



Variable End Mills

*Lessens chatter *Increases tool life *Allows for more aggressive machining

4 Flute Stub & Regular Length With Radius & Ball Nose



Dia	Flute Length	Overall Length	Radius	ALTIN Part Number	ALTIN List Price	ALTIN Ball Nose Part Number	ALTIN Ball Nose List Price
1/8	1/4	1-1/2	.010	471-125011	16.50	471-1250 BN11	23.10
1/8	1/2	1-1/2	.010	470-125011	19.80	470-1250 BN11	27.16
3/16	1/4	2	.010	471-187511	18.15	471-1875 BN11	26.40
3/16	5/8	2	.010	470-187511	23.10	470-1875 BN11	30.10
1/4	5/16	2	.015	471-250011	26.40	471-2500 BN11	39.60
1/4	3/4	2-1/2	.015	470-250011	29.70	470-2500 BN11	42.90
5/16	3/8	2	.015	471-312511	37.95	471-3125 BN11	52.80
5/16	7/8	2-1/2	.015	470-312511	42.90	470-3125 BN11	59.40
3/8	1/2	2	.020	471-375011	47.85	471-3750 BN11	61.05
3/8	1	2-1/2	.020	470-375011	52.80	470-3750 BN11	66.00
7/16	5/8	2-1/2	.025	471-437511	72.60	471-4375 BN11	84.15
7/16	1-1/8	2-3/4	.025	470-437511	79.20	470-4375 BN11	82.40
1/2	5/8	2-1/2	.030	471-500011	87.45	471-5000 BN11	108.90
1/2	1-1/4	3	.030	470-500011	95.70	470-5000 BN11	118.80
5/8	1	3	.030	471-625011	145.20	471-6250 BN11	199.98
5/8	1-1/2	3-1/2	.030	470-625011	155.10	470-6250 BN11	211.20
3/4	1	3	.040	471-750011	212.85	471-7500 BN11	270.60
3/4	1-3/4	4	.040	470-750011	224.40	470-7500 BN11	288.75
1	1	3	.045	471-100011	318.45	471-1000 BN11	433.95
1	1-3/4	4	.045	470-100011	356.40	470-1000 BN11	458.70

4 Flute Long Reach - With Radius



Dia	Flute Length	Overall Length	Radius	ALTIN Part Number	ALTIN List Price
1/4	3/4	4	.015	475-250011	56.93
5/16	7/8	4	.015	475-312511	59.73
3/8	1	4	.020	475-375011	69.55
1/2	1-1/4	4	.030	475-500011	128.70
1/2	1-1/4	6	.030	475L500011	145.04
5/8	1-1/2	6	.030	475-625011	252.45
3/4	1-3/4	6	.040	475-750011	323.40
1	1-3/4	6	.045	475-100011	458.70



End Mills – Roughers

Four Flute Rougher

Fine Pitch
Center Cutting

Designed for roughing when a reduction in horse power is needed, coupled with a reduction in vibration and chatter in steel, stainless steels, titanium and high temp alloys.



R430 = REGULAR

LR430 = LONG

XLR430 = EXTRA LONG

DIA.	FLUTE LENGTH	OVERALL LENGTH	ALTIN PART NUMBER	ALTIN LIST PRICE
1/8	3/8	1-1/2	R430-1250-11	23.36
3/16	5/8	2	R430-1875-11	27.36
1/4	3/4	2-1/2	R430-2500-11	42.90
1/4	1-1/8	3	LR430-2500-11	68.94
1/4	1-1/2	4	XLR430-2500-11	75.90
5/16	3/4	2-1/2	R430-3125-11	49.50
5/16	1-1/4	3	LR430-3125-11	65.74
5/16	1-5/8	4	XLR430-3125-11	99.00
3/8	1	2-1/2	R430-3750-11	66.00
3/8	1-1/4	3	LR430-3750-11	103.95
3/8	1-3/4	4	XLR430-3750-11	127.64
7/16	1	3	R430-4375-11	72.60
7/16	2	4	LR430-4375-11	151.80
1/2	1-1/4	3	R430-5000-11	85.80
1/2	2	4	LR430-5000-11	155.10
1/2	3	6	XLR430-5000-11	204.60
5/8	1-1/4	3-1/2	R430-6250-11	169.95
5/8	2-1/4	5	LR430-6250-11	310.20
5/8	3	6	XLR430-6250-11	415.80
3/4	1-1/2	4	R430-7500-11	217.14
3/4	2-1/4	5	LR430-7500-11	409.20
3/4	3	6	XLR430-7500-11	514.80
1	1-1/2	4	R430-1000-11	281.33
1	2-1/4	5	LR430-1000-11	539.55
1	3	6	XLR430-1000-11	706.20



