

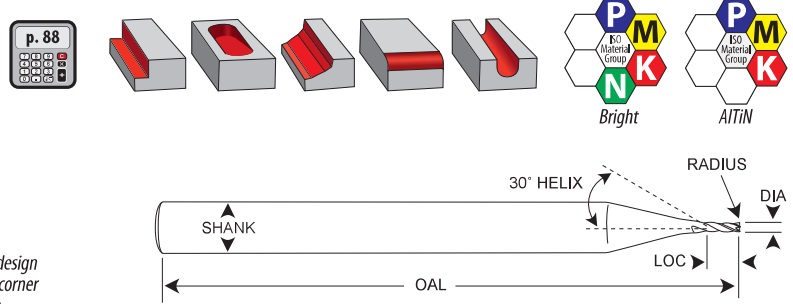
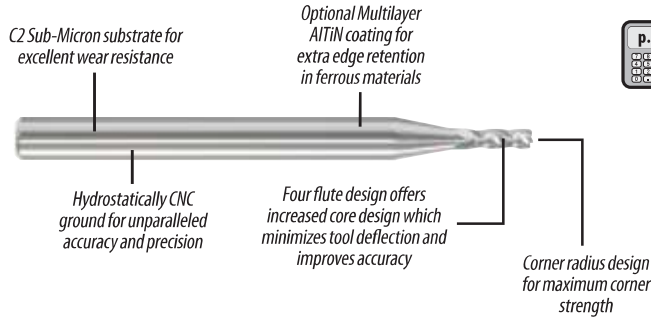


**MILLING RECOMMENDATIONS - GP MINIATURE ENDMILLS**

PROFILING 		Surface Feet Per Minute (SFM) Radial Depth of Cut (RDOC)		Inches Per Tooth (IPT)									
				Inches Per Tooth (IPT)									
Workpiece Material Group		Hardness	SFM	Cutting Diameter									
				0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	
Steels	Free Machining & Low Carbon: 10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	P	≤ 28 Rc	400									
	Medium/High Carbon Steels, Alloy Steels & Easy to Machine Tool: 13XX, 41XX, 43XX, 51XX, 86XX, 93XX	P	28-38 Rc	300	0.00007	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00081	0.00100
Tool & Die Steels	A2, H13, L6, P20, S7	P	28-44 Rc	200									
Stainless Steel	Easy to Machine, 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	M	≤ 28 Rc	400									
	Moderately Difficult to Machine, Nitronic 50, Nitronic 60, 301, 303, 304, 304L Incoloy 27-7MO, 316, 316L, 321, 347	M	≤ 28 Rc	200	0.00007	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00081	0.00100
	Difficult to Machine, 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	M	> 28 Rc	150									
Super Alloys	High Temp, Nimonic, Inconel, Monel, Hastelloy	S	≤ 42 Rc	70	0.00004	0.00008	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00080
	Titanium: Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al	S	≤ 42 Rc	150									
Hardened Materials		H	45-55 Rc	100	0.00010	0.00030	0.00050	0.00140	0.00180	0.00210	0.00300	0.00360	0.00420
Cast-Iron	Gray: SAE J431, ASTM A48	K	160-200 HB	400	0.00007	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00081	0.00100
	Ductile & Malleable, ASTM A536, ASTM 897, ASTM A47, ASTM A220, ASTM A602	K	200-250 HB	250									
Non-Ferrous	Aluminum, Brass, Bronze, Copper, Plastics, Graphite	N		100	0.00004	0.00008	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00080

SLOTTING 		Surface Feet Per Minute (SFM) Radial Depth of Cut (RDOC)		Inches Per Tooth (IPT)									
				Inches Per Tooth (IPT)									
Workpiece Material Group		Hardness	SFM	Cutting Diameter									
				0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	
Steels	Free Machining & Low Carbon: 10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	P	≤ 28 Rc	400				0.0003	0.0004	0.0005	0.0007	0.0010	
	Medium/High Carbon Steels, Alloy Steels & Easy to Machine Tool: 13XX, 41XX, 43XX, 51XX, 86XX, 93XX	P	28-38 Rc	300	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0007	0.0009
Tool & Die Steels	A2, H13, L6, P20, S7	P	28-44 Rc	200				0.0002	0.0003	0.0004	0.0006	0.0008	
Stainless Steel	Easy to Machine, 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	M	≤ 28 Rc	400			0.0002	0.0002	0.0003	0.0004	0.0005	0.0007	0.0010
	Moderately Difficult to Machine, Nitronic 50, Nitronic 60, 301, 303, 304, 304L Incoloy 27-7MO, 316, 316L, 321, 347	M	≤ 28 Rc	200	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0007	0.0009
	Difficult to Machine, 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	M	> 28 Rc	150			0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005
Super Alloys	High Temp, Nimonic, Inconel, Monel, Hastelloy	S	≤ 42 Rc	70	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005
	Titanium: Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al	S	≤ 42 Rc	150									
Hardened Materials		H	35-45 Rc	100	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004
Cast-Iron	Gray: SAE J431, ASTM A48	K	160-200 HB	400	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0007	0.0010
	Ductile & Malleable, ASTM A536, ASTM 897, ASTM A47, ASTM A220, ASTM A602	K	200-250 HB	250					0.0003	0.0004	0.0007	0.0009	
Non-Ferrous	Aluminum, Brass, Bronze, Copper, Plastics, Graphite	N		750	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0011	0.0017	0.0022

