitch, Long Length , Weldon Shk- TiALN	4		11	
5094	High Performance Variable Pitch, Regular Length , Ball Nose, Round Shk- TiALN	4		12	
5095	High Performance Variable Pitch, Regular Length , Ball Nose, Weldon Shk- TiALN	4		12	
5096	High Performance Variable Pitch, Long Length , Ball Nose, Round Shk- TiALN	4		12	
5097	High Performance Variable Pitch, Long Length , Ball Nose, Weldon Shk- TiALN	4		12	
5080	ULTRA High Performance Variable Pitch, Regular Length , Round Shk- TiALN	4,5		13	BEST
5081	ULTRA High Performance Variable Pitch, Regular Length , Weldon Shk- TiALN	4		13	
5082	ULTRA High Performance Variable Pitch, Long Length , Round Shk- TiALN	4		13	
5083	ULTRA High Performance Variable Pitch, Long Length , Weldon Shk- TiALN	4		13	
5088	ULTRA High Performance Variable Pitch, Extra Long Length , Round Shk- TiALN	4		14	
5084	ULTRA High Performance Variable Pitch, Regular Length , Ball Nose, Round Shk- TiALN	4		15	
5085	ULTRA High Performance Variable Pitch, Regular Length , Ball Nose, Weldon Shk- TiALN	4		15	
5086	ULTRA High Performance Variable Pitch, Long Length , Ball Nose, Round Shk- TiALN	4		15	
5087	ULTRA High Performance Variable Pitch, Long Length , Ball Nose, Weldon Shk- TiALN	4		15	
5089	ULTRA High Performance Variable Pitch, Extra Long Length , Ball Nose, Round Shk- TiALN	4		15	
5170	ULTRA High Performance Var. Pitch & Helix, Regular Length , Uncoated - ALUMINUM	2,3		16	BEST
5070	ULTRA High Performance Var. Pitch & Helix, Regular Length , ZrN Coated - ALUMINUM	2,3		16	
5270	ULTRA High Performance Var. Pitch & Helix, Regular Length , DLC Coated - ALUMINUM	2,3		16	
5172	ULTRA High Performance Var. Pitch & Helix, Long Length , Uncoated - ALUMINUM	2,3		16	
5072	ULTRA High Performance Var. Pitch & Helix, Long Length , ZrN Coated - ALUMINUM	2,3		16	
5272	ULTRA High Performance Var. Pitch & Helix, Long Length , DLC Coated - ALUMINUM	2,3		16	
5178	ULTRA High Performance Var. Pitch & Helix, Extra Long Length , Uncoated - ALUMINUM	2,3		16	
5078	ULTRA High Performance Var. Pitch & Helix, Extra Long Length , ZrN Coated - ALUMINUM	2,3		16	
5278	ULTRA High Performance Var. Pitch & Helix, Extra Long Length , DLC Coated - ALUMINUM	2,3		16	
5174	ULTRA High Performance Var. Pitch & Helix, Regular Length , Ball Nose Uncoated - ALUMINUM	2,3		17	
5074	ULTRA High Performance Var. Pitch & Helix, Regular Length , Ball Nose ZrN Coated - ALUMINUM	2,3		17	
5274	ULTRA High Performance Var. Pitch & Helix, Regular Length , Ball Nose DLC Coated - ALUMINUM	2,3		17	
5176	ULTRA High Performance Var. Pitch & Helix, Long Length , Ball Nose Uncoated - ALUMINUM	2,3		17	
5076	ULTRA High Performance Var. Pitch & Helix, Long Length , Ball Nose ZrN Coated - ALUMINUM	2,3		17	
5276	ULTRA High Performance Var. Pitch & Helix, Long Length , Ball Nose DLC Coated - ALUMINUM	2,3		17	
5179	ULTRA High Performance Var. Pitch & Helix, Extra Long Length , Ball Nose Uncoated - ALUMINUM	2,3		17	
5079	ULTRA High Performance Var. Pitch & Helix, Extra Long Length , Ball Nose ZrN Coated - ALUMINUM	2,3		17	
5279	ULTRA High Performance Var. Pitch & Helix, Extra Long Length , Ball Nose DLC Coated - ALUMINUM	2,3		17	



P	●	Steel
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● GOOD ◐ OK ○ NOT OPTIMAL		

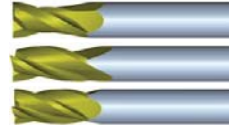
STANDARD PERFORMANCE

Standard Package: All Sizes - 1 Each



Square End, Standard Carbide, Stub Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/32	1/8	1/16	1-1/2	5001-031-2	5001-031-3	5001-031-4		5002-031-2	5002-031-3	5002-031-4		5003-031-2	5003-031-3	5003-031-4	
3/64	1/8	3/32	1-1/2	5001-046-2	5001-046-3	5001-046-4		5002-046-2	5002-046-3	5002-046-4		5003-046-2	5003-046-3	5003-046-4	
1/16	1/8	1/8	1-1/2	5001-062-2	5001-062-3	5001-062-4		5002-062-2	5002-062-3	5002-062-4		5003-062-2	5003-062-3	5003-062-4	
3/32	1/8	3/16	1-1/2	5001-093-2	5001-093-3	5001-093-4		5002-093-2	5002-093-3	5002-093-4		5003-093-2	5003-093-3	5003-093-4	
1/8	1/8	1/4	1-1/2	5001-125-2	5001-125-3	5001-125-4		5002-125-2	5002-125-3	5002-125-4		5003-125-2	5003-125-3	5003-125-4	
5/32	3/16	5/16	2	5001-156-2	5001-156-3	5001-156-4		5002-156-2	5002-156-3	5002-156-4		5003-156-2	5003-156-3	5003-156-4	
3/16	3/16	3/8	2	5001-187-2	5001-187-3	5001-187-4		5002-187-2	5002-187-3	5002-187-4		5003-187-2	5003-187-3	5003-187-4	
7/32	1/4	7/16	2	5001-218-2	5001-218-3	5001-218-4		5002-218-2	5002-218-3	5002-218-4		5003-218-2	5003-218-3	5003-218-4	
1/4	1/4	1/2	2	5001-250-2	5001-250-3	5001-250-4		5002-250-2	5002-250-3	5002-250-4		5003-250-2	5003-250-3	5003-250-4	
5/16	3/8	1/2	2	5001-312-2	5001-312-3	5001-312-4		5002-312-2	5002-312-3	5002-312-4		5003-312-2	5003-312-3	5003-312-4	
3/8	3/8	5/8	2	5001-375-2	5001-375-3	5001-375-4		5002-375-2	5002-375-3	5002-375-4		5003-375-2	5003-375-3	5003-375-4	
7/16	7/16	5/8	2-1/2	5001-437-2	5001-437-3	5001-437-4		5002-437-2	5002-437-3	5002-437-4		5003-437-2	5003-437-3	5003-437-4	
1/2	1/2	5/8	2-1/2	5001-500-2	5001-500-3	5001-500-4		5002-500-2	5002-500-3	5002-500-4		5003-500-2	5003-500-3	5003-500-4	
5/8	5/8	3/4	3	5001-625-2	5001-625-3	5001-625-4		5002-625-2	5002-625-3	5002-625-4		5003-625-2	5003-625-3	5003-625-4	
3/4	3/4	1	3	5001-750-2	5001-750-3	5001-750-4		5002-750-2	5002-750-3	5002-750-4		5003-750-2	5003-750-3	5003-750-4	
1	1	1	3	5001-100-2	5001-100-3	5001-100-4		5002-100-2	5002-100-3	5002-100-4		5003-100-2	5003-100-3	5003-100-4	



Square End, Standard Carbide, Regular Length, Single End

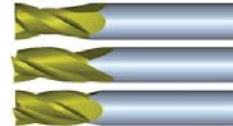
Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/64	1/8	1/16	1-1/2	5004-015-2	5004-015-3	5004-015-4		5005-015-2	5005-015-3	5005-015-4		5006-015-2	5006-015-3	5006-015-4	
1/32	1/8	3/32	1-1/2	5004-031-2	5004-031-3	5004-031-4		5005-031-2	5005-031-3	5005-031-4		5006-031-2	5006-031-3	5006-031-4	
3/64	1/8	1/8	1-1/2	5004-046-2	5004-046-3	5004-046-4		5005-046-2	5005-046-3	5005-046-4		5006-046-2	5006-046-3	5006-046-4	
1/16	1/8	3/16	1-1/2	5004-062-2	5004-062-3	5004-062-4		5005-062-2	5005-062-3	5005-062-4		5006-062-2	5006-062-3	5006-062-4	
5/64	1/8	1/4	1-1/2	5004-078-2	5004-078-3	5004-078-4		5005-078-2	5005-078-3	5005-078-4		5006-078-2	5006-078-3	5006-078-4	
3/32	1/8	3/8	1-1/2	5004-093-2	5004-093-3	5004-093-4		5005-093-2	5005-093-3	5005-093-4		5006-093-2	5006-093-3	5006-093-4	
7/64	1/8	3/8	1-1/2	5004-109-2	5004-109-3	5004-109-4		5005-109-2	5005-109-3	5005-109-4		5006-109-2	5006-109-3	5006-109-4	
1/8	1/8	1/2	1-1/2	5004-125-2	5004-125-3	5004-125-4		5005-125-2	5005-125-3	5005-125-4		5006-125-2	5006-125-3	5006-125-4	
9/64	3/16	9/16	2	5004-140-2	5004-140-3	5004-140-4		5005-140-2	5005-140-3	5005-140-4		5006-140-2	5006-140-3	5006-140-4	
5/32	3/16	9/16	2	5004-156-2	5004-156-3	5004-156-4		5005-156-2	5005-156-3	5005-156-4		5006-156-2	5006-156-3	5006-156-4	
11/64	3/16	9/16	2	5004-171-2	5004-171-3	5004-171-4		5005-171-2	5005-171-3	5005-171-4		5006-171-2	5006-171-3	5006-171-4	
3/16	3/16	5/8	2	5004-187-2	5004-187-3	5004-187-4		5005-187-2	5005-187-3	5005-187-4		5006-187-2	5006-187-3	5006-187-4	
13/64	1/4	5/8	2-1/2	5004-203-2	5004-203-3	5004-203-4		5005-203-2	5005-203-3	5005-203-4		5006-203-2	5006-203-3	5006-203-4	
7/32	1/4	5/8	2-1/2	5004-218-2	5004-218-3	5004-218-4		5005-218-2	5005-218-3	5005-218-4		5006-218-2	5006-218-3	5006-218-4	
15/64	1/4	3/4	2-1/2	5004-234-2	5004-234-3	5004-234-4		5005-234-2	5005-234-3	5005-234-4		5006-234-2	5006-234-3	5006-234-4	
1/4	1/4	3/4	2-1/2	5004-250-2	5004-250-3	5004-250-4		5005-250-2	5005-250-3	5005-250-4		5006-250-2	5006-250-3	5006-250-4	