End Mills – Roughers

Truncated Rougher For Titanium

3,4,6 Flute
45 Degree Helix



DIA.	FLUTE LENGTH	OVERALL LENGTH	NO. OF FLUTES	UNCOATED PART NUMBER	UNCOATED LIST PRICE	ALTIN PART NUMBER	ALTIN LIST PRICE
1/4	3/8	2-1/2	3	431-2500	78.34	431-250011	83.95
1/4	3/4	2-1/2	3	432-2500	83.79	432-250011	89.43
3/8	1/2	2-1/2	4	431-3750	108.77	431-375011	114.41
3/8	1	2-1/2	4	432-3750	116.41	432-375011	122.05
1/2	5/8	3	4	431-5000	137.05	431-500011	142.69
1/2	1-1/4	3	4	432-5000	146.65	432-500011	152.32
5/8	3/4	3-1/2	4	431-6250	237.14	431-625011	242.78
5/8	1-5/8	3-1/2	4	432-6250	253.75	432-625011	259.40
3/4	1	4	4	431-7500	269.76	431-750011	282.07
3/4	1-5/8	4	4	432-7500	288.65	432-750011	300.96
1	1-1/4	4	6	432-1000	432.94	432-100011	445.25

Fine Knuckle Rougher For Titanium

5 Flute
45 Degree Helix
High Speed Machining



DIA.	FLUTE LENGTH	OVERALL LENGTH	CHAMFER WIDTH	UNCOATED PART NUMBER	UNCOATED LIST PRICE	ALTIN PART NUMBER	ALTIN LIST PRICE
3/8	1/2	2-1/2	.020	433-3750	103.36	433-375011	112.48
3/8	1	2-1/2	.020	434-3750	131.00	434-375011	140.12
7/16	9/16	2-3/4	.020	433-4375	116.95	433-437511	127.17
7/16	1	2-3/4	.020	434-4375	144.95	434-437511	155.17
1/2	5/8	3	.025	433-5000	141.42	433-500011	152.48
1/2	1-1/4	3	.025	434-5000	164.80	434-500011	175.89
5/8	3/4	3-1/2	.025	433-6250	225.73	433-625011	242.12
5/8	1-5/8	3-1/2	.025	434-6250	285.47	434-625011	301.87
3/4	1	4	.025	433-7500	285.58	433-750011	310.08
3/4	1-5/8	4	.025	434-7500	324.75	434-750011	257.50
1	1-1/4	4	.025	433-1000	467.74	433-100011	502.03
1	2	4	.025	434-1000	521.20	434-100011	555.50



