MILLING RECOMMENDATIONS - GENERAL PURPOSE ENDMILLS

PROFILING

Surface Feet Per Minute (SFM)
Radial Depth of Cut (RDOC)
Inches Per Tooth (IPT)

Workpiece Material Group			Hardness	SFM based on RDOC: Cutting Diameter Engaged 5%	10%	20%	30%	50%	IPT* (BASELINE): Cutting Diameter 5/16	3/8	1/2	5/8	3/4	1
Steels	Free Machining & Low Carbon: 10XX, 11XX, 12XX 12LXX, ASTM A27 ASTM A36	P	≤ 28 Rc	1050	700	385	375	350	0.0027	0.0032	0.0045	0.0054	0.0063	0.0090
	Medium Carbon, High Carbon Steels, Alloy Steels & Easy to Machine Tool: 13XX, 41XX, 43XX 51XX, 86XX, 93XX	P	28 - 38 Rc	630	420	320	250	210						
Tool & Die Steels	A2, H13, L6, P20, S7	P	28 - 44 Rc	525	350	300	275	250	0.0027	0.0032	0.0045	0.0054	0.0063	0.0090
Stainless Steel	Easy to Machine, 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	M	≤ 28 Rc	650	600	550	500	450	0.0027	0.0032	0.0045	0.0054	0.0063	0.0090
	Moderately Difficult to Machine, Nitronic 50, Nitronic 60 , 301, 303 304, 304L Incoloy 27-7MO, 316 316L, 321, 347	M	≤ 28 Rc	525	400	350	300	250						
	Difficult to Machine, 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	M	> 28 Rc	525	400	350	300	250						
Super Alloys	High Temp, Nimonics, Inconel, Monel, Hastelloy	S	≤ 42 Rc	265	200	175	150	100	0.0014	0.0016	0.0023	0.0027	0.0032	0.0045
	Titanium: Ti 3Al-2.5V, Ti 6Al-4V Ti 10V-2Fe-3Al	S	≤ 42 Rc	230	200	175	150	125						
Hardened Materials		H	45-55 Rc	250	240	230	210	200	0.0018	0.0021	0.0030	0.0036	0.0042	0.0060
			55-65 Rc	200	180	160	150	100	0.0013	0.0014	0.0021	0.0024	0.0029	0.0041
Cast-Iron	Gray: SAE J431, ASTM A48	K	≤ 240 HB	425	400	375	350	300	0.0027	0.0032	0.0045	0.0054	0.0063	0.0090
	Ductile & Malleable: ASTM A536, ASTM 897, ASTM A47, ASTM A220 ASTM A602	K	> 240 HB	320	300	250	225	200						
Non-Ferrous	Aluminum, Brass, Bronze, Copper, Plastics, Graphite	N		1000	960	920	880	840	0.0027	0.0032	0.0045	0.0054	0.0063	0.0090

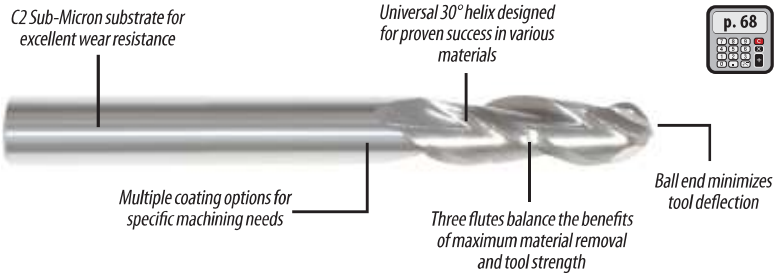
*CHIP THINNING Adjustments	
RDOC	Increase IPT
50%	None
30%	1.1 x
25%	1.2 x
20%	1.3 x
15%	1.4 x
10%	1.8 x
7%	2.0 x
5%	2.3 x
3%	3.0 x
2%	3.5 x
1%	5.0 x

SLOTTING

Surface Feet Per Minute (SFM)
Radial Depth of Cut (RDOC)
Inches Per Tooth (IPT)