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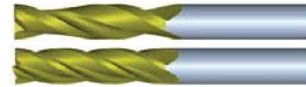
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				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
17/64	5/16	7/8	2-1/2	5004-265-2	5004-265-3	5004-265-4		5005-265-2	5005-265-3	5005-265-4		5006-265-2	5006-265-3	5006-265-4	
9/32	5/16	7/8	2-1/2	5004-281-2	5004-281-3	5004-281-4		5005-281-2	5005-281-3	5005-281-4		5006-281-2	5006-281-3	5006-281-4	
19/64	5/16	7/8	2-1/2	5004-296-2	5004-296-3	5004-296-4		5005-296-2	5005-296-3	5005-296-4		5006-296-2	5006-296-3	5006-296-4	
5/16	5/16	7/8	2-1/2	5004-312-2	5004-312-3	5004-312-4		5005-312-2	5005-312-3	5005-312-4		5006-312-2	5006-312-3	5006-312-4	
21/64	3/8	7/8	2-1/2	5004-328-2	5004-328-3	5004-328-4		5005-328-2	5005-328-3	5005-328-4		5006-328-2	5006-328-3	5006-328-4	
11/32	3/8	7/8	2-1/2	5004-343-2	5004-343-3	5004-343-4		5005-343-2	5005-343-3	5005-343-4		5006-343-2	5006-343-3	5006-343-4	
23/64	3/8	7/8	2-1/2	5004-359-2	5004-359-3	5004-359-4		5005-359-2	5005-359-3	5005-359-4		5006-359-2	5006-359-3	5006-359-4	
3/8	3/8	1	2-1/2	5004-375-2	5004-375-3	5004-375-4		5005-375-2	5005-375-3	5005-375-4		5006-375-2	5006-375-3	5006-375-4	
25/64	7/16	1	2-1/2	5004-390-2	5004-390-3	5004-390-4		5005-390-2	5005-390-3	5005-390-4		5006-390-2	5006-390-3	5006-390-4	
13/32	7/16	1	2-1/2	5004-406-2	5004-406-3	5004-406-4		5005-406-2	5005-406-3	5005-406-4		5006-406-2	5006-406-3	5006-406-4	
27/64	7/16	1	2-1/2	5004-421-2	5004-421-3	5004-421-4		5005-421-2	5005-421-3	5005-421-4		5006-421-2	5006-421-3	5006-421-4	
7/16	7/16	1	2-1/2	5004-437-2	5004-437-3	5004-437-4		5005-437-2	5005-437-3	5005-437-4		5006-437-2	5006-437-3	5006-437-4	
29/64	1/2	1	3	5004-453-2	5004-453-3	5004-453-4		5005-453-2	5005-453-3	5005-453-4		5006-453-2	5006-453-3	5006-453-4	
15/32	1/2	1	3	5004-468-2	5004-468-3	5004-468-4		5005-468-2	5005-468-3	5005-468-4		5006-468-2	5006-468-3	5006-468-4	
31/64	1/2	1	3	5004-484-2	5004-484-3	5004-484-4		5005-484-2	5005-484-3	5005-484-4		5006-484-2	5006-484-3	5006-484-4	
1/2	1/2	1	3	5004-500-2	5004-500-3	5004-500-4		5005-500-2	5005-500-3	5005-500-4		5006-500-2	5006-500-3	5006-500-4	
33/64	9/16	1-1/4	3-1/2	5004-515-2	5004-515-3	5004-515-4		5005-515-2	5005-515-3	5005-515-4		5006-515-2	5006-515-3	5006-515-4	
17/32	9/16	1-1/4	3-1/2	5004-531-2	5004-531-3	5004-531-4		5005-531-2	5005-531-3	5005-531-4		5006-531-2	5006-531-3	5006-531-4	
35/64	9/16	1-1/4	3-1/2	5004-546-2	5004-546-3	5004-546-4		5005-546-2	5005-546-3	5005-546-4		5006-546-2	5006-546-3	5006-546-4	
9/16	9/16	1-1/4	3-1/2	5004-562-2	5004-562-3	5004-562-4		5005-562-2	5005-562-3	5005-562-4		5006-562-2	5006-562-3	5006-562-4	
37/64	5/8	1-1/4	3-1/2	5004-578-2	5004-578-3	5004-578-4		5005-578-2	5005-578-3	5005-578-4		5006-578-2	5006-578-3	5006-578-4	
19/32	5/8	1-1/4	3-1/2	5004-593-2	5004-593-3	5004-593-4		5005-593-2	5005-593-3	5005-593-4		5006-593-2	5006-593-3	5006-593-4	
39/64	5/8	1-1/4	3-1/2	5004-609-2	5004-609-3	5004-609-4		5005-609-2	5005-609-3	5005-609-4		5006-609-2	5006-609-3	5006-609-4	
5/8	5/8	1-1/4	3-1/2	5004-625-2	5004-625-3	5004-625-4		5005-625-2	5005-625-3	5005-625-4		5006-625-2	5006-625-3	5006-625-4	
41/64	3/4	1-1/2	4	5004-640-2	5004-640-3	5004-640-4		5005-640-2	5005-640-3	5005-640-4		5006-640-2	5006-640-3	5006-640-4	
21/32	3/4	1-1/2	4	5004-656-2	5004-656-3	5004-656-4		5005-656-2	5005-656-3	5005-656-4		5006-656-2	5006-656-3	5006-656-4	
43/64	3/4	1-1/2	4	5004-671-2	5004-671-3	5004-671-4		5005-671-2	5005-671-3	5005-671-4		5006-671-2	5006-671-3	5006-671-4	
11/16	3/4	1-1/2	4	5004-687-2	5004-687-3	5004-687-4		5005-687-2	5005-687-3	5005-687-4		5006-687-2	5006-687-3	5006-687-4	
45/64	3/4	1-1/2	4	5004-703-2	5004-703-3	5004-703-4		5005-703-2	5005-703-3	5005-703-4		5006-703-2	5006-703-3	5006-703-4	
23/32	3/4	1-1/2	4	5004-718-2	5004-718-3	5004-718-4		5005-718-2	5005-718-3	5005-718-4		5006-718-2	5006-718-3	5006-718-4	
47/64	3/4	1-1/2	4	5004-734-2	5004-734-3	5004-734-4		5005-734-2	5005-734-3	5005-734-4		5006-734-2	5006-734-3	5006-734-4	
3/4	3/4	1-1/2	4	5004-750-2	5004-750-3	5004-750-4		5005-750-2	5005-750-3	5005-750-4		5006-750-2	5006-750-3	5006-750-4	
49/64	7/8	1-1/2	4	5004-765-2	5004-765-3	5004-765-4		5005-765-2	5005-765-3	5005-765-4		5006-765-2	5006-765-3	5006-765-4	
25/32	7/8	1-1/2	4	5004-781-2	5004-781-3	5004-781-4		5005-781-2	5005-781-3	5005-781-4		5006-781-2	5006-781-3	5006-781-4	
51/64	7/8	1-1/2	4	5004-796-2	5004-796-3	5004-796-4		5005-796-2	5005-796-3	5005-796-4		5006-796-2	5006-796-3	5006-796-4	
13/16	7/8	1-1/2	4	5004-812-2	5004-812-3	5004-812-4		5005-812-2	5005-812-3	5005-812-4		5006-812-2	5006-812-3	5006-812-4	
53/64	7/8	1-1/2	4	5004-828-2	5004-828-3	5004-828-4		5005-828-2	5005-828-3	5005-828-4		5006-828-2	5006-828-3	5006-828-4	
27/32	7/8	1-1/2	4	5004-843-2	5004-843-3	5004-843-4		5005-843-2	5005-843-3	5005-843-4		5006-843-2	5006-843-3	5006-843-4	
55/64	7/8	1-1/2	4	5004-859-2	5004-859-3	5004-859-4		5005-859-2	5005-859-3	5005-859-4		5006-859-2	5006-859-3	5006-859-4	
7/8	7/8	1-1/2	4	5004-875-2	5004-875-3	5004-875-4		5005-875-2	5005-875-3	5005-875-4		5006-875-2	5006-875-3	5006-875-4	
57/64	1	1-1/2	4	5004-890-2	5004-890-3	5004-890-4		5005-890-2	5005-890-3	5005-890-4		5006-890-2	5006-890-3	5006-890-4	
29/32	1	1-1/2	4	5004-906-2	5004-906-3	5004-906-4		5005-906-2	5005-906-3	5005-906-4		5006-906-2	5006-906-3	5006-906-4	
59/64	1	1-1/2	4	5004-921-2	5004-921-3	5004-921-4		5005-921-2	5005-921-3	5005-921-4		5006-921-2	5006-921-3	5006-921-4	
15/16	1	1-1/2	4	5004-937-2	5004-937-3	5004-937-4		5005-937-2	5005-937-3	5005-937-4		5006-937-2	5006-937-3	5006-937-4	
61/64	1	1-1/2	4	5004-953-2	5004-953-3	5004-953-4		5005-953-2	5005-953-3	5005-953-4		5006-953-2	5006-953-3	5006-953-4	
31/32	1	1-1/2	4	5004-968-2	5004-968-3	5004-968-4		5005-968-2	5005-968-3	5005-968-4		5006-968-2	5006-968-3	5006-968-4	
63/64	1	1-1/2	4	5004-984-2	5004-984-3	5004-984-4		5005-984-2	5005-984-3	5005-984-4		5006-984-2	5006-984-3	5006-984-4	
1	1	1-1/2	4	5004-100-2	5004-100-3	5004-100-4		5005-100-2	5005-100-3	5005-100-4		5006-100-2	5006-100-3	5006-100-4	