4 Flute - Variable Pitch



DIA.	FLUTE LENGTH	OVERALL LENGTH	SQUARE	RAD	SQUARE PART NUMBER	SQUARE LIST PRICE	RADIUS PART NUMBER	RADIUS LIST PRICE
1/8	1/4	2	SQ	.010	438-12504-C15	28.67	438-12504-010-C15	32.12
1/8	1/2	2	SQ	.010	438-12508-C15	36.32	438-12508-010-C15	40.69
3/16	5/16	2	SQ	.010	438-18705-C15	30.14	438-18705-010-C15	33.73
3/16	5/8	2-1/2	SQ	.010	438-18710-C15	33.21	438-18710-010-C15	39.19
1/4	3/8	2	SQ	.020	438-25006-C15	31.59	438-25006-020-C15	38.81
1/4	1/2	2-1/2	SQ	.020	438-25008-C15	35.73	438-25008-020-C15	43.13
1/4	3/4	2-1/2	SQ	.020	438-25012-C15	39.87	438-25012-020-C15	48.69
1/4	1	3	SQ	.020	438-25016-C15	43.47	438-25016-020-C15	53.84
5/16	7/16	2	SQ	.020	438-31207-C15	46.83	438-31207-020-C15	52.13
5/16	13/16	2-1/2	SQ	.020	438-31213-C15	50.91	438-31213-020-C15	57.03
5/16	1	3	SQ	.020	438-31216-C15	55.50	438-31216-020-C15	62.16
3/8	1/2	2	SQ	.020	438-37508-C15	52.70	438-37508-020-C15	59.03
3/8	7/8	2-1/2	SQ	.020	438-37514-C15	57.46	438-37514-020-C15	64.35
3/8	1	2-1/2	SQ	.020	438-37516-C15	62.63	438-37516-020-C15	70.26
3/8	1-1/4	3	SQ	.020	438-37520-C15	68.27	438-37520-020-C15	76.47
7/16	5/8	2-1/2	SQ	.020	438-43710-C15	75.17	438-43710-020-C15	84.20
7/16	7/8	2-3/4	SQ	.020	438-43714-C15	81.93	438-43714-020-C15	91.77
7/16	1-1/8	3	SQ	.020	438-43718-C15	89.31	438-43718-020-C15	100.05
1/2	5/8	2-1/2	SQ	.030	438-50010-C15	83.51	438-50010-030-C15	93.53
1/2	1	3	SQ	.030	438-50016-C15	91.02	438-50016-030-C15	99.39
1/2	1-1/4	3	SQ	.030	438-50020-C15	99.23	438-50020-030-C15	104.82
1/2	1-5/8	4	SQ	.030	438-50026-C15	108.17	438-50026-030-C15	113.86
5/8	7/8	3	SQ	.030	438-62514-C15	138.36	438-62514-030-C15	151.26
5/8	1-1/4	3-1/2	SQ	.030	438-62520-C15	141.17	438-62520-030-C15	161.20
5/8	1-5/8	3-1/2	SQ	.030	438-62526-C15	144.92	438-62526-030-C15	167.31
5/8	2-1/4	5	SQ	.030	438-62536-C15	186.21	438-62536-030-C15	212.31
5/8	3-1/4	6	SQ	.030	438-62552-C15	201.47	438-62552-030-C15	227.31
3/4	7/8	3	SQ	.030	438-75014-C15	235.50	438-75014-030-C15	251.16
3/4	1-1/4	4	SQ	.030	438-75020-C15	239.04	438-75020-030-C15	253.73
3/4	1-5/8	4	SQ	.030	438-75026-C15	243.32	438-75026-030-C15	262.23
3/4	2-1/4	5	SQ	.030	438-75036-C15	267.46	438-75036-030-C15	286.32
3/4	3-1/4	6	SQ	.030	438-75052-C15	309.74	438-75052-030-C15	302.21
1	1-1/2	4	SQ	.030	438-10024-C15	357.30	438-10024-030-C15	400.19
1	2	4	SQ	.030	438-10032-C15	389.46	438-10032-030-C15	436.20
1	2-5/8	5	SQ	.030	438-10042-C15	424.52	438-10042-030-C15	475.47
1	3	6	SQ	.030	438-10048-C15	462.73	438-10048-030-C15	518.27
1	4-1/4	7	SQ	.030	438-10068-C15	504.38	438-10068-030-C15	564.90



