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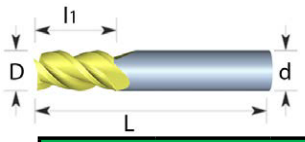
P		Steel
M		Stainless Steel
K		Cast Iron
N	●	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel

● BEST

UHP - Aluminum Medium/Rougher

- Special **36 Degree Helix** Design with Cylindrical Margin
- 3 Flute Variable Pitch & Special Core Design with Chipbreaker Flute Geometries, with High Polished finish
- Ultra High Performance Micrograin Carbide
- Diameter (D) Tolerance: +0.0000"/-0.0004"
- Shank (d) Tolerance: +0.0000"/-0.0004"



ULTRA HIGH PERFORMANCE 3Flute Medium/Roughing - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Corner Radius	Uncoated 3 Flute Part#	Uncoated 3 Flute Chipbreaker Part#	ZrN Coated 3 Flute Part#	ZrN Coated 3 Flute Chipbreaker Part#
1/4	1/4	3/4	2-1/2	SQ	370-250-3	--	470-250-3	--
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

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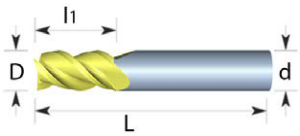
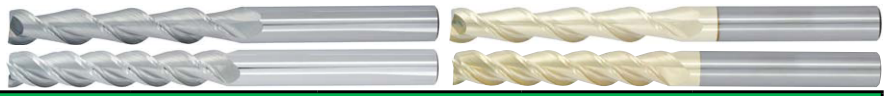


ULTRA HIGH PERFORMANCE Medium/Finishing, Regular Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#	DLC Coated 2 Flute Part#	DLC Coated 3 Flute Part#
1/8	1/8	1/2	1-1/2	SQ	170-125-2	170-125-3	--	--	--	--
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#	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#
3/16	3/16	3/4	2-1/2	SQ	172-188-2	172-188-3	072-188-2	072-188-3
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#	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#
3/16	3/16	1-1/8	3	SQ	178-188-2	178-188-3	078-188-2	078-188-3
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

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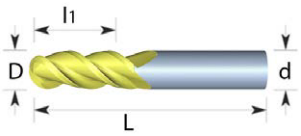
● BEST



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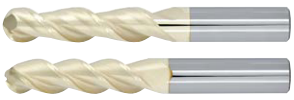
- Shank (d) Tolerance: +0.0000"/-0.0004"

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

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#
3/16	3/16	5/8	2	BN	174-188-2	174-188-3	074-188-2	074-188-3
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 Nose, Long Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#
3/16	3/16	3/4	2-1/2	BN	176-188-2	176-188-3	076-188-2	076-188-3
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

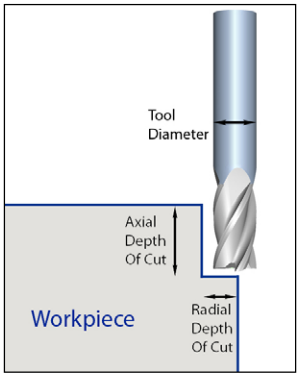
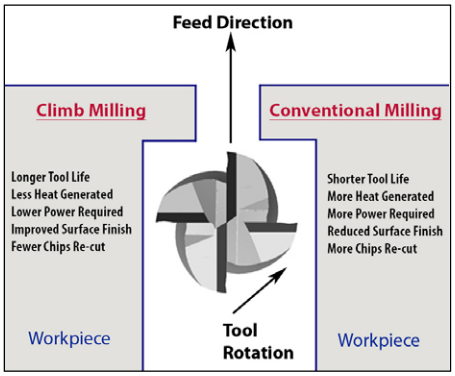
ULTRA HIGH PERFORMANCE Medium/Finishing, Ball Nose, Extra Long Length, Single End - ALUMINUM

Cutter Diam. D	Shank Diam. d	Length Of Cut l_1	O.A.L. L	Corner Radius	Uncoated 2 Flute Part#	Uncoated 3 Flute Part#	ZrN Coated 2 Flute Part#	ZrN Coated 3 Flute Part#
3/16	3/16	1-1/8	3	BN	179-188-2	179-188-3	079-188-2	079-188-3
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

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

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

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