P	●	Steel
M	○	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	○	Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

STANDARD PERFORMANCE

Standard Package: All Sizes - 1 Each



Square End, Standard Carbide, Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l ₁	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/8	1/8	3/4	2-1/2	5007-125-2	--	5007-125-4		5008-125-2	--	5008-125-4		5009-125-2	--	5009-125-4	
3/16	3/16	3/4	2-1/2	5007-187-2	--	5007-187-4		5008-187-2	--	5008-187-4		5009-187-2	--	5009-187-4	
1/4	1/4	1-1/8	3	5007-250-2	--	5007-250-4		5008-250-2	--	5008-250-4		5009-250-2	--	5009-250-4	
5/16	5/16	1-1/8	3	5007-312-2	--	5007-312-4		5008-312-2	--	5008-312-4		5009-312-2	--	5009-312-4	
3/8	3/8	1-1/8	3	5007-375-2	--	5007-375-4		5008-375-2	--	5008-375-4		5009-375-2	--	5009-375-4	
7/16	7/16	2	4	5007-437-2	--	5007-437-4		5008-437-2	--	5008-437-4		5009-437-2	--	5009-437-4	
1/2	1/2	2	4	5007-500-2	--	5007-500-4		5008-500-2	--	5008-500-4		5009-500-2	--	5009-500-4	
5/8	5/8	2-1/4	5	5007-625-2	--	5007-625-4		5008-625-2	--	5008-625-4		5009-625-2	--	5009-625-4	
3/4	3/4	2-1/4	5	5007-750-2	--	5007-750-4		5008-750-2	--	5008-750-4		5009-750-2	--	5009-750-4	
1	1	2-1/4	5	5007-100-2	--	5007-100-4		5008-100-2	--	5008-100-4		5009-100-2	--	5009-100-4	



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

Cutter Diam. D	Shank Diam. d	Length Of Cut l ₁	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/8	1/8	1	3	5010-125-2	--	5010-125-4		5011-125-2	--	5011-125-4		5012-125-2	--	5012-125-4	
3/16	3/16	1-1/8	3	5010-187-2	--	5010-187-4		5011-187-2	--	5011-187-4		5012-187-2	--	5012-187-4	
1/4	1/4	1-1/2	4	5010-250-2	--	5010-250-4		5011-250-2	--	5011-250-4		5012-250-2	--	5012-250-4	
5/16	5/16	1-5/8	4	5010-312-2	--	5010-312-4		5011-312-2	--	5011-312-4		5012-312-2	--	5012-312-4	
3/8	3/8	1-3/4	4	5010-375-2	--	5010-375-4		5011-375-2	--	5011-375-4		5012-375-2	--	5012-375-4	
1/2	1/2	3	6	5010-500-2	--	5010-500-4		5011-500-2	--	5011-500-4		5012-500-2	--	5012-500-4	
5/8	5/8	3	6	5010-625-2	--	5010-625-4		5011-625-2	--	5011-625-4		5012-625-2	--	5012-625-4	
3/4	3/4	3	6	5010-750-2	--	5010-750-4		5011-750-2	--	5011-750-4		5012-750-2	--	5012-750-4	
1	1	3	6	5010-100-2	--	5010-100-4		5011-100-2	--	5011-100-4		5012-100-2	--	5012-100-4	



P	●	Steel
M	☐	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel
● GOOD ☐ OK ○ NOT OPTIMAL		

STANDARD PERFORMANCE

Standard Package: All Sizes - 1 Each

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

Cutter Diam. D	Shank Diam. d	Length Of Cut L1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1	1	3	38	5041-010-2	5041-010-3	5041-010-4		--	--	--		5042-010-2	5042-010-3	5042-010-4	
1.5	2	5	38	5041-015-2	5041-015-3	5041-015-4		--	--	--		5042-015-2	5042-015-3	5042-015-4	
2	2	6	38	5041-020-2	5041-020-3	5041-020-4		--	--	--		5042-020-2	5042-020-3	5042-020-4	
3	3	12	38	5041-030-2	5041-030-3	5041-030-4		--	--	--		5042-030-2	5042-030-3	5042-030-4	
3.5	4	12	50	5041-035-2	5041-035-3	5041-035-4		--	--	--		5042-035-2	5042-035-3	5042-035-4	
4	4	14	50	5041-040-2	5041-040-3	5041-040-4		--	--	--		5042-040-2	5042-040-3	5042-040-4	
4.5	5	14	50	5041-045-2	5041-045-3	5041-045-4		--	--	--		5042-045-2	5042-045-3	5042-045-4	
5	5	16	50	5041-050-2	5041-050-3	5041-050-4		--	--	--		5042-050-2	5042-050-3	5042-050-4	
6	6	19	63	5041-060-2	5041-060-3	5041-060-4		--	--	--		5042-060-2	5042-060-3	5042-060-4	
7	7	19	63	5041-070-2	5041-070-3	5041-070-4		--	--	--		5042-070-2	5042-070-3	5042-070-4	
8	8	19	63	5041-080-2	5041-080-3	5041-080-4		--	--	--		5042-080-2	5042-080-3	5042-080-4	
9	9	22	70	5041-090-2	5041-090-3	5041-090-4		--	--	--		5042-090-2	5042-090-3	5042-090-4	
10	10	22	70	5041-100-2	5041-100-3	5041-100-4		--	--	--		5042-100-2	5042-100-3	5042-100-4	
11	11	25	70	5041-110-2	5041-110-3	5041-110-4		--	--	--		5042-110-2	5042-110-3	5042-110-4	
12	12	25	75	5041-120-2	5041-120-3	5041-120-4		--	--	--		5042-120-2	5042-120-3	5042-120-4	
14	14	30	88	5041-140-2	5041-140-3	5041-140-4		--	--	--		5042-140-2	5042-140-3	5042-140-4	
16	16	32	88	5041-160-2	5041-160-3	5041-160-4		--	--	--		5042-160-2	5042-160-3	5042-160-4	
18	18	36	100	5041-180-2	5041-180-3	5041-180-4		--	--	--		5042-180-2	5042-180-3	5042-180-4	
20	20	38	100	5041-200-2	5041-200-3	5041-200-4		--	--	--		5042-200-2	5042-200-3	5042-200-4	
22	22	38	100	5041-220-2	5041-220-3	5041-220-4		--	--	--		5042-220-2	5042-220-3	5042-220-4	
25	25	38	100	5041-250-2	5041-250-3	5041-250-4		--	--	--		5042-250-2	5042-250-3	5042-250-4	

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

Cutter Diam. D	Shank Diam. d	Length Of Cut L1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
3	3	25	75	5045-030-2	--	5045-030-4		--	--	--		5046-030-2	--	5046-030-4	
4	4	25	75	5045-040-2	--	5045-040-4		--	--	--		5046-040-2	--	5046-040-4	
5	5	25	75	5045-050-2	--	5045-050-4		--	--	--		5046-050-2	--	5046-050-4	
6	6	25	75	5045-060-2	--	5045-060-4		--	--	--		5046-060-2	--	5046-060-4	
8	8	30	100	5045-080-2	--	5045-080-4		--	--	--		5046-080-2	--	5046-080-4	
10	10	38	100	5045-100-2	--	5045-100-4		--	--	--		5046-100-2	--	5046-100-4	
12	12	50	100	5045-120-2	--	5045-120-4		--	--	--		5046-120-2	--	5046-120-4	
14	14	50	125	5045-140-2	--	5045-140-4		--	--	--		5046-140-2	--	5046-140-4	
16	16	75	150	5045-160-2	--	5045-160-4		--	--	--		5046-160-2	--	5046-160-4	
18	18	75	150	5045-180-2	--	5045-180-4		--	--	--		5046-180-2	--	5046-180-4	
20	20	75	150	5045-200-2	--	5045-400-4		--	--	--		5046-200-2	--	5046-400-4	
25	25	75	150	5045-250-2	--	5045-450-4		--	--	--		5046-250-2	--	5046-450-4	

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

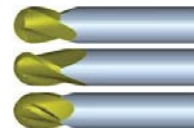
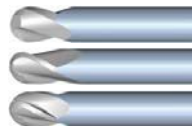
Cutter Diam. D	Shank Diam. d	Length Of Cut L1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
3	3	25	100	5047-030-2	--	5047-030-4		--	--	--		5048-030-2	--	5048-030-4	
4	4	50	100	5047-040-2	--	5047-040-4		--	--	--		5048-040-2	--	5048-040-4	
5	5	30	100	5047-050-2	--	5047-050-4		--	--	--		5048-050-2	--	5048-050-4	
6	6	50	100	5047-060-2	--	5047-060-4		--	--	--		5048-060-2	--	5048-060-4	
8	8	50	150	5047-080-2	--	5047-080-4		--	--	--		5048-080-2	--	5048-080-4	
10	10	75	150	5047-100-2	--	5047-100-4		--	--	--		5048-100-2	--	5048-100-4	
12	12	75	150	5047-120-2	--	5047-120-4		--	--	--		5048-120-2	--	5048-120-4	
14	14	75	150	5047-140-2	--	5047-140-4		--	--	--		5048-140-2	--	5048-140-4	



P	●	Steel
M	◐	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel
● GOOD ◐ OK ○ NOT OPTIMAL		

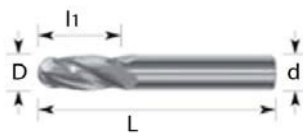
STANDARD PERFORMANCE

Standard Package: All Sizes - 1 Each



Ball Nose, Standard Carbide, Stub Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/32	1/8	1/16	1-1/2	5013-031-2	5013-031-3	5013-031-4		5014-031-2	5014-031-3	5014-031-4		5015-031-2	5015-031-3	5015-031-4	
3/64	1/8	3/32	1-1/2	5013-046-2	5013-046-3	5013-046-4		5014-046-2	5014-046-3	5014-046-4		5015-046-2	5015-046-3	5015-046-4	
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7/32	1/4	7/16	2	5013-218-2	5013-218-3	5013-218-4		5014-218-2	5014-218-3	5014-218-4		5015-218-2	5015-218-3	5015-218-4	
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5/16	3/8	1/2	2	5013-312-2	5013-312-3	5013-312-4		5014-312-2	5014-312-3	5014-312-4		5015-312-2	5015-312-3	5015-312-4	
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7/16	7/16	5/8	2-1/2	5013-437-2	5013-437-3	5013-437-4		5014-437-2	5014-437-3	5014-437-4		5015-437-2	5015-437-3	5015-437-4	
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Ball Nose, Standard Carbide, Regular Length, Single End