# 4 FLUTE CORNER RADIUS



ALL SHANK DIAMETERS = 0.125"      ALL OAL = 1.500"  
 DIA TOLERANCE: ±0.0005"      LOC TOLERANCE: +0.0000 / +0.0120"      SHANK TOLERANCE: +0.0000/-0.0003"

DIA	LOC	Length	Corner Radius	Bright	AITIN
0.010	0.015	Stub	.002	250-6401002	250-6401002B
	0.030	Regular	.002	250-5401002	250-5401002B
0.015	0.023	Stub	.002	250-6401502	250-6401502B
	0.045	Regular	.002	250-5401502	250-5401502B
0.020	0.030	Stub	.005	250-6402005	250-6402005B
	0.060	Regular	.005	250-5402005	250-5402005B
0.025	0.038	Stub	.005	250-6402505	250-6402505B
	0.075	Regular	.005	250-5402505	250-5402505B
0.030	0.045	Stub	.005	250-6403005	250-6403005B
		Regular	.010	250-6403010	250-6403010B
	0.090	Regular	.005	250-5403005	250-5403005B
0.031	0.047	Stub	.010	250-6403105	250-6403105B
		Regular	.005	250-5403105	250-5403105B
	0.093	Regular	.010	250-5403110	250-5403110B
0.035	0.053	Stub	.005	250-6403505	250-6403505B
		Regular	.010	250-6403510	250-6403510B
	0.105	Regular	.005	250-5403505	250-5403505B
0.040	0.060	Stub	.010	250-6404005	250-6404005B
		Regular	.005	250-5404005	250-5404005B
	0.120	Regular	.010	250-5404010	250-5404010B
0.045	0.068	Stub	.005	250-6404505	250-6404505B
		Regular	.010	250-6404510	250-6404510B
	0.135	Stub	.015	250-6404515	250-6404515B
		Regular	.005	250-5404505	250-5404505B
		Regular	.010	250-5404510	250-5404510B
0.047	0.071	Stub	.015	250-6404705	250-6404705B
		Regular	.010	250-5404705	250-5404705B
	0.141	Stub	.015	250-6404710	250-6404710B
		Regular	.005	250-5404705	250-5404705B
		Regular	.010	250-5404710	250-5404710B
0.050	0.075	Stub	.015	250-6404715	250-6404715B
		Regular	.005	250-5404705	250-5404705B
	0.150	Stub	.005	250-6405005	250-6405005B
		Regular	.010	250-6405010	250-6405010B
		Regular	.015	250-5405015	250-5405015B

4 FLUTE - RADIUS CONTINUED

ALL SHANK DIAMETERS = 0.125" ALL OAL = 1.500"