4 Flute - Variable Pitch with Chip Breaker



DIA.	FLUTE LENGTH	OVERALL LENGTH	RAD	PART NUMBER	RADIUS LIST PRICE
1/8	1/4	2	.010	CB438-12504-010-C15	36.93
1/8	1/2	2	.010	CB438-12508-010-C15	46.79
3/16	5/16	2	.010	CB438-18705-010-C15	37.83
3/16	5/8	2-1/2	.010	CB438-18710-010-C15	43.26
1/4	3/8	2	.020	CB438-25006-020-C15	40.70
1/4	1/2	2-1/2	.020	CB438-25008-020-C15	46.82
1/4	3/4	2-1/2	.020	CB438-25012-020-C15	56.00
1/4	1	3	.020	CB438-25016-020-C15	61.92
5/16	7/16	2	.020	CB438-31207-020-C15	59.95
5/16	13/16	2-1/2	.020	CB438-31213-020-C15	65.58
5/16	1	3	.020	CB438-31216-020-C15	71.49
3/8	1/2	2	.020	CB438-37508-020-C15	67.88
3/8	7/8	2-1/2	.020	CB438-37514-020-C15	74.01
3/8	1	2-1/2	.020	CB438-37516-020-C15	80.81
3/8	1-1/4	3	.020	CB438-37520-020-C15	87.95
7/16	5/8	2-1/2	.020	CB438-43710-020-C15	86.83
7/16	7/8	2-3/4	.020	CB438-43714-020-C15	105.54
7/16	1-1/8	3	.020	CB438-43718-020-C15	115.54
1/2	5/8	2-1/2	.030	CB438-50010-030-C15	116.03
1/2	1	3	.030	CB438-50016-030-C15	124.46
1/2	1-1/4	3	.030	CB438-50020-030-C15	133.64
1/2	1-5/8	4	.030	CB438-50026-030-C15	143.66
5/8	7/8	3	.030	CB438-62514-030-C15	173.76
5/8	1-1/4	3-1/2	.030	CB438-62520-030-C15	183.71
5/8	1-5/8	3-1/2	.030	CB438-62526-030-C15	189.82
5/8	2-1/4	5	.030	CB438-62536-030-C15	234.81
5/8	3-1/4	6	.030	CB438-62552-030-C15	249.81
3/4	7/8	3	.030	CB438-75014-030-C15	296.16
3/4	1-1/4	4	.030	CB438-75020-030-C15	298.73
3/4	1-5/8	4	.030	CB438-75026-030-C15	307.23
3/4	2-1/4	5	.030	CB438-75036-030-C15	331.82
3/4	3-1/4	6	.030	CB438-75052-030-C15	377.21
1	1-1/2	4	.030	CB438-10024-030-C15	445.19
1	2	4	.030	CB438-10032-030-C15	481.20
1	2-5/8	5	.030	CB438-10042-030-C15	520.47
1	3	6	.030	CB438-10048-030-C15	563.25
1	4-1/4	7	.030	CB438-10068-030-C15	609.90



4 Flute - Variable Pitch with Reduced Neck

DIA.	FLUTE LENGTH	OVERALL LENGTH	NECK DIA.	LBS	RAD.	PART NUMBER	SQUARE LIST PRICE
1/8	5/32	3	.118	3/8	.010	438-12502-010-NS06-C15	40.62
1/8	5/32	3	.118	1/2	.010	438-12502-010-NS08-C15	51.47
1/8	5/32	3	.118	5/8	.010	438-12502-010-NS10-C15	54.81
3/16	7/32	3	.178	1/2	.010	438-18703-010-NS08-C15	49.22
3/16	7/32	3	.178	3/4	.010	438-18703-010-NS12-C15	54.32
3/16	7/32	3	.178	1	.010	438-18703-010-NS16-C15	59.72
1/4	3/8	3	.237	3/4	.020	438-25006-020-NS12-C15	50.76
1/4	3/8	4	.237	1-1/8	.020	438-25006-020-NS18-C15	58.13
1/4	3/8	4	.237	2-1/8	.020	438-25006-020-NS34-C15	66.03
3/8	1/2	4	.356	1-1/8	.020	438-37508-020-NS18-C15	74.67
3/8	1/2	4	.356	2-1/8	.020	438-37508-020-NS34-C15	81.41
3/8	1/2	6	.356	3-1/8	.020	438-37508-020-NS50-C15	88.88
3/8	1/2	6	.356	4-1/8	.020	438-37508-020-NS66-C15	96.74
1/2	5/8	4	.475	1-1/2	.030	438-50010-030-NS24-C15	118.30
1/2	5/8	4	.475	2-1/4	.030	438-50010-030-NS36-C15	128.97
1/2	5/8	6	.475	3-3/8	.030	438-50010-030-NS54-C15	140.58
1/2	5/8	6	.475	4-1/8	.030	438-50010-030-NS66-C15	153.26
5/8	3/4	4	.593	1-5/8	.030	438-62512-030-NS26-C15	177.12
5/8	3/4	6	.593	2-3/8	.030	438-62512-030-NS38-C15	187.62
5/8	3/4	6	.593	3-3/8	.030	438-62512-030-NS54-C15	199.13
5/8	3/4	6	.593	4-1/8	.030	438-62512-030-NS66-C15	219.17
3/4	1	4	.712	2	.030	438-75016-030-NS32-C15	301.40
3/4	1	6	.712	2-1/2	.030	438-75016-030-NS40-C15	304.47
3/4	1	6	.712	3-3/8	.030	438-75016-030-NS54-C15	314.67
3/4	1	6	.712	4-1/8	.030	438-75016-030-NS66-C15	343.59
1	1-1/4	4	.950	2-1/4	.030	438-10020-030-NS36-C15	506.24
1	1-1/4	6	.950	2-5/8	.030	438-10020-030-NS42-C15	551.79
1	1-1/4	6	.950	3-3/8	.030	438-10020-030-NS54-C15	601.47
1	1-1/4	6	.950	4-1/8	.030	438-10020-030-NS66-C15	655.59