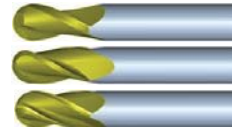
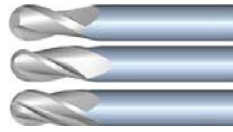
Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/64	1/8	1/16	1-1/2	5016-015-2	5016-015-3	5016-015-4		5017-015-2	5017-015-3	5017-015-4		5018-015-2	5018-015-3	5018-015-4	
1/32	1/8	3/32	1-1/2	5016-031-2	5016-031-3	5016-031-4		5017-031-2	5017-031-3	5017-031-4		5018-031-2	5018-031-3	5018-031-4	
3/64	1/8	1/8	1-1/2	5016-046-2	5016-046-3	5016-046-4		5017-046-2	5017-046-3	5017-046-4		5018-046-2	5018-046-3	5018-046-4	
1/16	1/8	3/16	1-1/2	5016-062-2	5016-062-3	5016-062-4		5017-062-2	5017-062-3	5017-062-4		5018-062-2	5018-062-3	5018-062-4	
5/64	1/8	1/4	1-1/2	5016-078-2	5016-078-3	5016-078-4		5017-078-2	5017-078-3	5017-078-4		5018-078-2	5018-078-3	5018-078-4	
3/32	1/8	3/8	1-1/2	5016-093-2	5016-093-3	5016-093-4		5017-093-2	5017-093-3	5017-093-4		5018-093-2	5018-093-3	5018-093-4	
7/64	1/8	3/8	1-1/2	5016-109-2	5016-109-3	5016-109-4		5017-109-2	5017-109-3	5017-109-4		5018-109-2	5018-109-3	5018-109-4	
1/8	1/8	1/2	1-1/2	5016-125-2	5016-125-3	5016-125-4		5017-125-2	5017-125-3	5017-125-4		5018-125-2	5018-125-3	5018-125-4	
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11/64	3/16	9/16	2	5016-171-2	5016-171-3	5016-171-4		5017-171-2	5017-171-3	5017-171-4		5018-171-2	5018-171-3	5018-171-4	
3/16	3/16	5/8	2	5016-187-2	5016-187-3	5016-187-4		5017-187-2	5017-187-3	5017-187-4		5018-187-2	5018-187-3	5018-187-4	
13/64	1/4	5/8	2-1/2	5016-203-2	5016-203-3	5016-203-4		5017-203-2	5017-203-3	5017-203-4		5018-203-2	5018-203-3	5018-203-4	
7/32	1/4	5/8	2-1/2	5016-218-2	5016-218-3	5016-218-4		5017-218-2	5017-218-3	5017-218-4		5018-218-2	5018-218-3	5018-218-4	
15/64	1/4	3/4	2-1/2	5016-234-2	5016-234-3	5016-234-4		5017-234-2	5017-234-3	5017-234-4		5018-234-2	5018-234-3	5018-234-4	
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P	●	Steel
M	☐	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel
● GOOD ☐ OK ○ NOT OPTIMAL		

STANDARD PERFORMANCE

Standard Package: All Sizes - 1 Each



Ball Nose, Standard Carbide, Regular Length, Single End

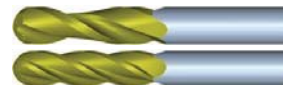
Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
17/64	5/16	7/8	2-1/2	5016-265-2	5016-265-3	5016-265-4		5017-265-2	5017-265-3	5017-265-4		5018-265-2	5018-265-3	5018-265-4	
9/32	5/16	7/8	2-1/2	5016-281-2	5016-281-3	5016-281-4		5017-281-2	5017-281-3	5017-281-4		5018-281-2	5018-281-3	5018-281-4	
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5/16	5/16	7/8	2-1/2	5016-312-2	5016-312-3	5016-312-4		5017-312-2	5017-312-3	5017-312-4		5018-312-2	5018-312-3	5018-312-4	
21/64	3/8	7/8	2-1/2	5016-328-2	5016-328-3	5016-328-4		5017-328-2	5017-328-3	5017-328-4		5018-328-2	5018-328-3	5018-328-4	
11/32	3/8	7/8	2-1/2	5016-343-2	5016-343-3	5016-343-4		5017-343-2	5017-343-3	5017-343-4		5018-343-2	5018-343-3	5018-343-4	
23/64	3/8	7/8	2-1/2	5016-359-2	5016-359-3	5016-359-4		5017-359-2	5017-359-3	5017-359-4		5018-359-2	5018-359-3	5018-359-4	
3/8	3/8	1	2-1/2	5016-375-2	5016-375-3	5016-375-4		5017-375-2	5017-375-3	5017-375-4		5018-375-2	5018-375-3	5018-375-4	
25/64	7/16	1	2-1/2	5016-390-2	5016-390-3	5016-390-4		5017-390-2	5017-390-3	5017-390-4		5018-390-2	5018-390-3	5018-390-4	
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27/64	7/16	1	2-1/2	5016-421-2	5016-421-3	5016-421-4		5017-421-2	5017-421-3	5017-421-4		5018-421-2	5018-421-3	5018-421-4	
7/16	7/16	1	2-1/2	5016-437-2	5016-437-3	5016-437-4		5017-437-2	5017-437-3	5017-437-4		5018-437-2	5018-437-3	5018-437-4	
29/64	1/2	1	3	5016-453-2	5016-453-3	5016-453-4		5017-453-2	5017-453-3	5017-453-4		5018-453-2	5018-453-3	5018-453-4	
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13/16	7/8	1-1/2	4	5016-812-2	5016-812-3	5016-812-4		5017-812-2	5017-812-3	5017-812-4		5018-812-2	5018-812-3	5018-812-4	
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59/64	1	1-1/2	4	5016-921-2	5016-921-3	5016-921-4		5017-921-2	5017-921-3	5017-921-4		5018-921-2	5018-921-3	5018-921-4	
15/16	1	1-1/2	4	5016-937-2	5016-937-3	5016-937-4		5017-937-2	5017-937-3	5017-937-4		5018-937-2	5018-937-3	5018-937-4	
61/64	1	1-1/2	4	5016-953-2	5016-953-3	5016-953-4		5017-953-2	5017-953-3	5017-953-4		5018-953-2	5018-953-3	5018-953-4	
31/32	1	1-1/2	4	5016-968-2	5016-968-3	5016-968-4		5017-968-2	5017-968-3	5017-968-4		5018-968-2	5018-968-3	5018-968-4	
63/64	1	1-1/2	4	5016-984-2	5016-984-3	5016-984-4		5017-984-2	5017-984-3	5017-984-4		5018-984-2	5018-984-3	5018-984-4	
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P	●	Steel
M	○	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	○	Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

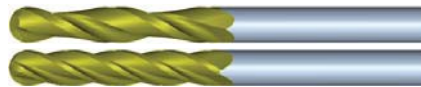
STANDARD PERFORMANCE

Standard Package: All Sizes - 1 Each



Ball Nose, Standard Carbide, Long Length, Single End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/8	1/8	3/4	2-1/2	5019-125-2	--	5019-125-4		5020-125-2	--	5020-125-4		5021-125-2	--	5021-125-4	
3/16	3/16	3/4	2-1/2	5019-187-2	--	5019-187-4		5020-187-2	--	5020-187-4		5021-187-2	--	5021-187-4	
1/4	1/4	1-1/8	3	5019-250-2	--	5019-250-4		5020-250-2	--	5020-250-4		5021-250-2	--	5021-250-4	
5/16	5/16	1-1/8	3	5019-312-2	--	5019-312-4		5020-312-2	--	5020-312-4		5021-312-2	--	5021-312-4	
3/8	3/8	1-1/8	3	5019-375-2	--	5019-375-4		5020-375-2	--	5020-375-4		5021-375-2	--	5021-375-4	
7/16	7/16	2	4	5019-437-2	--	5019-437-4		5020-437-2	--	5020-437-4		5021-437-2	--	5021-437-4	
1/2	1/2	2	4	5019-500-2	--	5019-500-4		5020-500-2	--	5020-500-4		5021-500-2	--	5021-500-4	
5/8	5/8	2-1/4	5	5019-625-2	--	5019-625-4		5020-625-2	--	5020-625-4		5021-625-2	--	5021-625-4	
3/4	3/4	2-1/4	5	5019-750-2	--	5019-750-4		5020-750-2	--	5020-750-4		5021-750-2	--	5021-750-4	
1	1	2-1/4	5	5019-100-2	--	5019-100-4		5020-100-2	--	5020-100-4		5021-100-2	--	5021-100-4	



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

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/8	1/8	1	3	5022-125-2	--	5022-125-4		5023-125-2	--	5023-125-4		5024-125-2	--	5024-125-4	
3/16	3/16	1-1/8	3	5022-187-2	--	5022-187-4		5023-187-2	--	5023-187-4		5024-187-2	--	5024-187-4	
1/4	1/4	1-1/2	4	5022-250-2	--	5022-250-4		5023-250-2	--	5023-250-4		5024-250-2	--	5024-250-4	
5/16	5/16	1-5/8	4	5022-312-2	--	5022-312-4		5023-312-2	--	5023-312-4		5024-312-2	--	5024-312-4	
3/8	3/8	1-3/4	4	5022-375-2	--	5022-375-4		5023-375-2	--	5023-375-4		5024-375-2	--	5024-375-4	
1/2	1/2	3	6	5022-500-2	--	5022-500-4		5023-500-2	--	5023-500-4		5024-500-2	--	5024-500-4	
5/8	5/8	3	6	5022-625-2	--	5022-625-4		5023-625-2	--	5023-625-4		5024-625-2	--	5024-625-4	
3/4	3/4	3	6	5022-750-2	--	5022-750-4		5023-750-2	--	5023-750-4		5024-750-2	--	5024-750-4	
1	1	3	6	5022-100-2	--	5022-100-4		5023-100-2	--	5023-100-4		5024-100-2	--	5024-100-4	

