

3-FLUTE END MILLS

E13

3 Helical Flutes

For profiling, slotting, & contouring



E13 • Radius



E13 • Square

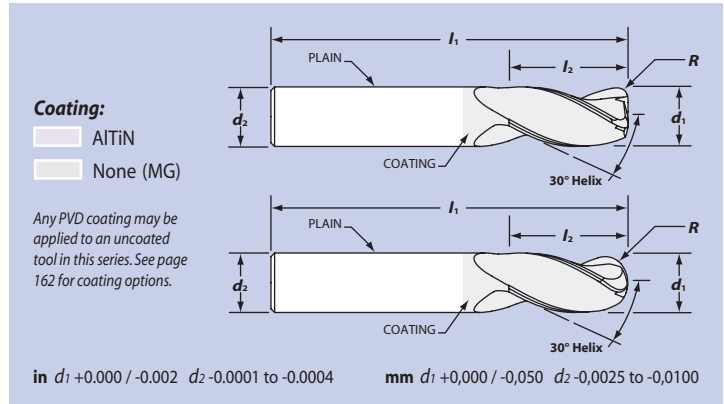


E13B • Ball

A good compromise between the high flute volume of 2-flute and strength of a 4-flute end mill

	AlTiN Spector	MG Uncoated
Carbon & tool steels ≤ 48 HRC	✓✓	✓
Stainless steels	✓✓✓	
Cast irons	✓✓	✓
Aluminum and non-ferrous	✓	✓

✓ Suitable ✓✓ Good ✓✓✓ Recommended



End designs

- Wide variety of corner radii available
- Square end for general machining and finishing
- Ball nose styles for contouring
- Center cutting

Shank designs

- Precision shanks fit all collets and most shrinkfit systems

Multiple lengths

- Long, extra long and extreme lengths for deep cavity milling
- Stub length for extra rigidity

Inch						Standard			
d_1 Cutter Dia	d_2 Shank Dia	l_2 Length of Cut	l_1 Overall Length	R Corner Radius	Style Code	AlTiN EDP Number	List Price	MG EDP Number	List Price
1/32	1/8	1/16	1-1/2	Square	SR	34095	13.93	34697	11.24
		3/32	1-1/2	Square	RR	33801	14.02	33802	11.33
		3/32	1-1/2	Ball	RR	62053	16.85	33865	14.16
3/64	1/8	3/32	1-1/2	Square	SR	34096	13.70	34700	11.01
		9/64	1-1/2	Square	RR	33819	14.02	33803	11.33
		9/64	1-1/2	Ball	RR	62054	16.85	33867	14.16
1/16	1/8	1/8	1-1/2	Square	SR	34057	12.53	33773	10.13
		1/8	1-1/2	Ball	SR	62063	15.34	33834	12.75
		3/16	1-1/2	Square	RR	33826	12.69	33804	10.22
		3/16	1-1/2	Ball	RR	62055	15.55	33868	12.80
3/32	1/8	3/16	1-1/2	Square	SR	34011	12.12	33774	9.71
		3/16	1-1/2	Ball	SR	62064	14.61	33835	12.02
		3/8	1-1/2	Square	RR	33827	12.27	33806	9.78
		3/8	1-1/2	Ball	RR	62056	14.82	33869	12.20
1/8	1/8	1/4	1-1/2	Square	SR	33800	11.18	33775	8.78
		1/4	1-1/2	Ball	SR	62065	13.73	33836	11.15
		1/2	1-1/2	Square	RR	33810	11.23	33808	9.00
		1/2	1-1/2	Ball	RR	62057	13.83	33844	11.46

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GENERAL PURPOSE E13 END MILLS