Workpiece Material Group			Hardness	SFM: Cutting Diameter Engaged 25%	50%	100%	IPT* (BASELINE): Cutting Diameter 5/16	3/8	1/2	5/8	3/4	1
Steels	Free Machining & Low Carbon: 10XX, 11XX, 12XX 12LXX, ASTM A27 ASTM A36	P	≤ 28 Rc	385	370	350	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
	Medium Carbon, High Carbon Steels, Alloy Steels & Easy to Machine Tool: 13XX, 41XX, 43XX 51XX, 86XX, 93XX	P	28 - 38 Rc	245	230	2210						
Tool & Die Steels	A2, H13, L6, P20, S7	P	28 - 44 Rc	210	195	175	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
Stainless Steel	Easy to Machine, 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	M	≤ 28 Rc	385	370	350	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
	Moderately Difficult to Machine, Nitronic 50, Nitronic 60 , 301, 303 304, 304L Incoloy 27-7MO, 316 316L, 321, 347	M	≤ 28 Rc	245	210	175						
	Difficult to Machine, 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	M	> 28 Rc	210	195	175						
Super Alloys	High Temp, Nimonics, Inconel, Monel, Hastelloy	S	≤ 42 Rc	125	105	90	0.0008	0.0010	0.0013	0.0016	0.0017	0.0026
	Titanium: Ti 3Al-2.5V, Ti 6Al-4V Ti 10V-2Fe-3Al	S	≤ 42 Rc	100	90	80						
Hardened Materials		H	34-45 Rc	245	230	210	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
			45-55 Rc	175	160	140	0.0008	0.0010	0.0013	0.0016	0.0020	0.0025
			55-65 Rc	150	125	100	0.0004	0.0005	0.0008	0.0008	0.0010	0.0012
Cast-Iron	Gray: SAE J431, ASTM A48	K	≤ 240 HB	450	400	350	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
	Ductile & Malleable: ASTM A536, ASTM 897, ASTM A47, ASTM A220 ASTM A602	K	> 240 HB	300	250	225						
Non-Ferrous	Aluminum, Brass, Bronze, Copper, Plastics, Graphite	N		750	600	450	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050

3 FLUTE - SINGLE END BALLNOSE



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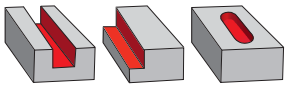

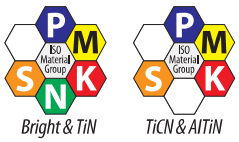

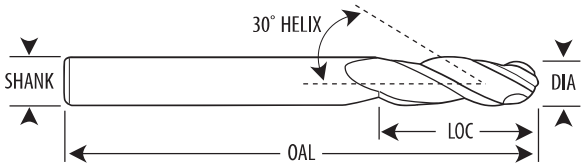

DIAMETER TOLERANCE: +0.000 / -0.002" SHANK TOLERANCE: +0.0000 / -0.0005"

DIA	Dec In	LOC	Shank	OAL	Length	Bright	TiN	TiCN	AlTiN
1/32	0.0313	1/8	1/8	1-1/2	Regular	222-001001	222-001002	222-001003	222-001004
3/64	0.0469	1/8	1/8	1-1/2	Regular	222-001020	222-001021	222-001022	222-001023
1/16	0.0625	1/4	1/8	1-1/2	Regular	222-001030	222-001031	222-001032	222-001033
5/64	0.0781	1/4	1/8	1-1/2	Regular	222-001040	222-001041	222-001042	222-001043
3/32	0.0938	3/8	1/8	1-1/2	Regular	222-001050	222-001051	222-001052	222-001053
7/64	0.1094	3/8	1/8	1-1/2	Regular	222-001060	222-001061	222-001062	222-001063
1/8	0.1250	1/2	1/8	1-1/2	Regular	222-001070	222-001071	222-001072	222-001073
5/32	0.1563	9/16	3/16	2	Regular	222-001090	222-001091	222-001092	222-001093
3/16	0.1875	5/8	3/16	2	Regular	222-001110	222-001111	222-001112	222-001113
7/32	0.2188	5/8	1/4	2-1/2	Regular	222-001130	222-001131	222-001132	222-001133
1/4	0.2500	3/4	1/4	2-1/2	Regular	222-001140	222-001141	222-001142	222-001143
9/32	0.2813	3/4	5/16	2-1/2	Regular	222-001150	222-001151	222-001152	222-001153
5/16	0.3125	13/16	5/16	2-1/2	Regular	222-001160	222-001161	222-001162	222-001163
3/8	0.3750	1	3/8	2-1/2	Regular	222-001180	222-001181	222-001182	222-001183
7/16	0.4375	1	7/16	2-3/4	Regular	222-001200	222-001201	222-001202	222-001203
1/2	0.5000	1	1/2	3	Regular	222-001210	222-001211	222-001212	222-001213
9/16	0.5625	1-1/4	9/16	3-1/2	Regular	222-001220	222-001221	222-001222	222-001223
5/8	0.6250	1-1/4	5/8	3-1/2	Regular	222-001230	222-001231	222-001232	222-001233
3/4	0.7500	1-1/2	3/4	4	Regular	222-001250	222-001251	222-001252	222-001253
1	1.0000	1-1/2	1	4	Regular	222-001270	222-001271	222-001272	222-001273