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

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1	1	3	38	5043-010-2	5043-010-3	5043-010-4		--	--	--		5044-010-2	5044-010-3	5044-010-4	
1.5	2	5	38	5043-015-2	5043-015-3	5043-015-4		--	--	--		5044-015-2	5044-015-3	5044-015-4	
2	2	6	38	5043-020-2	5043-020-3	5043-020-4		--	--	--		5044-020-2	5044-020-3	5044-020-4	
3	3	12	38	5043-030-2	5043-030-3	5043-030-4		--	--	--		5044-030-2	5044-030-3	5044-030-4	
3.5	4	12	50	5043-035-2	5043-035-3	5043-035-4		--	--	--		5044-035-2	5044-035-3	5044-035-4	
4	4	14	50	5043-040-2	5043-040-3	5043-040-4		--	--	--		5044-040-2	5044-040-3	5044-040-4	
4.5	5	14	50	5043-045-2	5043-045-3	5043-045-4		--	--	--		5044-045-2	5044-045-3	5044-045-4	
5	5	16	50	5043-050-2	5043-050-3	5043-050-4		--	--	--		5044-050-2	5044-050-3	5044-050-4	
6	6	19	63	5043-060-2	5043-060-3	5043-060-4		--	--	--		5044-060-2	5044-060-3	5044-060-4	
7	7	19	63	5043-070-2	5043-070-3	5043-070-4		--	--	--		5044-070-2	5044-070-3	5044-070-4	
8	8	19	63	5043-080-2	5043-080-3	5043-080-4		--	--	--		5044-080-2	5044-080-3	5044-080-4	
9	9	22	70	5043-090-2	5043-090-3	5043-090-4		--	--	--		5044-090-2	5044-090-3	5044-090-4	
10	10	22	70	5043-100-2	5043-100-3	5043-100-4		--	--	--		5044-100-2	5044-100-3	5044-100-4	
11	11	25	70	5043-110-2	5043-110-3	5043-110-4		--	--	--		5044-110-2	5044-110-3	5044-110-4	
12	12	25	75	5043-120-2	5043-120-3	5043-120-4		--	--	--		5044-120-2	5044-120-3	5044-120-4	
14	14	30	88	5043-140-2	5043-140-3	5043-140-4		--	--	--		5044-140-2	5044-140-3	5044-140-4	
16	16	32	88	5043-160-2	5043-160-3	5043-160-4		--	--	--		5044-160-2	5044-160-3	5044-160-4	
18	18	36	100	5043-180-2	5043-180-3	5043-180-4		--	--	--		5044-180-2	5044-180-3	5044-180-4	
20	20	38	100	5043-200-2	5043-200-3	5043-200-4		--	--	--		5044-200-2	5044-200-3	5044-200-4	
22	22	38	100	5043-220-2	5043-220-3	5043-220-4		--	--	--		5044-220-2	5044-220-3	5044-220-4	
25	25	38	100	5043-250-2	5043-250-3	5043-250-4		--	--	--		5044-250-2	5044-250-3	5044-250-4	



P	●	Steel
M	○	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	●	Hardened Steel
● GOOD		○ OK
		○ NOT OPTIMAL

STANDARD PERFORMANCE

Standard Package: All Sizes - 1 Each



Square End, Standard Carbide, Stub Length, Double End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/32	1/8	1/16	1-1/2	5025-031-2	--	5025-031-4		5026-031-2	--	5026-031-4		5027-031-2	--	5027-031-4	
3/64	1/8	3/32	1-1/2	5025-046-2	--	5025-046-4		5026-046-2	--	5026-046-4		5027-046-2	--	5027-046-4	
1/16	1/8	1/8	1-1/2	5025-062-2	--	5025-062-4		5026-062-2	--	5026-062-4		5027-062-2	--	5027-062-4	
3/32	1/8	3/16	1-1/2	5025-093-2	--	5025-093-4		5026-093-2	--	5026-093-4		5027-093-2	--	5027-093-4	
7/64	1/8	7/32	1-1/2	5025-109-2	--	5025-109-4		5026-109-2	--	5026-109-4		5027-109-2	--	5027-109-4	
1/8	1/8	1/4	1-1/2	5025-125-2	--	5025-125-4		5026-125-2	--	5026-125-4		5027-125-2	--	5027-125-4	
5/32	3/16	5/16	2	5025-156-2	--	5025-156-4		5026-156-2	--	5026-156-4		5027-156-2	--	5027-156-4	
3/16	3/8	5/16	2	5025-187-2	--	5025-187-4		5026-187-2	--	5026-187-4		5027-187-2	--	5027-187-4	
7/32	1/4	3/8	2-1/2	5025-218-2	--	5025-218-4		5026-218-2	--	5026-218-4		5027-218-2	--	5027-218-4	
1/4	1/4	1/2	2-1/2	5025-250-2	--	5025-250-4		5026-250-2	--	5026-250-4		5027-250-2	--	5027-250-4	
9/32	5/16	1/2	2-1/2	5025-281-2	--	5025-281-4		5026-281-2	--	5026-281-4		5027-281-2	--	5027-281-4	
5/16	5/16	1/2	2-1/2	5025-312-2	--	5025-312-4		5026-312-2	--	5026-312-4		5027-312-2	--	5027-312-4	
3/8	3/8	9/16	2-1/2	5025-375-2	--	5025-375-4		5026-375-2	--	5026-375-4		5027-375-2	--	5027-375-4	
7/16	1/2	9/16	2-3/4	5025-437-2	--	5025-437-4		5026-437-2	--	5026-437-4		5027-437-2	--	5027-437-4	
1/2	1/2	5/8	3	5025-500-2	--	5025-500-4		5026-500-2	--	5026-500-4		5027-500-2	--	5027-500-4	
9/16	5/8	11/16	3-1/2	5025-562-2	--	5025-562-4		5026-562-2	--	5026-562-4		5027-562-2	--	5027-562-4	
5/8	5/8	11/16	3-1/2	5025-625-2	--	5025-625-4		5026-625-2	--	5026-625-4		5027-625-2	--	5027-625-4	
3/4	3/4	7/8	4	5025-750-2	--	5025-750-4		5026-750-2	--	5026-750-4		5027-750-2	--	5027-750-4	



Square End, Standard Carbide, Regular Length, Double End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
3/32	3/8	5/16	3	5031-093-2	--	5031-093-4		--	--	--		5032-093-2	--	5032-093-4	
1/8	3/8	3/8	3-1/16	5031-125-2	--	5031-125-4		--	--	--		5032-125-2	--	5032-125-4	
5/32	3/8	7/16	3-1/8	5031-156-2	--	5031-156-4		--	--	--		5032-156-2	--	5032-156-4	
3/16	3/8	1/2	3-1/4	5031-187-2	--	5031-187-4		--	--	--		5032-187-2	--	5032-187-4	
7/32	3/8	9/16	3-1/2	5031-218-2	--	5031-218-4		--	--	--		5032-218-2	--	5032-218-4	
1/4	3/8	5/8	3-1/2	5031-250-2	--	5031-250-4		--	--	--		5032-250-2	--	5032-250-4	
5/16	3/8	3/4	3-1/2	5031-312-2	--	5031-312-4		--	--	--		5032-312-2	--	5032-312-4	
3/8	3/8	3/4	3-1/2	5031-375-2	--	5031-375-4		--	--	--		5032-375-2	--	5032-375-4	
7/16	1/2	7/8	4	5031-437-2	--	5031-437-4		--	--	--		5032-437-2	--	5032-437-4	
1/2	1/2	1	4	5031-500-2	--	5031-500-4		--	--	--		5032-500-2	--	5032-500-4	
5/8	5/8	1-1/2	6	5031-625-2	--	5031-625-4		--	--	--		5032-625-2	--	5032-625-4	
3/4	3/4	1-1/2	6	5031-750-2	--	5031-750-4		--	--	--		5032-750-2	--	5032-750-4	



P	●	Steel
M	○	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	○	Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

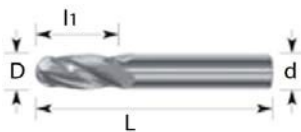
STANDARD PERFORMANCE

Standard Package: All Sizes - 1 Each



Ball Nose, Standard Carbide, Stub Length, Double End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
1/32	1/8	1/16	1-1/2	5028-031-2	--	5028-031-4		5029-031-2	--	5029-031-4		5030-031-2	--	5030-031-4	
3/64	1/8	3/32	1-1/2	5028-046-2	--	5028-046-4		5029-046-2	--	5029-046-4		5030-046-2	--	5030-046-4	
1/16	1/8	1/8	1-1/2	5028-062-2	--	5028-062-4		5029-062-2	--	5029-062-4		5030-062-2	--	5030-062-4	
3/32	1/8	3/16	1-1/2	5028-093-2	--	5028-093-4		5029-093-2	--	5029-093-4		5030-093-2	--	5030-093-4	
7/64	1/8	7/32	1-1/2	5028-109-2	--	5028-109-4		5029-109-2	--	5029-109-4		5030-109-2	--	5030-109-4	
1/8	1/8	1/4	1-1/2	5028-125-2	--	5028-125-4		5029-125-2	--	5029-125-4		5030-125-2	--	5030-125-4	
5/32	3/16	5/16	2	5028-156-2	--	5028-156-4		5029-156-2	--	5029-156-4		5030-156-2	--	5030-156-4	
3/16	3/8	5/16	2	5028-187-2	--	5028-187-4		5029-187-2	--	5029-187-4		5030-187-2	--	5030-187-4	
7/32	1/4	3/8	2-1/2	5028-218-2	--	5028-218-4		5029-218-2	--	5029-218-4		5030-218-2	--	5030-218-4	
1/4	1/4	1/2	2-1/2	5028-250-2	--	5028-250-4		5029-250-2	--	5029-250-4		5030-250-2	--	5030-250-4	
9/32	5/16	1/2	2-1/2	5028-281-2	--	5028-281-4		5029-281-2	--	5029-281-4		5030-281-2	--	5030-281-4	
5/16	5/16	1/2	2-1/2	5028-312-2	--	5028-312-4		5029-312-2	--	5029-312-4		5030-312-2	--	5030-312-4	
3/8	3/8	9/16	2-1/2	5028-375-2	--	5028-375-4		5029-375-2	--	5029-375-4		5030-375-2	--	5030-375-4	
7/16	1/2	9/16	2-3/4	5028-437-2	--	5028-437-4		5029-437-2	--	5029-437-4		5030-437-2	--	5030-437-4	
1/2	1/2	5/8	3	5028-500-2	--	5028-500-4		5029-500-2	--	5029-500-4		5030-500-2	--	5030-500-4	
9/16	5/8	11/16	3-1/2	5028-562-2	--	5028-562-4		5029-562-2	--	5029-562-4		5030-562-2	--	5030-562-4	
5/8	5/8	11/16	3-1/2	5028-625-2	--	5028-625-4		5029-625-2	--	5029-625-4		5030-625-2	--	5030-625-4	
3/4	3/4	7/8	4	5028-750-2	--	5028-750-4		5029-750-2	--	5029-750-4		5030-750-2	--	5030-750-4	