For general milling applications

Inch • Continued						Standard					
d_1 Cutter Dia	d_2 Shank Dia	l_2 Length of Cut	l_1 Overall Length	R Corner Radius	Style Code	AITiN EDP Number	List Price	MG EDP Number	List Price		
1/8	1/8	3/4	2-1/4	Square	LL	33911	16.43	33782	14.22		
		3/4	2-1/4	Ball	LL	62070	20.07	33889	17.02		
		1	3	Square	XX	34046	22.26	33791	19.33		
		1	3	Ball	XX	62079	27.09	33899	23.17		
5/32	3/16	9/16	2	Square	RR	33814	16.59	33811	13.44		
3/16	3/16	3/8	2	Square	SR	34058	14.92	33776	12.11		
		3/8	2	Ball	SR	62066	17.58	33837	14.56		
		5/8	2	Square	RR	33850	15.50	33812	12.67		
		5/8	2	Ball	RR	62058	18.10	33845	15.08		
		3/4	2-1/2	Square	LL	33913	22.26	33783	18.22		
		3/4	2-1/2	Ball	LL	62071	23.97	33890	21.80		
		1-1/8	3	Square	XX	34047	25.69	33792	22.00		
		1-1/8	3	Ball	XX	62080	30.32	33900	26.35		
7/32	1/4	5/8	2-1/2	Square	RR	33851	21.06	33818	16.78		
1/4	1/4	1/2	2	Square	SS	34059	18.98	33777	14.22		
		1/2	2	Ball	SS	62067	20.07	33838	17.11		
		3/4	2-1/2	Square	RR	33852	18.93	33816	14.89		
		3/4	2-1/2	Ball	RR	62059	23.76	33846	19.45		
		1-1/8	3	Square	LL	33929	27.61	33784	22.44		
		1-1/8	3	Ball	LL	62072	34.42	33891	28.97		
		1-1/2	4	Square	XX	34051	33.59	33793	27.33		
		1-1/2	4	Ball	XX	62081	39.42	33901	32.52		
5/16	5/16	1/2	2	Square	SS	34060	26.26	33778	19.42		
		13/16	2-1/2	Square	RR	33853	26.99	33820	21.04		
		1-5/8	4	Square	XX	34097	43.00	33794	35.56		
		5/8	2	Square	SS	34061	31.62	33779	24.22		
3/8	3/8	5/8	2	Ball	SS	62068	34.06	33839	28.53		
		1	2-1/2	Square	RR	33854	32.50	33824	26.22		
		1	2-1/2	Ball	RR	99776	37.96	33847	31.39		
		1-1/8	3	Square	LL	33931	43.37	33786	34.89		
		1-1/8	3	Ball	LL	62074	51.38	33893	44.23		
		1-3/4	4	Square	XX	34052	49.14	33795	40.82		
		1-3/4	4	Ball	XX	62083	58.66	33903	48.39		
		7/16	7/16	1	2-3/4	Square	RR	30422	42.38	33863	33.89
1/2	1/2	5/8	2-1/2	Square	SS	34063	50.18	33781	40.84		
		5/8	2-1/2	Ball	SS	62069	53.46	33843	48.00		
		1	3	Square	RR	90089	51.95	33832	42.89		
		1	3	Ball	RR	62060	64.74	33861	55.31		
		2	4	Square	LL	33955	72.49	33787	60.67		
		2	4	Ball	LL	62075	82.26	33894	68.51		
		3	6	Square	XX	34053	100.88	33796	87.33		
		3	6	Ball	XX	62084	113.00	33904	96.96		
		5/8	5/8	1-1/4	3-1/2	Square	RR	33855	97.50	33840	82.67
				2-1/4	5	Square	LL	34068	141.96	33788	116.78
3	6			Square	XX	34054	146.38	33797	123.93		
3/4	3/4	1-1/2	4	Square	RR	33856	142.69	33848	121.11		
		2-1/4	5	Square	LL	34069	186.21	33789	155.56		
		3	6	Square	XX	34055	224.69	33798	192.80		

