

**General Purpose 3 & 4-Flute Long Reach Micro Endmills Speeds & Feeds**

Material	Grades	Cut Type	Axial DOC	Radial DOC	SFM	SFM	Feed by Endmill Diameter (IPT)						
					Uncoated	AlTiN	.0150	.0300	.0450	.0600	.0750	.0900	.1000
<b>P - Steels</b>													
High Strength Tool Steel	A2, D2, P20, H11, H13, S2, 01	Slotting	.2 x D	.2 x D	130	195	.00004	.00008	.00008	.00012	.00016	.00020	.00024
		Finish	.2 x D	.3 x D	130	195	.00003	.00006	.00006	.00009	.00012	.00015	.00018
Low Carbon	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012	Slotting	.2 x D	.2 x D	195	400	.00020	.00020	.00030	.00030	.00040	.00050	.00060
		Finish	.2 x D	.3 x D	195	400	.00015	.00015	.00023	.00023	.00030	.00038	.00045
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	Slotting	.2 x D	.2 x D	195	260	.00030	.00030	.00040	.00050	.00060	.00070	.00080
		Finish	.2 x D	.3 x D	195	260	.00023	.00023	.00030	.00038	.00045	.00053	.00060
<b>M - Stainless Steels</b>													
Austenitic	301-304L, 310, 316L, 321, 347	Slotting	.2 x D	.2 x D	80	145	.00004	.00008	.00008	.00012	.00016	.00020	.00024
		Finish	.2 x D	.3 x D	80	145	.00004	.00008	.00008	.00012	.00016	.00020	.00024
Martensitic	403, 410, 416, 420, 430, 431, 440	Slotting	.2 x D	.2 x D	80	145	.00004	.00008	.00008	.00012	.00016	.00020	.00024
		Finish	.2 x D	.3 x D	80	145	.00004	.00008	.00008	.00012	.00016	.00020	.00024
Precipitation Hardening	12/8, 15/5, 17/4, AM-350/355/363, PH13-8MO, PH14-8/MO	Slotting	.2 x D	.2 x D	80	145	.00004	.00008	.00008	.00012	.00016	.00020	.00024
		Finish	.2 x D	.3 x D	80	145	.00004	.00008	.00008	.00012	.00016	.00020	.00024
<b>K - Cast Irons</b>													
Ductile	A536, J434, 60-40-18	Slotting	.2 x D	.2 x D	195	260	.00040	.00080	.00100	.00120	.00160	.00200	.00230
		Finish	.2 x D	.3 x D	195	260	.00012	.00024	.00030	.00036	.00048	.00060	.00069
Gray	A48, A436, A319, Class 20, G4000	Slotting	.2 x D	.2 x D	195	260	.00040	.00080	.00100	.00120	.00160	.00200	.00230
		Finish	.2 x D	.3 x D	195	260	.00012	.00024	.00030	.00036	.00048	.00060	.00069
Malleable	A220, A602, J158	Slotting	.2 x D	.2 x D	195	260	.00040	.00080	.00100	.00120	.00160	.00200	.00230
		Finish	.2 x D	.3 x D	195	260	.00012	.00024	.00030	.00036	.00048	.00060	.00069
<b>N - Non-Ferrous</b>													
Aluminum Alloys	2014, 2024, 6061, 7075	Slotting	.2 x D	.2 x D	490	N/A	.00020	.00030	.00050	.00070	.00090	.00110	.00130
		Finish	.2 x D	.3 x D	490	N/A	.00003	.00005	.00009	.00012	.00015	.00019	.00022
Aluminum High Silicon	A380, A390	Slotting	.2 x D	.2 x D	490	N/A	.00020	.00030	.00050	.00070	.00090	.00110	.00130
		Finish	.2 x D	.3 x D	490	N/A	.00003	.00005	.00009	.00012	.00015	.00019	.00022
Brass/Bronze	Aluminum Bronze, Low Silicon Bronze	Slotting	.2 x D	.2 x D	365	400	.00020	.00030	.00040	.00050	.00060	.00070	.00080
		Finish	.2 x D	.3 x D	365	400	.00013	.00020	.00026	.00033	.00039	.00046	.00052
Composites	G-10, Fiberglass, Graphite, Graphite Epoxy, Plastics	Slotting	.2 x D	.2 x D	260	N/A	.00010	.00020	.00030	.00040	.00040	.00050	.00050
		Finish	.2 x D	.3 x D	260	N/A	.00010	.00020	.00030	.00040	.00040	.00050	.00050
Copper		Slotting	.2 x D	.2 x D	400	500	.00020	.00030	.00040	.00050	.00060	.00070	.00080
		Finish	.2 x D	.3 x D	400	500	.00020	.00030	.00040	.00050	.00060	.00070	.00080
Magnesium		Slotting	.2 x D	.2 x D	800	800	.00020	.00030	.00040	.00050	.00060	.00070	.00080
		Finish	.2 x D	.3 x D	800	800	.00020	.00030	.00040	.00050	.00060	.00070	.00080
<b>S - High Temp Alloys</b>													
Cobalt Base	Stellite, HS-21, Haynes 25/188, X40, L605	Slotting	.2 x D	.2 x D	N/A	80	.00006	.00008	.00008	.00012	.00012	.00015	.00024
		Finish	.2 x D	.3 x D	N/A	80	.00003	.00004	.00004	.00006	.00006	.00008	.00012
Iron Base	Incoloy 800-802, Multmet N-155, Timkin 16-25-6, Carpenter 22-b3	Slotting	.2 x D	.2 x D	N/A	300	.00010	.00020	.00030	.00040	.00050	.00060	.00070
		Finish	.2 x D	.3 x D	N/A	300	.00005	.00010	.00015	.00020	.00025	.00030	.00035
Nickel Base	Inconel 625/718, Inco 700, 713C, 718, Monel 400-401, 404, K401, Rene, Rene 41 & 95 Hastelloy, Waspoly, Udimet 500 & 700	Slotting	.2 x D	.2 x D	N/A	80	.00006	.00008	.00008	.00012	.00012	.00015	.00024
		Finish	.2 x D	.3 x D	N/A	80	.00003	.00004	.00004	.00006	.00006	.00008	.00012
Titanium	Commercially Pure, 6Al-4V ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si, Ti-8Al-1Mo, Ti-8Al-4Mo	Slotting	.2 x D	.2 x D	N/A	80	.00004	.00008	.00008	.00012	.00016	.00020	.00024
		Finish	.2 x D	.3 x D	N/A	80	.00003	.00006	.00006	.00009	.00012	.00015	.00018

**D = tool diameter. Reduce feed rates by 20% when using long length tools. Starting parameters shown. NOTE: Speeds and Feeds listed are estimated and will vary by application.**

These General Purpose tools can be found on pages 118-133, 139-140 & 180.