DIA	LOC	Length	Corner Radius	Bright	AlTiN
0.055	0.083	Stub	.005	250-6405505	250-6405505B
			.010	250-6405510	250-6405510B
			.015	250-6405515	250-6405515B
	0.165	Regular	.005	250-5405505	250-5405505B
			.010	250-5405510	250-5405510B
			.015	250-5405515	250-5405515B
0.060	0.090	Stub	.005	250-6406005	250-6406005B
			.010	250-6406010	250-6406010B
			.015	250-6406015	250-6406015B
	0.180	Regular	.005	250-5406005	250-5406005B
			.010	250-5406010	250-5406010B
			.015	250-5406015	250-5406015B
0.062	0.093	Stub	.005	250-6406205	250-6406205B
			.010	250-6406210	250-6406210B
			.015	250-6406215	250-6406215B
	0.186	Regular	.005	250-5406205	250-5406205B
			.010	250-5406210	250-5406210B
			.015	250-5406215	250-5406215B
0.065	0.098	Stub	.005	250-6406505	250-6406505B
			.010	250-6406510	250-6406510B
			.015	250-6406515	250-6406515B
	0.195	Regular	.005	250-5406505	250-5406505B
			.010	250-5406510	250-5406510B
			.015	250-5406515	250-5406515B
0.070	0.105	Stub	.005	250-6407005	250-6407005B
			.010	250-6407010	250-6407010B
			.015	250-6407015	250-6407015B
	0.210	Regular	.005	250-5407005	250-5407005B
			.010	250-5407010	250-5407010B
			.015	250-5407015	250-5407015B
0.075	0.113	Stub	.005	250-6407505	250-6407505B
			.010	250-6407510	250-6407510B
			.015	250-6407515	250-6407515B
	0.225	Regular	.005	250-5407505	250-5407505B
			.010	250-5407510	250-5407510B
			.015	250-5407515	250-5407515B
0.078	0.117	Stub	.005	250-6407805	250-6407805B
			.010	250-6407810	250-6407810B
			.015	250-6407815	250-6407815B
	0.234	Regular	.005	250-5407805	250-5407805B
			.010	250-5407810	250-5407810B
			.015	250-5407815	250-5407815B
0.080	0.120	Stub	.005	250-6408005	250-6408005B
			.010	250-6408010	250-6408010B
			.015	250-6408015	250-6408015B
	0.240	Regular	.005	250-5408005	250-5408005B
			.010	250-5408010	250-5408010B
			.015	250-5408015	250-5408015B
0.085	0.128	Stub	.005	250-6408505	250-6408505B
			.010	250-6408510	250-6408510B
			.015	250-6408515	250-6408515B
	0.255	Regular	.005	250-5408505	250-5408505B
			.010	250-5408510	250-5408510B
			.015	250-5408515	250-5408515B

4 FLUTE - RADIUS CONTINUED

ALL SHANK DIAMETERS = 0.125" ALL OAL = 1.500"

DIA	LOC	Length	Corner Radius	Bright	AlTiN
0.090	0.135	Stub	.005	250-6409005	250-6409005B
			.010	250-6409010	250-6409010B
			.015	250-6409015	250-6409015B
	0.270	Regular	.005	250-5409005	250-5409005B
			.010	250-5409010	250-5409010B
			.015	250-5409015	250-5409015B
0.093	0.140	Stub	.005	250-6409305	250-6409305B
			.010	250-6409310	250-6409310B
			.015	250-6409315	250-6409315B
	0.279	Regular	.005	250-5409305	250-5409305B
			.010	250-5409310	250-5409310B
			.015	250-5409315	250-5409315B
0.095	0.143	Stub	.005	250-6409505	250-6409505B
			.010	250-6409510	250-6409510B
			.015	250-6409515	250-6409515B
	0.285	Regular	.005	250-5409505	250-5409505B
			.010	250-5409510	250-5409510B
			.015	250-5409515	250-5409515B
0.100	0.150	Stub	.005	250-6410005	250-6410005B
			.010	250-6410010	250-6410010B
			.015	250-6410015	250-6410015B
	0.300	Regular	.005	250-5410005	250-5410005B
			.010	250-5410010	250-5410010B
			.015	250-5410015	250-5410015B
0.105	0.158	Stub	.010	250-6410510	250-6410510B
			.015	250-6410515	250-6410515B
			.020	250-6410520	250-6410520B
	0.315	Regular	.010	250-5410510	250-5410510B
			.015	250-5410515	250-5410515B
			.020	250-5410520	250-5410520B
0.110	0.165	Stub	.010	250-6411010	250-6411010B
			.015	250-6411015	250-6411015B
			.020	250-6411020	250-6411020B
	0.330	Regular	.010	250-5411010	250-5411010B
			.015	250-5411015	250-5411015B
			.020	250-5411020	250-5411020B
0.115	0.173	Stub	.010	250-6411510	250-6411510B
			.015	250-6411515	250-6411515B
			.020	250-6411520	250-6411520B
	0.345	Regular	.010	250-5411510	250-5411510B
			.015	250-5411515	250-5411515B
			.020	250-5411520	250-5411520B
0.120	0.180	Stub	.010	250-6412010	250-6412010B
			.015	250-6412015	250-6412015B
			.020	250-6412020	250-6412020B
	0.360	Regular	.010	250-5412010	250-5412010B
			.015	250-5412015	250-5412015B
			.020	250-5412020	250-5412020B