Metric						Standard			
d_1 Cutter Dia	d_2 Shank Dia	l_2 Length of Cut	l_1 Overall Length	R Corner Radius	Style Code	AITiN EDP Number	List Price	MG EDP Number	List Price
1	3	2	38	Square	SR	30897	13.70	38849	11.01
		3	38	Square	RR	62456	13.93	31451	11.24
		3	38	Ball	RR	62460	18.26	32571	16.10
1,5	3	3	38	Square	SR	62272	13.70	38850	11.01
		3	38	Ball	SR	62689	17.74	39057	15.58
		4,5	38	Square	RR	62457	13.93	31452	11.24
		4,5	38	Ball	RR	62461	17.18	32572	15.02
		6	38	Square	RR	37012	13.70	38605	11.01
2	3	6	38	Ball	RR	62601	17.74	38614	15.58
		4	38	Square	SR	62273	11.94	38851	9.78
		4	38	Ball	SR	62690	13.73	39058	11.57
		6,3	38	Square	RR	62458	12.05	31453	9.89
		6,3	38	Ball	RR	62462	13.85	32573	11.69
2,5	3	9	38	Square	RR	37014	12.16	38606	10.00
		9	38	Ball	RR	62602	15.05	38615	12.89
		5	38	Square	SR	62274	11.49	38852	9.33
		9,5	38	Square	RR	37016	11.83	31454	9.67
		6	38	Square	SR	62275	10.94	38853	8.78
3	3	6	38	Ball	SR	62692	12.41	39060	10.25
		9	38	Square	RR	99801	11.16	36732	9.00
		12	38	Square	RR	30247	11.38	31455	9.22
		12	38	0,3	RR	36951	16.88	36785	14.72
		12	38	Ball	RR	62604	14.00	32575	11.84
		12	75	Square	RX	33374	22.71	31280	18.67
		12	75	Ball	RX	37290	26.03	37238	21.99
		19	57	Square	LL	62260	17.42	30139	14.22
		19	57	Ball	LL	62637	20.09	39095	16.89
		25	75	Square	XX	62170	23.26	31631	19.22
25	75	Ball	XX	62661	26.65	32761	22.61		
3,5	4	14	50	Square	RR	37018	16.35	31456	13.11
		8	50	Square	SR	62277	15.24	38855	12.00
		8	50	Ball	SR	62694	17.45	39062	14.21
		11	50	Square	RR	36771	15.80	36734	12.56
		11	50	0,4	RR	36952	21.02	36786	17.78
4	4	14	50	Square	RR	37020	16.46	31457	13.22
		14	50	Ball	RR	62606	19.18	32577	15.94
		19	63	Square	LL	62261	21.63	30140	17.67
		19	63	Ball	LL	62638	24.61	39096	20.65
		31	75	Square	XX	62171	25.01	31632	20.33
		31	75	Ball	XX	62662	28.56	32762	23.88
4,5	5	16	50	Square	RR	37022	17.88	31458	13.56

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Style Code Reference
 LL—Long LOC, Long OAL
 RR—Regular LOC, Regular OAL
 RX—Regular LOC, X-Long OAL
 SR—Short LOC, Regular OAL
 SS—Short LOC, Short OAL
 XX—X-Long LOC, X-Long OAL

E13 end mills with Weldon® flats are available by request. See page 160 for modification charges.

GENERAL PURPOSE E13 END MILLS

For general milling applications

Metric • Continued						Standard			
d ₁ Cutter Dia	d ₂ Shank Dia	l ₂ Length of Cut	l ₁ Overall Length	R Corner Radius	Style Code	AITiN EDP Number	List Price	MG EDP Number	List Price
5	5	10	50	Square	SR	62279	18.21	38858	13.89
		10	50	Ball	SR	62696	20.87	39064	16.55
		13	50	Square	RR	36772	18.43	36736	14.11
		13	50	0,5	RR	36953	23.38	36787	19.06
		16	50	Square	RR	37024	18.76	31459	14.44
		16	50	Ball	RR	62608	22.14	32579	17.82
		19	63	Square	LL	62262	25.17	30141	19.89
		19	63	Ball	LL	62639	29.20	39097	23.92
		31	100	Square	XX	62172	33.74	30150	25.78
		31	100	Ball	XX	62663	38.64	39110	30.68
		6	6	12	54	Square	SS	36949	18.63
12	54			Ball	SS	37500	21.21	39459	16.89
13	57			Square	RR	36773	19.12	36738	14.64
13	57			0,3	RR	36954	23.80	36788	19.32
13	57			0,5	RR	36955	23.80	36789	19.32
19	63			Square	RR	37026	20.36	31460	15.44
19	63			Ball	RR	32591	23.88	32580	18.96
29	75			Square	LL	62263	27.14	31634	21.42
29	75			Ball	LL	62640	30.37	32764	24.65
38	100			Square	XX	62173	34.17	30151	26.73
38	100			Ball	XX	62664	38.75	39111	31.31
7	7	16	60	Square	RR	36774	25.78	36740	20.22
8	8	14	58	Square	SS	37168	26.14	38842	20.58
		19	63	Square	RR	36775	27.52	36742	21.56
		19	63	0,5	RR	36956	31.92	36790	25.96
		19	63	1,0	RR	36957	31.92	36791	25.96
		19	63	1,5	RR	36958	31.92	36792	25.96
		20	63	Square	RR	37028	29.69	31462	23.73
		20	63	Ball	RR	32592	33.73	32582	27.77
		29	75	Square	LL	62264	37.96	31635	31.04
		29	75	Ball	LL	62641	42.52	32765	35.60
		41	100	Square	XX	62174	45.67	30152	36.71
		41	100	Ball	XX	62665	52.15	39113	43.19
9	9	19	67	Square	RR	36776	40.12	36744	27.04
	10	22	72	Square	RR	37030	43.32	31463	32.56
10	10	16	66	Square	SS	37172	39.89	38843	29.89
		16	66	Ball	SS	37376	44.45	39461	34.45
		22	72	Square	RR	36777	41.76	36746	31.00
		22	72	0,5	RR	36959	45.88	36793	35.12
		22	72	1,0	RR	36960	45.88	36794	35.12
		22	72	1,5	RR	36961	45.88	36795	35.12
		25	72	Square	RR	37031	44.27	31464	33.51
		25	72	Ball	RR	32593	49.26	32584	38.50
		25	100	Square	RX	33373	60.18	31286	45.82
		25	100	Ball	RX	37372	68.98	37272	54.62
		40	88	Square	LL	37166	53.57	31644	40.73
		40	88	Ball	LL	37374	58.93	39462	46.09
		45	100	Square	XX	62175	61.36	31636	47.00
		45	100	Ball	XX	62666	67.79	32766	53.43