Ball Nose, Standard Carbide, Regular Length, Double End

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Uncoated				TiN Coated				TiAlN Coated			
				2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price	2 Flute Part#	3 Flute Part#	4 Flute Part#	Price
3/32	3/8	5/16	3	5033-093-2	--	5033-093-4		--	--	--		5034-093-2	--	5034-093-4	
1/8	3/8	3/8	3-1/16	5033-125-2	--	5033-125-4		--	--	--		5034-125-2	--	5034-125-4	
5/32	3/8	7/16	3-1/8	5033-156-2	--	5033-156-4		--	--	--		5034-156-2	--	5034-156-4	
3/16	3/8	1/2	3-1/4	5033-187-2	--	5033-187-4		--	--	--		5034-187-2	--	5034-187-4	
7/32	3/8	9/16	3-1/2	5033-218-2	--	5033-218-4		--	--	--		5034-218-2	--	5034-218-4	
1/4	3/8	5/8	3-1/2	5033-250-2	--	5033-250-4		--	--	--		5034-250-2	--	5034-250-4	
5/16	3/8	3/4	3-1/2	5033-312-2	--	5033-312-4		--	--	--		5034-312-2	--	5034-312-4	
3/8	3/8	3/4	3-1/2	5033-375-2	--	5033-375-4		--	--	--		5034-375-2	--	5034-375-4	
7/16	1/2	7/8	4	5033-437-2	--	5033-437-4		--	--	--		5034-437-2	--	5034-437-4	
1/2	1/2	1	4	5033-500-2	--	5033-500-4		--	--	--		5034-500-2	--	5034-500-4	
5/8	5/8	1-1/2	6	5033-625-2	--	5033-625-4		--	--	--		5034-625-2	--	5034-625-4	
3/4	3/4	1-1/2	6	5033-750-2	--	5033-750-4		--	--	--		5034-750-2	--	5034-750-4	



P	●	Steel
M	○	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	○	Hardened Steel
● BETTER ● OK ○ NOT OPTIMAL		

HIGH PERFORMANCE

Standard Package: All Sizes - 1 Each



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		TiAlN Coated		Price
					4 Flute - ROUND Shank Part#		4 Flute - WELDON Shank Part#		
3/16	3/16	5/8	2	SQ	5090-188-4		--		
3/16	3/16	5/8	2	.015CR	5090-188-4-015R		--		
1/4	1/4	3/4	2-1/2	SQ	5090-250-4		5091-250-4		
1/4	1/4	3/4	2-1/2	.020CR	5090-250-4-020R		5091-250-4-020R		
5/16	5/16	13/16	2-1/2	SQ	5090-312-4		5091-312-4		
5/16	5/16	13/16	2-1/2	.020CR	5090-312-4-020R		5091-312-4-020R		
3/8	3/8	7/8	2-1/2	SQ	5090-375-4		5091-375-4		
3/8	3/8	7/8	2-1/2	.020CR	5090-375-4-020R		5091-375-4-020R		
7/16	7/16	1	2-3/4	SQ	5090-437-4		5091-437-4		
1/2	1/2	1	3	SQ	5090-500-4		5091-500-4		
1/2	1/2	1	3	.015CR	5090-500-4-015R		5091-500-4-015R		
1/2	1/2	1	3	.030CR	5090-500-4-030R		5091-500-4-030R		
1/2	1/2	1	3	.060CR	5090-500-4-060R		5091-500-4-060R		
5/8	5/8	1-1/4	3-1/2	SQ	5090-625-4		5091-625-4		
5/8	5/8	1-1/4	3-1/2	.030CR	5090-625-4-030R		5091-625-4-030R		
5/8	5/8	1-1/4	3-1/2	.060CR	5090-625-4-060R		5091-625-4-060R		
5/8	5/8	1-1/4	3-1/2	.125CR	5090-625-4-125R		5091-625-4-125R		
3/4	3/4	1-1/2	4	SQ	5090-750-4		5091-750-4		
3/4	3/4	1-1/2	4	.030CR	5090-750-4-030R		5091-750-4-030R		
3/4	3/4	1-1/2	4	.060CR	5090-750-4-060R		5091-750-4-060R		
3/4	3/4	1-1/2	4	.125CR	5090-750-4-125R		5091-750-4-125R		
1	1	1-1/2	4	SQ	5090-100-4		5091-100-4		
1	1	1-1/2	4	.030CR	5090-100-4-030R		5091-100-4-030R		
1	1	1-1/2	4	.060CR	5090-100-4-060R		5091-100-4-060R		
1	1	1-1/2	4	.125CR	5090-100-4-125R		5091-100-4-125R		



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		TiAlN Coated		Price
					4 Flute - ROUND Shank Part#		4 Flute - WELDON Shank Part#		
3/16	3/16	3/4	2-1/2	SQ	5092-188-4		--		
3/16	3/16	3/4	2-1/2	.015CR	5092-188-4-015R		--		
1/4	1/4	1-1/8	3	SQ	5092-250-4		5093-250-4		
1/4	1/4	1-1/8	3	.020CR	5092-250-4-020R		5093-250-4-020R		
5/16	5/16	1-1/8	3	SQ	5092-312-4		5093-312-4		
5/16	5/16	1-1/8	3	.020CR	5092-312-4-020R		5093-312-4-020R		
3/8	3/8	1-1/8	3	SQ	5092-375-4		5093-375-4		
3/8	3/8	1-1/8	3	.020CR	5092-375-4-020R		5093-375-4-020R		
7/16	7/16	2	4	SQ	5092-437-4		5093-437-4		
1/2	1/2	2	4	SQ	5092-500-4		5093-500-4		
1/2	1/2	2	4	.015CR	5092-500-4-015R		5093-500-4-015R		
1/2	1/2	2	4	.030CR	5092-500-4-030R		5093-500-4-030R		
1/2	1/2	2	4	.060CR	5092-500-4-060R		5093-500-4-060R		
5/8	5/8	2-1/4	5	SQ	5092-625-4		5093-625-4		
5/8	5/8	2-1/4	5	.030CR	5092-625-4-030R		5093-625-4-030R		
5/8	5/8	2-1/4	5	.060CR	5092-625-4-060R		5093-625-4-060R		
5/8	5/8	2-1/4	5	.125CR	5092-625-4-125R		5093-625-4-125R		
3/4	3/4	2-1/4	5	SQ	5092-750-4		5093-750-4		
3/4	3/4	2-1/4	5	.030CR	5092-750-4-030R		5093-750-4-030R		
3/4	3/4	2-1/4	5	.060CR	5092-750-4-060R		5093-750-4-060R		
3/4	3/4	2-1/4	5	.125CR	5092-750-4-125R		5093-750-4-125R		
1	1	2-1/4	5	SQ	5092-100-4		5093-100-4		
1	1	2-1/4	5	.030CR	5092-100-4-030R		5093-100-4-030R		
1	1	2-1/4	5	.060CR	5092-100-4-060R		5093-100-4-060R		
1	1	2-1/4	5	.125CR	5092-100-4-125R		5093-100-4-125R		



P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High Temp. Alloys
H	Hardened Steel
● BETTER ◐ OK ○ NOT OPTIMAL	

HIGH PERFORMANCE

Standard Package: All Sizes - 1 Each



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		TiALN Coated	
				4 Flute - ROUND Shank Part#	Price	4 Flute - WELDON Shank Part#	Price
3/16	3/16	5/8	2	5094-188-4		--	
1/4	1/4	3/4	2-1/2	5094-250-4		5095-250-4	
5/16	5/16	13/16	2-1/2	5094-312-4		5095-312-4	
3/8	3/8	7/8	2-1/2	5094-375-4		5095-375-4	
7/16	7/16	1	2-3/4	5094-437-4		5095-437-4	
1/2	1/2	1	3	5094-500-4		5095-500-4	
5/8	5/8	1-1/4	3-1/2	5094-625-4		5095-625-4	
3/4	3/4	1-1/2	4	5094-750-4		5095-750-4	
1	1	1-1/2	4	5094-100-4		5095-100-4	



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		TiALN Coated	
				4 Flute - ROUND Shank Part#	Price	4 Flute - WELDON Shank Part#	Price
3/16	3/16	3/4	2-1/2	5096-188-4		--	
1/4	1/4	1-1/8	3	5096-250-4		5097-250-4	
5/16	5/16	1-1/8	3	5096-312-4		5097-312-4	
3/8	3/8	1-1/8	3	5096-375-4		5097-375-4	
7/16	7/16	2	4	5096-437-4		5097-437-4	
1/2	1/2	2	4	5096-500-4		5097-500-4	
5/8	5/8	2-1/4	5	5096-625-4		5097-625-4	
3/4	3/4	2-1/4	5	5096-750-4		5097-750-4	
1	1	2-1/4	5	5096-100-4		5097-100-4	



