

MILLING RECOMMENDATIONS - GENERAL PURPOSE ENDMILLS



PROFILING

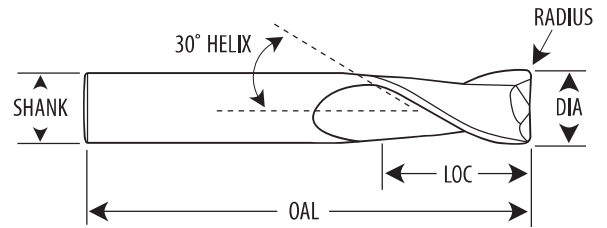
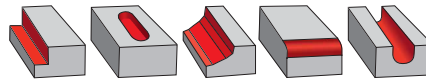
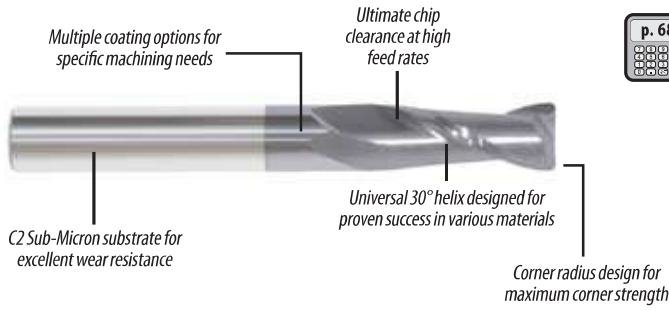
Workpiece Material Group		Hardness	Surface Feet Per Minute (SFM) Radial Depth of Cut (RDOC)					Inches Per Tooth (IPT)					*CHIP THINNING Adjustments			
			SFM based on RDOC					IPT *(BASELINE)								
			Cutting Diameter Engaged					Cutting Diameter								
			5%	10%	20%	30%	50%	5/16	3/8	1/2	5/8	3/4	1	RDOC	Increase IPT	
Steels	Free Machining & Low Carbon: 10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	P ≤ 28 Rc	1050	700	385	375	350									
	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	0.0027	0.0032	0.0045	0.0054	0.0063	0.0090	50%	None	
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	30%	1.1 x	
Stainless Steel	Easy to Machine, 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	M ≤ 28 Rc	650	600	550	500	450							25%	1.2 x	
	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	0.0027	0.0032	0.0045	0.0054	0.0063	0.0090	20%	1.3 x	
	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							15%	1.4 x	
Super Alloys	High Temp, Nimonic, Inconel, Monel, Hastelloy	S ≤ 42 Rc	265	200	175	150	100	0.0014	0.0016	0.0023	0.0027	0.0032	0.0045	10%	1.8 x	
	Titanium: Ti 3Al-2.5V, Ti 6Al-4V Ti 10V-2Fe-3Al	S ≤ 42 Rc	230	200	175	150	125							7%	2.0 x	
Hardened Materials		H 45-55 Rc	250	240	230	210	200	0.0018	0.0021	0.0030	0.0036	0.0042	0.0060	5%	2.3 x	
		H 55-65 Rc	200	180	160	150	100	0.0013	0.0014	0.0021	0.0024	0.0029	0.0041	3%	3.0 x	
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	2%	3.5 x	
	Ductile & Malleable: ASTM A536, ASTM 897, ASTM A47, ASTM A220 ASTM A602	K > 240 HB	320	300	250	225	200							1%	5.0 x	
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			



SLOTING

Workpiece Material Group		Hardness	Surface Feet Per Minute (SFM) Radial Depth of Cut (RDOC)			Inches Per Tooth (IPT)						
			SFM			IPT *(BASELINE)						
			Cutting Diameter Engaged			Cutting Diameter						
			25%	50%	100%	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							
	Medium Carbon, High Carbon Steels, Alloy Steels & Easy to Machine Tool: 13XX, 41XX, 43XX, 51XX, 86XX, 93XX	P 28-38 Rc	245	230	2210	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050	
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							
	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	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050	
	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, Nimonic, 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	
		H 45-55 Rc	175	160	140	0.0008	0.0010	0.0013	0.0016	0.0020	0.0025	
		H 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	