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Metric • Continued						Standard			
d ₁ Cutter Dia	d ₂ Shank Dia	l ₂ Length of Cut	l ₁ Overall Length	R Corner Radius	Style Code	AITiN EDP Number	List Price	MG EDP Number	List Price
11	11	26	83	Square	RR	36778	50.40	36747	40.40
		19	73	Square	SS	37164	51.64	38844	41.64
		19	73	Ball	SS	37378	53.54	39463	43.54
		25	76	Square	RR	37034	55.03	31465	44.71
		26	83	Square	RR	36779	53.94	36748	42.78
		26	83	0,5	RR	36962	57.52	36796	46.36
		26	83	1,0	RR	36963	57.52	36797	46.36
		26	83	1,5	RR	36964	57.52	36798	46.36
		26	83	Ball	RR	37380	60.63	39464	49.47
		50	100	Square	LL	62266	73.01	31637	59.89
		50	100	Ball	LL	62643	80.30	32767	67.18
12	12	75	150	Square	XX	62176	105.29	31638	86.33
		75	150	Ball	XX	62667	122.58	32768	103.62
		26	83	Square	RR	36780	88.41	36750	75.33
		57	125	Square	LL	62267	119.61	30144	100.89
		75	150	Square	XX	62177	138.97	31639	116.89
		25	82	Square	SS	62287	96.08	38865	83.00
14	14	32	92	Square	RR	36781	101.28	36752	86.84
		57	125	Square	LL	62268	145.54	30145	126.62
		75	150	Square	XX	62178	156.43	31640	134.11
		32	92	Square	RR	36782	133.96	36753	120.04
16	16	57	125	Square	LL	62269	179.78	30146	161.62
		75	150	Square	XX	62179	206.44	31641	185.04
		38	104	Square	RR	36783	171.59	36754	149.27
18	18	57	125	Square	LL	62270	207.82	30147	181.62
		75	150	Square	XX	62180	248.53	31642	217.69

Style Code Reference

- LL—Long LOC, Long OAL
- RR—Regular LOC, Regular OAL
- RX—Regular LOC, X-Long OAL
- SR—Short LOC, Regular OAL
- SS—Short LOC, Short OAL
- XX—X-Long LOC, X-Long OAL



Metric E13 end mills with DIN 6535 HB (Weldon®) flats are available by request. See page 160 for modification charges.