4 Flute - Variable Pitch - Ball Nose



DIA.	FLUTE LENGTH	OVERALL LENGTH	PART NUMBER	LIST PRICE
1/8	1/4	2	438-12504-BN-C15	37.89
1/8	1/2	2	438-12508-BN-C15	48.00
3/16	5/16	2	438-18705-BN-C15	44.04
3/16	9/16	2-1/2	438-18709-BN-C15	46.23
1/4	3/8	2	438-25006-BN-C15	46.32
1/4	1/2	2-1/2	438-25008-BN-C15	50.46
1/4	3/4	2-1/2	438-25012-BN-C15	57.45
5/16	7/16	2	438-31207-BN-C15	61.52
5/16	13/16	2-1/2	438-31213-BN-C15	67.30
3/8	1/2	2	438-37508-BN-C15	69.65
3/8	1	2-1/2	438-37516-BN-C15	82.90
1/2	5/8	2-1/2	438-50010-BN-C15	110.36
1/2	1	3	438-50016-BN-C15	117.29
1/2	1-1/4	3	438-50020-BN-C15	123.70
5/8	7/8	3	438-62514-BN-C15	178.49
5/8	1-1/4	3-1/2	438-62520-BN-C15	190.22
5/8	1-5/8	4	438-62526-BN-C15	197.43
3/4	1	3	438-75016-BN-C15	298.40
3/4	1-5/8	4	438-75026-BN-C15	309.44
1	1-1/4	4	438-10020-BN-C15	472.22
1	2	4	438-10032-BN-C15	541.71



4 FLUTE - 438 SERIES

MATERIAL	AXIAL	RADIAL	DIAMETER												4 FLUTE - 438 SERIES		
	DOC	DOC	1/8				1/4			3/8			1/2				
			SFM	RPM	IPM	CPT	RPM	IPM	CPT	RPM	IPM	CPT	RPM	IPM	CPT		
Med Carbon Steel <375																	
Full Slot	1 x D	1 x D	250	7640	15	0.0005	3820	15	0.0010	2547	18	0.0018	1910	19	0.0025		
30% Radial	1.25 x D	.3 x D	350	10696	26	0.0006	5348	26	0.0012	3565	31	0.0022	2674	32	0.0030		
10% Radial	1.5 X D	.1 x D	500	15280	61	0.001	7640	61	0.0020	5093	73	0.0036	3820	77	0.0050		
Tool Steel <375																	
A2,A6,D2,H13, Full Slot	1 x D	1 x D	225	6876	13	0.0005	3438	13	0.0010	2292	16	0.0017	1719	16	0.0024		
30% Radial	1.25 x D	.3 x D	325	9932	23	0.0006	4966	23	0.0011	3311	27	0.0021	2483	29	0.0029		
10% Radial	1.5 X D	.1 x D	475	14516	55	0.0010	7258	55	0.0019	4839	66	0.0034	3629	70	0.0048		
Cast Iron- gray <220																	
Full Slot	1 x D	1 x D	105	3209	6	0.0005	1604	6	0.0009	1070	7	0.0016	802	7	0.0023		
30% Radial	1.25 x D	.3 x D	200	6112	13	0.0005	3056	13	0.0011	2037	16	0.0019	1528	17	0.0027		
10% Radial	1.5 X D	.1 x D	560	17114	62	0.0009	8557	62	0.0018	5705	74	0.0032	4278	78	0.0045		
Cast Iron- gray malleable																	
Full Slot	.75 x D	1 x D	155	4737	8	0.0004	2368	8	0.0009	1579	10	0.0015	1184	10	0.0022		
30% Radial	1.25 x D	.3 x D	180	5501	11	0.0005	2750	11	0.0010	1834	14	0.0019	1375	14	0.0026		
10% Radial	1.5 x D	.1 x D	300	9168	31	0.0009	4584	31	0.0017	3056	38	0.0031	2292	40	0.0043		
SS 300 Series (303,420)																	
Full Slot	.75 x D	1 x D	120	3667	6	0.0004	1834	6	0.0008	1222	7	0.0015	917	8	0.0021		
30% Radial	1.25 x D	.3 x D	185	5654	11	0.0005	2827	11	0.0010	1885	13	0.0018	1413	14	0.0025		
10% Radial	1.5 x D	.1 x D	300	9168	30	0.0008	4584	30	0.0016	3056	36	0.0029	2292	38	0.0041		
Martensitic SS (400 grades)																	
Full Slot	0.5	1 x D	115	3514	5	0.0004	1757	5	0.0008	1171	7	0.0014	879	7	0.0019		
30% Radial	1.25 x D	.3 x D	180	5501	10	0.0005	2750	10	0.0009	1834	12	0.0017	1375	13	0.0023		
10% Radial	1.5 x D	.1 x D	250	7640	24	0.0008	3820	24	0.0015	2547	28	0.0028	1910	30	0.0039		
High Temp Alloys																	
Inconel Full Slot	.25 x D	1 x D	60	1834	3	0.0004	917	3	0.0007	611	3	0.0013	458	3	0.0019		
Hastalloy 30% Radial	1.25 x D	.3 x D	80	2445	4	0.0004	1222	4	0.0009	815	5	0.0016	611	5	0.0022		
Waspalloy 10% Radial	1.5 x D	.1 x D	125	3820	11	0.0007	1910	11	0.0015	1273	13	0.0026	955	14	0.0037		
Titanium [6AL4V]																	
Grades (5-38) Full Slot	0.5	1 x D	100	3056	4	0.0003	1528	4	0.0007	1019	5	0.0013	764	5	0.0018		
30% Radial	1.25 x D	.3 x D	135	4126	7	0.0004	2063	7	0.0008	1375	8	0.0015	1031	9	0.0021		
10% Radial	1.5 x D	.1 x D	220	6723	19	0.0007	3362	19	0.0014	2241	23	0.0025	1681	24	0.0035		