2 FLUTE - SINGLE END CORNER RADIUS



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

DIA	Dec In	LOC	Shank	OAL	Length	Radius	Bright	TiN	TiCN	AlTiN
1/8	0.1250	1/2	1/8	1-1/2	Regular	0.010	204-602300	204-602301	204-602302	204-602303
						0.015	204-602306	204-602307	204-602308	204-602309
						0.020	204-602312	204-602313	204-602314	204-602315
						0.030	204-602318	204-602319	204-602320	204-602321
						0.045	204-602348	204-602349	204-602350	204-602351
3/16	0.1875	5/8	3/16	2	Regular	0.010	204-602424	204-602425	204-602426	204-602427
						0.015	204-602430	204-602431	204-602432	204-602433
						0.020	204-602436	204-602437	204-602438	204-602439
						0.030	204-602442	204-602443	204-602444	204-602445
						0.045	204-602448	204-602449	204-602450	204-602451
						0.060	204-602452	—	—	—
						0.015	204-602551	204-602552	204-602553	204-602554
						0.020	204-602557	204-602558	204-602559	204-602560
						0.025	204-602563	204-602564	204-602565	204-602566
						0.030	204-602569	204-602570	204-602571	204-602572
5/16	0.3125	13/16	5/16	2-1/2	Regular	0.015	204-602684	204-602685	204-602686	204-602687
						0.020	204-602690	204-602691	204-602692	204-602693
						0.025	204-602696	204-602697	204-602698	204-602699
						0.030	204-602702	204-602703	204-602704	204-602705
						0.045	204-602708	204-602709	204-602710	204-602711
						0.060	204-602714	204-602715	204-602716	204-602717
						0.015	204-602820	204-602821	204-602822	204-602823
						0.020	204-602826	204-602827	204-602828	204-602829
						0.025	204-602832	204-602833	204-602834	204-602835
						0.030	204-602838	204-602839	204-602840	204-602841
3/8	0.3750	1	3/8	2-1/2	Regular	0.045	204-602844	204-602845	204-602846	204-602847
						0.060	204-602850	204-602851	204-602852	204-602853
						0.090	204-602856	204-602857	204-602858	204-602859
						0.125	204-999375	—	—	—

DIA	Dec In	LOC	Shank	OAL	Length	Radius	Bright	TiN	TiCN	AlTiN
7/16	0.4375	1	7/16	2-3/4	Regular	0.015	204-602961	204-602962	204-602963	204-602964
						0.020	204-602967	204-602968	204-602969	204-602970
						0.025	204-602974	204-602975	204-602976	204-602977
						0.030	204-602980	204-602981	204-602982	204-602983
						0.045	204-602986	204-602987	204-602988	204-602989
						0.060	204-602992	204-602993	204-602994	204-602995
						0.090	204-602998	204-602999	204-603000	204-603001
1/2	0.5000	1	1/2	3	Regular	0.015	204-603003	204-603004	204-603005	204-603006
						0.020	204-603009	204-603010	204-603011	204-603012
						0.025	204-603015	204-603016	204-603017	204-603018
						0.030	204-603021	204-603022	204-603023	204-603024
						0.045	204-603027	204-603028	204-603029	204-603030
						0.060	204-603033	204-603034	204-603035	204-603036
						0.090	204-603039	204-603040	204-603041	204-603042
5/8	0.6250	1-1/4	5/8	3-1/2	Regular	0.015	204-603150	204-603151	204-603152	204-603153
						0.020	204-603156	204-603157	204-603158	204-603159
						0.025	204-603162	204-603163	204-603164	204-603165
						0.030	204-603168	204-603169	204-603170	204-603171
						0.045	204-603174	204-603175	204-603176	204-603177
						0.060	204-603180	204-603181	204-603182	204-603183
						0.090	204-603186	204-603187	204-603188	204-603189
						0.125	204-603192	204-603193	204-603194	204-603195
						0.250	204-603196	—	—	—
						3/4	0.7500	1-1/2	3/4	4
0.020	204-603303	204-603304	204-603305	204-603306						
0.025	204-603309	204-603310	204-603311	204-603312						
0.030	204-603315	204-603316	204-603317	204-603318						
0.045	204-603321	204-603322	204-603323	204-603324						
0.060	204-603327	204-603328	204-603329	204-603330						
0.090	204-603333	204-603334	204-603335	204-603336						
0.125	204-603339	204-603340	204-603341	204-603342						
0.190	204-603345	204-603346	204-603347	204-603348						
0.250	204-603349	—	—	—						
1	1.0000	1-1/2	1	4	Regular	0.015	204-603450	204-603451	204-603452	204-603453
						0.020	204-603456	204-603457	204-603458	204-603459
						0.025	204-603462	204-603463	204-603464	204-603465
						0.030	204-603468	204-603469	204-603470	204-603471
						0.045	204-603474	204-603475	204-603476	204-603477
						0.060	204-603480	204-603481	204-603482	204-603483
						0.090	204-603486	204-603487	204-603488	204-603489
						0.125	204-603492	204-603493	204-603494	204-603495
						0.190	204-603498	204-603499	204-603500	204-603501
						0.250	204-603504	204-603505	204-603506	204-603507