GENERAL PURPOSE 3-FLUTE END MILLS

For general milling applications

Application Guide • Speed & Feed

Work Material	Type of Cut	Axial DOC	Radial DOC	Speed (SFM)			Feed (Inches per Tooth)							Speed (m/min)			Feed (mm per Tooth)						
				MG	TiCN	AlTiN	1/8	1/4	3/8	1/2	5/8	3/4	1	MG	TiCN	AlTiN	3,0	6,0	9,0	12,0	16,0	19,0	25,0
Aluminum Alloys 2024, 6061, 7075	Slot	.5 x D	1 x D	350	550	550	.0008	.0015	.0022	.0030	.0037	.0047	.0060	107	168	168	.0203	.0381	.0559	.0762	.0940	.1194	.1524
	Rough	1 x D	.5 x D	450	650	650	.0010	.0020	.0030	.0040	.0050	.0060	.0080	137	198	198	.0254	.0508	.0762	.1016	.1270	.1524	.2032
	Finish	1.5 x D	.01 x D	550	750	750	.0010	.0020	.0030	.0040	.0050	.0060	.0080	168	229	229	.0254	.0508	.0762	.1016	.1270	.1524	.2032
Copper Alloys Brass & Bronze	Slot	.5 x D	1 x D	275	350	350	.0006	.0012	.0018	.0025	.0030	.0039	.0050	84	107	107	.0152	.0305	.0457	.0635	.0762	.0991	.1270
	Rough	1 x D	.5 x D	300	400	400	.0008	.0015	.0022	.0030	.0037	.0047	.0060	91	122	122	.0203	.0381	.0559	.0762	.0940	.1194	.1524
	Finish	1.5 x D	.01 x D	350	450	450	.0009	.0017	.0026	.0035	.0045	.0055	.0070	107	137	137	.0229	.0432	.0660	.0889	.1143	.1397	.1778
Composites, Plastics	Slot	.5 x D	1 x D	300	350	350	.0008	.0015	.0022	.0030	.0037	.0047	.0060	91	107	107	.0203	.0381	.0559	.0762	.0940	.1194	.1524
	Rough	1 x D	.5 x D	375	450	450	.0009	.0018	.0027	.0035	.0045	.0055	.0070	114	137	137	.0229	.0457	.0686	.0889	.1143	.1397	.1778
	Finish	1.5 x D	.01 x D	450	650	650	.0009	.0018	.0027	.0035	.0045	.0055	.0070	137	198	198	.0229	.0457	.0686	.0889	.1143	.1397	.1778
Magnesium Alloys	Slot	.5 x D	1 x D	350	550	550	.0008	.0015	.0022	.0030	.0037	.0047	.0060	107	168	168	.0203	.0381	.0559	.0762	.0940	.1194	.1524
	Rough	1 x D	.5 x D	450	650	650	.0010	.0020	.0030	.0040	.0050	.0060	.0080	137	198	198	.0254	.0508	.0762	.1016	.1270	.1524	.2032
	Finish	1.5 x D	.01 x D	550	750	750	.0010	.0020	.0030	.0040	.0050	.0060	.0080	168	229	229	.0254	.0508	.0762	.1016	.1270	.1524	.2032
Graphite	Slot	.5 x D	1 x D	350	400	450	.0008	.0015	.0023	.0030	.0037	.0045	.0060	107	122	137	.0203	.0381	.0584	.0762	.0940	.1143	.1524
	Rough	1 x D	.5 x D	425	475	525	.0009	.0017	.0026	.0035	.0043	.0053	.0070	130	145	160	.0229	.0432	.0660	.0889	.1092	.1346	.1778
	Finish	1.5 x D	.01 x D	500	550	600	.0010	.0019	.0028	.0038	.0047	.0057	.0076	152	168	183	.0254	.0483	.0711	.0965	.1194	.1448	.1930
Cast Iron - Gray	Slot	.5 x D	1 x D	200	350	350	.0004	.0007	.0011	.0015	.0019	.0023	.0030	61	107	107	.0102	.0178	.0279	.0381	.0483	.0584	.0762
	Rough	1 x D	.5 x D	250	400	400	.0005	.0010	.0015	.0020	.0025	.0030	.0040	76	122	122	.0127	.0254	.0381	.0508	.0635	.0762	.1016