			5/8				3/4			1		
			SFM	RPM	IPM	CPT	RPM	IPM	CPT	RPM	IPM	CPT
Med Carbon Steel <375												
Full Slot	1 x D	1 x D	250	1528	18	0.0030	1273	17	0.0033	955	17	0.0043
30% Radial	1.25 x D	.3 x D	350	2139	31	0.0036	1783	28	0.0040	1337	28	0.0052
10% Radial	1.5 X D	.1 x D	500	3056	74	0.0060	2547	68	0.0067	1910	66	0.0086
Tool Steel <375												
A2,A6,D2,H13, Full Slot	1 x D	1 x D	225	1375	16	0.0029	1146	14	0.0032	860	14	0.0041
30% Radial	1.25 x D	.3 x D	325	1986	27	0.0034	1655	25	0.0038	1242	24	0.0049
10% Radial	1.5 X D	.1 x D	475	2903	67	0.0057	2419	61	0.0063	1815	60	0.0082
Cast Iron- gray <220												
Full Slot	1 x D	1 x D	105	642	7	0.0027	535	6	0.0030	401	6	0.0039
30% Radial	1.25 x D	.3 x D	200	1222	16	0.0033	1019	15	0.0036	764	14	0.0047
10% Radial	1.5 X D	.1 x D	560	3423	75	0.0055	2852	69	0.0060	2139	67	0.0078
Cast Iron- gray malleable												
Full Slot	.75 x D	1 x D	155	947	10	0.0026	789	9	0.0029	592	9	0.0037
30% Radial	1.25 x D	.3 x D	180	1100	14	0.0031	917	13	0.0034	688	12	0.0044
10% Radial	1.5 x D	.1 x D	300	1834	38	0.0052	1528	35	0.0057	1146	34	0.0074
SS 300 Series (303,420)												
Full Slot	.75 x D	1 x D	120	733	7	0.0025	611	7	0.0027	458	6	0.0035
30% Radial	1.25 x D	.3 x D	185	1131	13	0.0030	942	12	0.0033	707	12	0.0042
10% Radial	1.5 x D	.1 x D	300	1834	36	0.0049	1528	33	0.0054	1146	32	0.0070
Martensitic SS (400 grades)												
Full Slot	0.5	1 x D	115	703	7	0.0023	586	6	0.0026	439	6	0.0033
30% Radial	1.25 x D	.3 x D	180	1100	12	0.0028	917	11	0.0031	688	11	0.0040
10% Radial	1.5 x D	.1 x D	250	1528	29	0.0047	1273	26	0.0051	955	26	0.0067
High Temp Alloys												
Inconel Full Slot	.25 x D	1 x D	60	367	3	0.0022	306	3	0.0024	229	3	0.0032
Hastalloy 30% Radial	1.25 x D	.3 x D	80	489	5	0.0027	407	5	0.0029	306	5	0.0038
Waspalloy 10% Radial	1.5 x D	.1 x D	125	764	14	0.0044	637	12	0.0049	478	12	0.0064
Titanium [6AL4V]												
Grades (5-38) Full Slot	0.5	1 x D	100	611	5	0.0021	509	5	0.0023	382	5	0.0030
30% Radial	1.25 x D	.3 x D	135	825	8	0.0025	688	8	0.0028	516	7	0.0036
10% Radial	1.5 x D	.1 x D	220	1345	23	0.0042	1121	21	0.0046	840	20	0.0060