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

Standard Package: All Sizes - 1 Each



ULTRA 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		TiAlN Coated		TiAlN Coated	
					4 Flute - ROUND Shank Part#	Price	5 Flute - ROUND Shank Part#	Price	4 Flute - WELDON Shank Part#	Price
1/8	1/8	1/2	1-1/2	.010CR	5080-125-4-010R		--		--	
3/16	3/16	5/8	2	SQ	5080-188-4		--		--	
3/16	3/16	5/8	2	.015CR	5080-188-4-015R		--		--	
1/4	1/4	3/4	2-1/2	SQ	5080-250-4		5080-250-5		5081-250-4	
1/4	1/4	3/4	2-1/2	.020CR	5080-250-4-020R		5080-250-5-020R		5081-250-4-020R	
5/16	5/16	13/16	2-1/2	SQ	5080-312-4		5080-312-5		5081-312-4	
5/16	5/16	13/16	2-1/2	.020CR	5080-312-4-020R		5080-312-5-020R		5081-312-4-020R	
3/8	3/8	7/8	2-1/2	SQ	5080-375-4		5080-375-5		5081-375-4	
3/8	3/8	7/8	2-1/2	.020CR	5080-375-4-020R		5080-375-5-020R		5081-375-4-020R	
3/8	3/8	7/8	2-1/2	.030CR	5080-375-4-030R		5080-375-5-030R		5081-375-4-030R	
7/16	7/16	1	2-3/4	SQ	5080-437-4		--		5081-437-4	
1/2	1/2	1	3	SQ	5080-500-4		5080-500-5		5081-500-4	
1/2	1/2	1	3	.015CR	5080-500-4-015R		--		5081-500-4-015R	
1/2	1/2	1	3	.030CR	5080-500-4-030R		5080-500-5-030R		5081-500-4-030R	
1/2	1/2	1	3	.060CR	5080-500-4-060R		--		5081-500-4-060R	
5/8	5/8	1-1/4	3-1/2	SQ	5080-625-4		5080-625-5		5081-625-4	
5/8	5/8	1-1/4	3-1/2	.030CR	5080-625-4-030R		5080-625-5-030R		5081-625-4-030R	
5/8	5/8	1-1/4	3-1/2	.060CR	5080-625-4-060R		--		5081-625-4-060R	
5/8	5/8	1-1/4	3-1/2	.125CR	5080-625-4-125R		--		5081-625-4-125R	
3/4	3/4	1-1/2	4	SQ	5080-750-4		5080-750-5		5081-750-4	
3/4	3/4	1-1/2	4	.030CR	5080-750-4-030R		5080-750-5-030R		5081-750-4-030R	
3/4	3/4	1-1/2	4	.060CR	5080-750-4-060R		--		5081-750-4-060R	
3/4	3/4	1-1/2	4	.125CR	5080-750-4-125R		--		5081-750-4-125R	
1	1	1-1/2	4	SQ	5080-100-4		5080-100-5		5081-100-4	
1	1	1-1/2	4	.030CR	5080-100-4-030R		5080-100-5-030R		5081-100-4-030R	
1	1	1-1/2	4	.060CR	5080-100-4-060R		--		5081-100-4-060R	
1	1	1-1/2	4	.125CR	5080-100-4-125R		--		5081-100-4-125R	





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

Standard Package: All Sizes - 1 Each



ULTRA 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		TiAlN Coated	
					4 Flute - ROUND Shank Part#	Price	4 Flute - WELDON Shank Part#	Price
3/16	3/16	3/4	2-1/2	SQ	5082-188-4		--	
3/16	3/16	3/4	2-1/2	.015CR	5082-188-4-015R		--	
1/4	1/4	1-1/8	3	SQ	5082-250-4		5083-250-4	
1/4	1/4	1-1/8	3	.020CR	5082-250-4-020R		5083-250-4-020R	
5/16	5/16	1-1/8	3	SQ	5082-312-4		5083-312-4	
5/16	5/16	1-1/8	3	.020CR	5082-312-4-020R		5083-312-4-020R	
3/8	3/8	1-1/8	3	SQ	5082-375-4		5083-375-4	
3/8	3/8	1-1/8	3	.020CR	5082-375-4-020R		5083-375-4-020R	
7/16	7/16	2	4	SQ	5082-437-4		5083-437-4	
1/2	1/2	2	4	SQ	5082-500-4		5083-500-4	
1/2	1/2	2	4	.015CR	5082-500-4-015R		5083-500-4-015R	
1/2	1/2	2	4	.030CR	5082-500-4-030R		5083-500-4-030R	
1/2	1/2	2	4	.060CR	5082-500-4-060R		5083-500-4-060R	
5/8	5/8	2-1/4	5	SQ	5082-625-4		5083-625-4	
5/8	5/8	2-1/4	5	.030CR	5082-625-4-030R		5083-625-4-030R	
5/8	5/8	2-1/4	5	.060CR	5082-625-4-060R		5083-625-4-060R	
5/8	5/8	2-1/4	5	.125CR	5082-625-4-125R		5083-625-4-125R	
3/4	3/4	2-1/4	5	SQ	5082-750-4		5083-750-4	
3/4	3/4	2-1/4	5	.030CR	5082-750-4-030R		5083-750-4-030R	
3/4	3/4	2-1/4	5	.060CR	5082-750-4-060R		5083-750-4-060R	
3/4	3/4	2-1/4	5	.125CR	5082-750-4-125R		5083-750-4-125R	
1	1	2-1/4	5	SQ	5082-100-4		5083-100-4	
1	1	2-1/4	5	.030CR	5082-100-4-030R		5083-100-4-030R	
1	1	2-1/4	5	.060CR	5082-100-4-060R		5083-100-4-060R	
1	1	2-1/4	5	.125CR	5082-100-4-125R		5083-100-4-125R	



ULTRA 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		TiAlN Coated	
					4 Flute - ROUND Shank Part#	Price	4 Flute - WELDON Shank Part#	Price
3/16	3/16	1-1/8	3	SQ	5088-188-4		--	
1/4	1/4	1-1/2	4	SQ	5088-250-4		--	
5/16	5/16	1-5/8	4	SQ	5088-312-4		--	
3/8	3/8	1-3/4	4	SQ	5088-375-4		--	
1/2	1/2	3	6	SQ	5088-500-4		--	
5/8	5/8	3	6	SQ	5088-625-4		--	
3/4	3/4	3	6	SQ	5088-750-4		--	
1	1	3	6	SQ	5088-100-4		--	



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

Standard Package: All Sizes - 1 Each



ULTRA 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		TiAlN Coated	
				4 Flute - ROUND Shank Part#	Price	4 Flute - WELDON Shank Part#	Price
3/16	3/16	5/8	2	5084-188-4		--	
1/4	1/4	3/4	2-1/2	5084-250-4		5085-250-4	
5/16	5/16	13/16	2-1/2	5084-312-4		5085-312-4	
3/8	3/8	7/8	2-1/2	5084-375-4		5085-375-4	
7/16	7/16	1	2-3/4	5084-437-4		5085-437-4	
1/2	1/2	1	3	5084-500-4		5085-500-4	
5/8	5/8	1-1/4	3-1/2	5084-625-4		5085-625-4	
3/4	3/4	1-1/2	4	5084-750-4		5085-750-4	
1	1	1-1/2	4	5084-100-4		5085-100-4	



ULTRA 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		TiAlN Coated	
				4 Flute - ROUND Shank Part#	Price	4 Flute - WELDON Shank Part#	Price
3/16	3/16	3/4	2-1/2	5086-188-4		--	
1/4	1/4	1-1/8	3	5086-250-4		5087-250-4	
5/16	5/16	1-1/8	3	5086-312-4		5087-312-4	
3/8	3/8	1-1/8	3	5086-375-4		5087-375-4	
7/16	7/16	2	4	5086-437-4		5087-437-4	
1/2	1/2	2	4	5086-500-4		5087-500-4	
5/8	5/8	2-1/4	5	5086-625-4		5087-625-4	
3/4	3/4	2-1/4	5	5086-750-4		5087-750-4	
1	1	2-1/4	5	5086-100-4		5087-100-4	



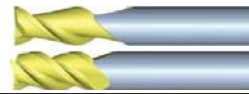
ULTRA HIGH PERFORMANCE Variable Pitch Carbide, Ball Extra Long Length, Single End							
Cutter Diam. D	Shank Diam. d	Length Of Cut l ₁	O.A.L. L	TiAlN Coated		TiAlN Coated	
				4 Flute - ROUND Shank Part#	Price	4 Flute - WELDON Shank Part#	Price
3/16	3/16	1-1/8	3	5089-188-4		--	
1/4	1/4	1-1/2	4	5089-250-4		--	
5/16	5/16	1-5/8	4	5089-312-4		--	
3/8	3/8	1-3/4	4	5089-375-4		--	
1/2	1/2	3	6	5089-500-4		--	
5/8	5/8	3	6	5089-625-4		--	
3/4	3/4	3	6	5089-750-4		--	
1	1	3	6	5089-100-4		--	



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

ULTRA HIGH PERFORMANCE

Standard Package: All Sizes - 1 Each



ULTRA HIGH PERFORMANCE Variable Pitch & Helix Carbide, Regular Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut L1	O.A.L. L	Corner Radius	Uncoated			ZrN Coated			DLC Coated		
					2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price
1/8	1/8	1/2	1-1/2	SQ	5170-125-2	5170-125-3		--	--		--	--	
3/16	3/16	5/8	2	SQ	5170-188-2	5170-188-3		5070-188-2	5070-188-3		5270-188-2	5270-188-3	
1/4	1/4	3/4	2-1/2	SQ	5170-250-2	5170-250-3		5070-250-2	5070-250-3		5270-250-2	5270-250-3	
1/4	1/4	3/4	2-1/2	.020CR	5170-250-2-020R	5170-250-3-020R		5070-250-2-020R	5070-250-3-020R		5270-250-2-020R	5270-250-3-020R	
5/16	5/16	13/16	2-1/2	SQ	5170-312-2	5170-312-3		5070-312-2	5070-312-3		5270-312-2	5270-312-3	
5/16	5/16	13/16	2-1/2	.020CR	5170-312-2-020R	5170-312-3-020R		5070-312-2-020R	5070-312-3-020R		5270-312-2-020R	5270-312-3-020R	
3/8	3/8	1	2-1/2	SQ	5170-375-2	5170-375-3		5070-375-2	5070-375-3		5270-375-2	5270-375-3	
3/8	3/8	1	2-1/2	.020CR	5170-375-2-020R	5170-375-3-020R		5070-375-2-020R	5070-375-3-020R		5270-375-2-020R	5270-375-3-020R	
1/2	1/2	1-1/4	3	SQ	5170-500-2	5170-500-3		5070-500-2	5070-500-3		5270-500-2	5270-500-3	
1/2	1/2	1-1/4	3	.030CR	5170-500-2-030R	5170-500-3-030R		5070-500-2-030R	5070-500-3-030R		5270-500-2-030R	5270-500-3-030R	
5/8	5/8	1-1/4	3-1/2	SQ	5170-625-2	5170-625-3		5070-625-2	5070-625-3		5270-625-2	5270-625-3	
5/8	5/8	1-1/4	3-1/2	.030CR	5170-625-2-030R	5170-625-3-030R		5070-625-2-030R	5070-625-3-030R		5270-625-2-030R	5270-625-3-030R	
3/4	3/4	1-1/2	4	SQ	5170-750-2	5170-750-3		5070-750-2	5070-750-3		5270-750-2	5270-750-3	
3/4	3/4	1-1/2	4	.030CR	5170-750-2-030R	5170-750-3-030R		5070-750-2-030R	5070-750-3-030R		5270-750-2-030R	5270-750-3-030R	
1	1	1-1/2	4	SQ	5170-100-2	5170-100-3		5070-100-2	5070-100-3		5270-100-2	5270-100-3	
1	1	1-1/2	4	.030CR	5170-100-2-030R	5170-100-3-030R		5070-100-2-030R	5070-100-3-030R		5270-100-2-030R	5270-100-3-030R	



