

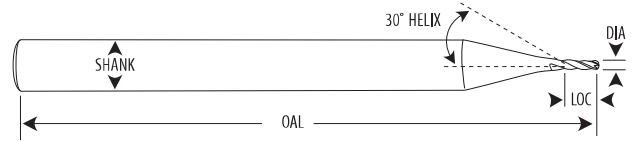
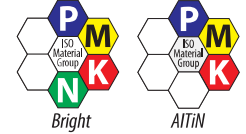
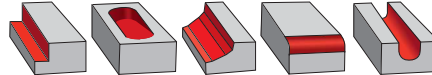
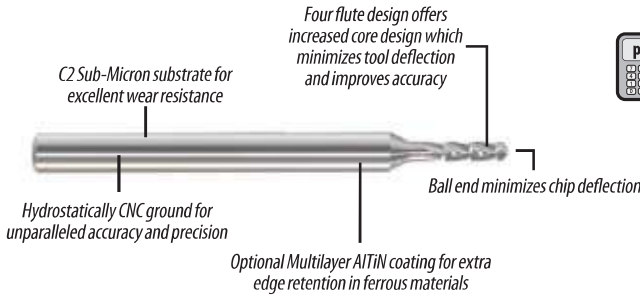


**MILLING RECOMMENDATIONS - GP MINIATURE ENDMILLS**

PROFILING 		Surface Feet Per Minute (SFM) Radial Depth of Cut (RDOC)		Inches Per Tooth (IPT)									
				Cutting Diameter									
Workpiece Material Group		Hardness	SFM	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)									
				Cutting Diameter									
Workpiece Material Group		Hardness	SFM	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 BALLNOSE



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	Bright	AlTiN
0.010	0.015	Stub	250-370150	250-370150B
	0.030	Regular	250-340010	250-340010B
0.011	0.033	Regular	250-340011	250-340011B
0.012	0.036	Regular	250-340012	250-340012B
0.013	0.039	Regular	250-340013	250-340013B
0.014	0.042	Regular	250-340014	250-340014B
0.015	0.023	Stub	250-370200	250-370200B
	0.045	Regular	250-340015	250-340015B
0.016	0.048	Regular	250-340016	250-340016B
0.017	0.051	Regular	250-340017	250-340017B
0.018	0.054	Regular	250-340018	250-340018B
0.019	0.057	Regular	250-340019	250-340019B
0.020	0.030	Stub	250-370250	250-370250B
	0.060	Regular	250-340020	250-340020B
0.021	0.063	Regular	250-340021	250-340021B
0.022	0.066	Regular	250-340022	250-340022B
0.023	0.069	Regular	250-340023	250-340023B
0.024	0.072	Regular	250-340024	250-340024B
0.025	0.038	Stub	250-370300	250-370300B
	0.075	Regular	250-340025	250-340025B
0.026	0.078	Regular	250-340026	250-340026B
0.027	0.081	Regular	250-340027	250-340027B
0.028	0.084	Regular	250-340028	250-340028B
0.029	0.087	Regular	250-340029	250-340029B
0.030	0.045	Stub	250-370350	250-370350B
	0.090	Regular	250-340030	250-340030B
0.031	0.093	Regular	250-340031	250-340031B
0.032	0.096	Regular	250-340032	250-340032B
0.033	0.099	Regular	250-340033	250-340033B
0.034	0.102	Regular	250-340034	250-340034B
0.035	0.053	Stub	250-370400	250-370400B
	0.105	Regular	250-340035	250-340035B
0.036	0.108	Regular	250-340036	250-340036B
0.037	0.111	Regular	250-340037	250-340037B
0.038	0.114	Regular	250-340038	250-340038B

4 FLUTE - BALLNOSE CONTINUED

ALL SHANK DIAMETERS = 0.125"

ALL OAL = 1.500"

DIA	LOC	Length	Bright	AlTiN
0.039	0.117	Regular	250-340039	250-340039B
	0.060	Stub	250-370450	250-370450B
0.040	0.120	Regular	250-340040	250-340040B
	0.123	Regular	250-340041	250-340041B
0.041	0.123	Regular	250-340041	250-340041B
0.042	0.126	Regular	250-340042	250-340042B
0.043	0.129	Regular	250-340043	250-340043B
0.044	0.132	Regular	250-340044	250-340044B
0.045	0.068	Stub	250-370500	250-370500B
	0.135	Regular	250-340045	250-340045B
0.046	0.138	Regular	250-340046	250-340046B
0.047	0.141	Regular	250-340047	250-340047B
0.048	0.144	Regular	250-340048	250-340048B
0.049	0.147	Regular	250-340049	250-340049B
0.050	0.075	Stub	250-370550	250-370550B
	0.150	Regular	250-340050	250-340050B
0.051	0.153	Regular	250-340051	250-340051B
0.052	0.156	Regular	250-340052	250-340052B
0.053	0.159	Regular	250-340053	250-340053B
0.054	0.162	Regular	250-340054	250-340054B
0.055	0.083	Stub	250-370600	250-370600B
	0.165	Regular	250-340055	250-340055B
0.056	0.168	Regular	250-340056	250-340056B
0.057	0.171	Regular	250-340057	250-340057B
0.058	0.174	Regular	250-340058	250-340058B
0.059	0.177	Regular	250-340059	250-340059B
0.060	0.090	Stub	250-370620	250-370620B
	0.180	Regular	250-340060	250-340060B
0.061	0.183	Regular	250-340061	250-340061B
0.062	0.186	Regular	250-340062	250-340062B
0.063	0.189	Regular	250-340063	250-340063B
0.064	0.192	Regular	250-340064	250-340064B
0.065	0.098	Stub	250-370640	250-370640B
	0.195	Regular	250-340065	250-340065B
0.070	0.105	Stub	250-370660	250-370660B
	0.210	Regular	250-340070	250-340070B
0.075	0.113	Stub	250-370680	250-370680B
	0.225	Regular	250-340075	250-340075B
0.080	0.120	Stub	250-370700	250-370700B
	0.240	Regular	250-340080	250-340080B
0.085	0.128	Stub	250-370720	250-370720B
	0.255	Regular	250-340085	250-340085B
0.090	0.135	Stub	250-370740	250-370740B
	0.270	Regular	250-340090	250-340090B
0.095	0.143	Stub	250-370760	250-370760B
	0.285	Regular	250-340095	250-340095B

MICRO DECIMAL ENDMILLS

**4 FLUTE - BALLNOSE** CONTINUED

ALL SHANK DIAMETERS = 0.125"

ALL OAL = 1.500"

DIA	LOC	Length	Bright	AlTiN
0.100	0.150	Stub	250-370780	250-370780B
	0.300	Regular	250-340100	250-340100B
0.105	0.158	Stub	250-370800	250-370800B
	0.315	Regular	250-340105	250-340105B
0.110	0.165	Stub	250-370820	250-370820B
	0.330	Regular	250-340110	250-340110B
0.115	0.173	Stub	250-370840	250-370840B
	0.345	Regular	250-340115	250-340115B
0.120	0.180	Stub	250-370860	250-370860B
	0.360	Regular	250-340120	250-340120B