



3-Flute, High Performance Endmills, 45 Degree Helix

- RedLine 3-flute 45° lead tools are recommended for slotting and profiling of stainless steel and other similar alloys. This tool is designed to run at higher speeds and feeds while producing excellent part finishes.
- These High Performance tools can be found on page 42.

3-Flute 45° Speeds & Feeds

Material	Grades	SFM		Feed by Endmill Diameter (IPT)						
		SFM	SFM	1/8	1/4	3/8	1/2	5/8	3/4	1
		Uncoated	AlTiN	(.1250)	(.2500)	(.3750)	(.5000)	(.6250)	(.7500)	(1.000)
P - Steels										
High Strength Tool Steel	A2, D2, P20, H11, H13, S2, 01	225-300	315-420	.0005-.0010	.0008-.0010	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040
High Strength Tool Steel > 32 HRC		135-180	190-250	.0003-.0005	.0004-.0005	.0005-.0008	.0010-.0015	.0012-.0015	.0015-.0020	.0020-.0030
Low Carbon	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	250-350	350-490	.0007-.0015	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040	.0040-.0050
Low Carbon > 32 HRC	Reduce SFM by 40%	150-210	210-290	.0005-.0010	.0008-.0010	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040
Medium Carbon	1040-1095, 1140-1151, 1330-1345, 1520-1572, 4023-4063, 4120-4161, 4330-4340, 4620-4640, 8620-8660, 8740-8750, 6150, 51000, 52100	250-350	350-490	.0007-.0015	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040	.0040-.0050
Medium Carbon > 32 HRC	Reduce SFM by 40%	150-210	210-290	.0005-.0010	.0008-.0010	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040
M - Stainless Steels										
Austenitic	301-304L, 310, 316L, 321, 347	250-350	350-490	.0005-.0010	.0008-.0010	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040
Austenitic > 32 HRC		190-260	265-360	.0003-.0005	.0004-.0005	.0005-.0008	.0010-.0015	.0012-.0015	.0015-.0020	.0020-.0030
Martensitic	403, 410, 416, 420, 430, 431, 440	200-350	280-490	.0005-.0010	.0008-.0010	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040
Martensitic > 32 HRC		150-260	210-360	.0003-.0005	.0004-.0005	.0005-.0008	.0010-.0015	.0012-.0015	.0015-.0020	.0020-.0030
Precipitation Hardening	12/8, 15/5, 17/4, AM-350/355/363, PH13-8MO, PH14-8/MO	200-350	280-490	.0005-.0010	.0008-.0010	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040
Precipitation Hardening > 32 HRC		150-260	210-360	.0003-.0005	.0004-.0005	.0005-.0008	.0010-.0015	.0012-.0015	.0015-.0020	.0020-.0030
K - Cast Irons										
Ductile	A536, J434, 60-40-18	300-400	420-560	.0010-.0020	.0010-.0015	.0015-.0020	.0020-.0035	.0035-.0050	.0050-.0070	.0070-.0100
Gray	A48, A436, A319, Class 20, G4000	350-450	490-630	.0010-.0020	.0010-.0015	.0015-.0020	.0020-.0035	.0035-.0050	.0050-.0070	.0070-.0100
Malleable	A220, A602, J158	490-630	680-740	.0010-.0020	.0010-.0015	.0015-.0020	.0020-.0035	.0035-.0050	.0050-.0070	.0070-.0100
N - Non-Ferrous										
Aluminum Alloys	2014, 2024, 6061, 7075	> 500	>700	.0010-.0020	.0010-.0015	.0015-.0020	.0020-.0040	.0050-.0080	.0090-.0110	.0110-.0150
Aluminum High Silicon	A380, A390	450	630	.0010-.0020	.0010-.0015	.0015-.0020	.0020-.0040	.0050-.0080	.0090-.0110	.0110-.0150
Brass/Bronze	Aluminum Bronze, Low Silicon Bronze	300-400	420-560	.0007-.0015	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0040	.0040-.0080	.0070-.0100
Composites		250-1000	350-1400	.0007-.0012	.0010-.0015	.0015-.0020	.0020-.0035	.0035-.0050	.0050-.0070	.0070-.0100
Copper		400-500	560-700	.0007-.0015	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0040	.0040-.0080	.0070-.0100
Magnesium	G-10, Fiberglass, Graphite, Graphite Epoxy, Plastics	> 500	>700	.0010-.0020	.0010-.0015	.0015-.0020	.0020-.0035	.0035-.0050	.0050-.0070	.0070-.0100
S - High Temp Alloys										
Cobalt Base	Stellite, HS-21, Haynes 25/188, X40, L605	200-275	280-385	.0005-.0010	.0008-.0010	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040
Cobalt Base > 32 HRC		130-180	180-250	.0003-.0005	.0004-.0005	.0005-.0008	.0010-.0015	.0012-.0015	.0015-.0020	.0020-.0030
Iron Base	Incoloy 800-802, Multimet N-155 Timkin 16-25-6, Carpenter 22-b3	250-300	350-420	.0005-.0010	.0008-.0010	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040
Iron Base > 32 HRC		150-180	210-250	.0003-.0005	.0004-.0005	.0005-.0008	.0010-.0015	.0012-.0015	.0015-.0020	.0020-.0030
Nickel Base	Inconel 625/718, Inco 700, 713C, 718, Monel 400-401, 404, K401, Rene, Rene 41 & 95 Hastelloy, Waspoly, Udimet 500 & 700	150-200	210-280	.0005-.0010	.0008-.0010	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040
Nickel Base >32 HRC		90-120	125-165	.0003-.0005	.0004-.0005	.0005-.0008	.0010-.0015	.0012-.0015	.0015-.0020	.0020-.0030
Titanium	Commercially Pure, 6Al-4V, ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si, Ti-8Al-1Mo, Ti-8Al-4Mo	250-400	350-560	.0007-.0015	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0040	.0040-.0050

NOTE: Speeds and Feeds listed are estimated and will vary by application.