ULTRA HIGH PERFORMANCE Variable Pitch & Helix Carbide, Long Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut L1	O.A.L. L	Corner Radius	Uncoated			ZrN Coated			DLC Coated		
					2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price
3/16	3/16	3/4	2-1/2	SQ	5172-188-2	5172-188-3		5072-188-2	5072-188-3		5272-188-2	5272-188-3	
1/4	1/4	1-1/8	3	SQ	5172-250-2	5172-250-3		5072-250-2	5072-250-3		5272-250-2	5272-250-3	
5/16	5/16	1-1/8	3	SQ	5172-312-2	5172-312-3		5072-312-2	5072-312-3		5272-312-2	5272-312-3	
3/8	3/8	1-1/8	3	SQ	5172-375-2	5172-375-3		5072-375-2	5072-375-3		5272-375-2	5272-375-3	
1/2	1/2	2	4	SQ	5172-500-2	5172-500-3		5072-500-2	5072-500-3		5272-500-2	5272-500-3	
5/8	5/8	2-1/4	5	SQ	5172-625-2	5172-625-3		5072-625-2	5072-625-3		5272-625-2	5272-625-3	
3/4	3/4	2-1/4	5	SQ	5172-750-2	5172-750-3		5072-750-2	5072-750-3		5272-750-2	5272-750-3	
1	1	2-1/4	5	SQ	5172-100-2	5172-100-3		5072-100-2	5072-100-3		5272-100-2	5272-100-3	



ULTRA HIGH PERFORMANCE Variable Pitch & Helix Carbide, Extra Long Length, Single End - ALUMINUM

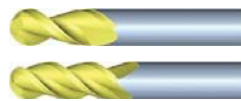
Cutter Diam. D	Shank Diam. d	Length Of Cut L1	O.A.L. L	Corner Radius	Uncoated			ZrN Coated			DLC Coated		
					2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price
3/16	3/16	1-1/8	3	SQ	5178-188-2	5178-188-3		5078-188-2	5078-188-3		5278-188-2	5278-188-3	
1/4	1/4	1-1/2	4	SQ	5178-250-2	5178-250-3		5078-250-2	5078-250-3		5278-250-2	5278-250-3	
5/16	5/16	1-5/8	4	SQ	5178-312-2	5178-312-3		5078-312-2	5078-312-3		5278-312-2	5278-312-3	
3/8	3/8	1-3/4	4	SQ	5178-375-2	5178-375-3		5078-375-2	5078-375-3		5278-375-2	5278-375-3	
1/2	1/2	3	6	SQ	5178-500-2	5178-500-3		5078-500-2	5078-500-3		5278-500-2	5278-500-3	
5/8	5/8	3	6	SQ	5178-625-2	5178-625-3		5078-625-2	5078-625-3		5278-625-2	5278-625-3	
3/4	3/4	3	6	SQ	5178-750-2	5178-750-3		5078-750-2	5078-750-3		5278-750-2	5278-750-3	
1	1	3	6	SQ	5178-100-2	5178-100-3		5078-100-2	5078-100-3		5278-100-2	5278-100-3	



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

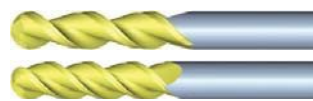
ULTRA HIGH PERFORMANCE

Standard Package: All Sizes - 1 Each



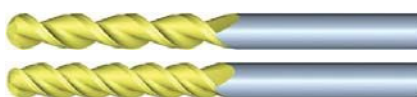
ULTRA HIGH PERFORMANCE Variable Pitch & Helix Carbide, Ball Regular Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius BN	Uncoated			ZrN Coated			DLC Coated		
					2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price
3/16	3/16	5/8	2	BN	5174-188-2	5174-188-3		5074-188-2	5074-188-3		5274-188-2	5274-188-3	
1/4	1/4	3/4	2-1/2	BN	5174-250-2	5174-250-3		5074-250-2	5074-250-3		5274-250-2	5274-250-3	
5/16	5/16	13/16	2-1/2	BN	5174-312-2	5174-312-3		5074-312-2	5074-312-3		5274-312-2	5274-312-3	
3/8	3/8	1	2-1/2	BN	5174-375-2	5174-375-3		5074-375-2	5074-375-3		5274-375-2	5274-375-3	
1/2	1/2	1-1/4	3	BN	5174-500-2	5174-500-3		5074-500-2	5074-500-3		5274-500-2	5274-500-3	
5/8	5/8	1-1/4	3-1/2	BN	5174-625-2	5174-625-3		5074-625-2	5074-625-3		5274-625-2	5274-625-3	
3/4	3/4	1-1/2	4	BN	5174-750-2	5174-750-3		5074-750-2	5074-750-3		5274-750-2	5274-750-3	
1	1	1-1/2	4	BN	5174-100-2	5174-100-3		5074-100-2	5074-100-3		5274-100-2	5274-100-3	



ULTRA HIGH PERFORMANCE Variable Pitch & Helix Carbide, Ball Long Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius BN	Uncoated			ZrN Coated			DLC Coated		
					2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price
3/16	3/16	3/4	2-1/2	BN	5176-188-2	5176-188-3		5076-188-2	5076-188-3		5276-188-2	5276-188-3	
1/4	1/4	1-1/8	3	BN	5176-250-2	5176-250-3		5076-250-2	5076-250-3		5276-250-2	5276-250-3	
5/16	5/16	1-1/8	3	BN	5176-312-2	5176-312-3		5076-312-2	5076-312-3		5276-312-2	5276-312-3	
3/8	3/8	1-1/8	3	BN	5176-375-2	5176-375-3		5076-375-2	5076-375-3		5276-375-2	5276-375-3	
1/2	1/2	2	4	BN	5176-500-2	5176-500-3		5076-500-2	5076-500-3		5276-500-2	5276-500-3	
5/8	5/8	2-1/4	5	BN	5176-625-2	5176-625-3		5076-625-2	5076-625-3		5276-625-2	5276-625-3	
3/4	3/4	2-1/4	5	BN	5176-750-2	5176-750-3		5076-750-2	5076-750-3		5276-750-2	5276-750-3	
1	1	2-1/4	5	BN	5176-100-2	5176-100-3		5076-100-2	5076-100-3		5276-100-2	5276-100-3	



ULTRA HIGH PERFORMANCE Variable Pitch & Helix Carbide, Ball Extra Long Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius BN	Uncoated			ZrN Coated			DLC Coated		
					2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price	2 Flute Part#	3 Flute Part#	Price
3/16	3/16	1-1/8	3	BN	5179-188-2	5179-188-3		5079-188-2	5079-188-3		5279-188-2	5279-188-3	
1/4	1/4	1-1/2	4	BN	5179-250-2	5179-250-3		5079-250-2	5079-250-3		5279-250-2	5279-250-3	
5/16	5/16	1-5/8	4	BN	5179-312-2	5179-312-3		5079-312-2	5079-312-3		5279-312-2	5279-312-3	
3/8	3/8	1-3/4	4	BN	5179-375-2	5179-375-3		5079-375-2	5079-375-3		5279-375-2	5279-375-3	
1/2	1/2	3	6	BN	5179-500-2	5179-500-3		5079-500-2	5079-500-3		5279-500-2	5279-500-3	
5/8	5/8	3	6	BN	5179-625-2	5179-625-3		5079-625-2	5079-625-3		5279-625-2	5279-625-3	
3/4	3/4	3	6	BN	5179-750-2	5179-750-3		5079-750-2	5079-750-3		5279-750-2	5279-750-3	
1	1	3	6	BN	5179-100-2	5179-100-3		5079-100-2	5079-100-3		5279-100-2	5279-100-3	



SPEED & FEED RECOMMENDATIONS

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		350-850	525-1275	.0020	.0025	.0025	.0030	.0030	.0035	.0040	.0060
Brass & Bronze		250-400	375-600	.0020	.0025	.0025	.0030	.0030	.0035	.0040	.0050
Graphite		500-800	500-1200	.0030	.0035	.0025	.0030	.0030	.0040	.0050	.0070
Plastics		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)		100-250	100-375	.0008	.0010	.0015	.0017	.0020	.0025	.0030	.0040
Iron, Ductile		80-400	100-600	.0010	.0012	.0015	.0017	.0020	.0030	.0040	.0060
Iron, Malleable		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		100-250	150-375	.0015	.0016	.0017	.0018	.0020	.0030	.0040	.0050
Carbon Steels Hardened to 35 Rc		130-230	130-345	.0010	.0011	.0012	.0013	.0015	.0017	.0020	.0030
Carbon Steels Hardened to 50 Rc		70-130	70-160	.0007	.0007	.0008	.0009	.0010	.0015	.0020	.0030
Carbon Steels Hardened to 60 Rc		30-70	30-90	.0005	.0006	.0007	.0009	.0010	.0012	.0015	.0020
Steels, Mold		200-350	300-525	.0010	.0012	.0015	.0017	.0020	.0025	.0030	.0040
Steels, Tool		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		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		125-300	125-375	.0010	.0012	.0015	.0017	.0020	.0030	.0040	.0060
Titanium, Hard		50-150	50-175	.0005	.0006	.0007	.0008	.0010	.0015	.0020	.0020
Nickel Based High Temp Alloys		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

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

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