	Finish	1.5 x D	.01 x D	300	450	450	.0007	.0015	.0022	.0030	.0038	.0045	.0060	91	137	137	.0178	.0381	.0559	.0762	.0965	.1143	.1524
Cast Iron - Ductile	Slot	.5 x D	1 x D	200	250	250	.0004	.0007	.0011	.0015	.0018	.0023	.0030	61	76	76	.0102	.0178	.0279	.0381	.0457	.0584	.0762
	Rough	1 x D	.5 x D	250	275	275	.0005	.0010	.0015	.0020	.0025	.0030	.0040	76	84	84	.0127	.0254	.0381	.0508	.0635	.0762	.1016
	Finish	1.5 x D	.01 x D	275	325	325	.0006	.0012	.0018	.0023	.0028	.0034	.0046	84	99	99	.0152	.0305	.0457	.0584	.0711	.0864	.1168
Low Carbon Steel ≤ 38 HRc 1018, 12L14, 8620	Slot	.5 x D	1 x D	250	275	300	.0005	.0010	.0015	.0020	.0025	.0030	.0040	76	84	91	.0127	.0254	.0381	.0508	.0635	.0762	.1016
	Rough	1 x D	.5 x D	275	300	325	.0006	.0012	.0018	.0025	.0031	.0037	.0050	84	91	99	.0152	.0305	.0457	.0635	.0787	.0940	.1270
	Finish	1.5 x D	.01 x D	300	325	350	.0007	.0015	.0022	.0030	.0038	.0045	.0060	91	99	107	.0178	.0381	.0559	.0762	.0965	.1143	.1524
Medium Carbon Steels ≤ 38 HRc 4140, 4340	Slot	.5 x D	1 x D	225	250	275	.0005	.0010	.0015	.0020	.0025	.0030	.0040	69	76	84	.0127	.0254	.0381	.0508	.0635	.0762	.1016
	Rough	1 x D	.5 x D	250	275	300	.0006	.0012	.0018	.0025	.0031	.0037	.0050	76	84	91	.0152	.0305	.0457	.0635	.0787	.0940	.1270
	Finish	1.5 x D	.01 x D	275	300	325	.0007	.0015	.0022	.0030	.0038	.0045	.0060	84	91	99	.0178	.0381	.0559	.0762	.0965	.1143	.1524
Tool & Die Steels ≤ 38 HRc A2, D2, H13, P20	Slot	.5 x D	1 x D	225	250	275	.0005	.0010	.0015	.0020	.0025	.0030	.0040	69	76	84	.0127	.0254	.0381	.0508	.0635	.0762	.1016
	Rough	1 x D	.5 x D	250	275	300	.0006	.0012	.0018	.0025	.0031	.0037	.0050	76	84	91	.0152	.0305	.0457	.0635	.0787	.0940	.1270
	Finish	1.5 x D	.01 x D	275	300	325	.0007	.0015	.0022	.0030	.0038	.0045	.0060	84	91	99	.0178	.0381	.0559	.0762	.0965	.1143	.1524
Easy to Machine Stainless Steel 416, 410, 302, 303	Slot	.5 x D	1 x D	200	250	250	.0003	.0007	.0011	.0015	.0019	.0023	.0030	61	76	76	.0076	.0178	.0279	.0381	.0483	.0584	.0762
	Rough	1 x D	.5 x D	250	275	275	.0005	.0010	.0015	.0020	.0025	.0030	.0040	76	84	84	.0127	.0254	.0381	.0508	.0635	.0762	.1016
	Finish	1.5 x D	.01 x D	300	325	325	.0006	.0012	.0018	.0025	.0031	.0038	.0050	91	99	99	.0152	.0305	.0457	.0635	.0787	.0965	.1270
Moderate Machining Stainless Steels 304, 316, Invar, Kovar	Slot	.5 x D	1 x D	200	225	250	.0003	.0005	.0008	.0010	.0012	.0015	.0020	61	69	76	.0064	.0127	.0191	.0254	.0305	.0381	.0508
	Rough	1 x D	.5 x D	250	275	300	.0003	.0007	.0011	.0015	.0019	.0022	.0030	76	84	91	.0076	.0178	.0279	.0381	.0483	.0559	.0762
	Finish	1.5 x D	.01 x D	300	325	350	.0004	.0009	.0014	.0018	.0023	.0027	.0036	91	99	107	.0102	.0229	.0356	.0457	.0584	.0686	.0914

D = tool diameter Reduce feed rates by 20% when using long length tools Starting parameters shown