CPT: Chip per tooth
Surface feet per
SFM: minute
IPM: Inches per minute
DOC: Depth of cut
FPT: Feed per tooth

SFM= .262 x Dia. X RPM
RPM= 3.82 x SFM/DIA.
IPM= FPT x No. Teeth X
RPM
FPT= IPM/ (No. Teeth x
RPM)



5 Flute - Variable Pitch with Radius



Variable End Mills

DIA.	LOC	OAL	.010 RAD	.020 RAD	.030 RAD	.060 RAD	.090 RAD	.120 RAD	.190 RAD	.250 RAD	PART NUMBER	SQ. LIST PRICE	RAD <= .060 LIST PRICE	RAD > .060 LIST PRICE
1/8	1/4	1-1/2	.010	.020	.030						538-12504-(RAD)-C15	30.68	35.28	
1/8	1/2	2	.010	.020	.030						538-12508-(RAD)-C15	38.87	47.70	
1/8	3/4	2-1/2	.010		.030						538-12512-(RAD)-C15	42.18	48.51	
3/16	5/16	2	.010	.020	.030						538-18705-(RAD)-C15	33.77	40.71	
3/16	9/16	2	.010	.020	.030						538-18709-(RAD)-C15	37.26	42.86	
3/16	3/4	2-1/2	.010		.030						538-18712-(RAD)-C15	44.61	51.30	
1/4	3/8	2	.010	.020	.030	.060					538-25006-(RAD)-C15	37.77	43.44	
1/4	1/2	2-1/2	.010	.020	.030	.060					538-25008-(RAD)-C15	40.32	46.37	
1/4	3/4	2-1/2	.010	.020	.030	.060					538-25012-(RAD)-C15	44.94	51.68	
1/4	1	3	.010	.020	.030	.060					538-25016-(RAD)-C15	46.68	53.69	
1/4	1-1/4	3	.010	.020	.030	.060					538-25020-(RAD)-C15	50.66	58.26	
5/16	7/16	2	.010	.020	.030	.060					538-31207-(RAD)-C15	51.77	59.54	
5/16	13/16	2-1/2	.010	.020	.030	.060					538-31213-(RAD)-C15	54.48	62.66	
5/16	1	3	.010	.020	.030	.060					538-31216-(RAD)-C15	56.22	64.65	
3/8	1/2	2		.020	.030	.060	.090				538-37508-(RAD)-C15	56.39	64.85	71.33
3/8	1	2-1/2		.020	.030	.060	.090				538-37516-(RAD)-C15	61.53	70.75	77.84
3/8	1-1/4	3		.020	.030	.060	.090				538-37520-(RAD)-C15	64.67	74.37	81.80
3/8	1-1/2	4		.020	.030	.060	.090				538-37524-(RAD)-C15	68.81	79.13	87.05
1/2	5/8	2-1/2		.020	.030	.060	.090	.120			538-50010-(RAD)-C15	89.36	102.77	107.96
1/2	1	3		.020	.030	.060	.090	.120			538-50016-(RAD)-C15	99.21	110.00	115.50
1/2	1-1/4	3		.020	.030	.060	.090	.120			538-50020-(RAD)-C15	108.15	115.26	121.02
1/2	1-5/8	4		.020	.030	.060	.090	.120			538-50026-(RAD)-C15	117.90	125.16	131.42
1/2	2	4		.020	.030	.060	.090	.120			538-50032-(RAD)-C15	123.18	133.11	139.77
5/8	3/4	3			.030	.060	.090	.120			538-62512-(RAD)-C15	159.12	182.99	192.14
5/8	1-1/4	3-1/2			.030	.060	.090	.120			538-62520-(RAD)-C15	171.77	197.54	207.41
5/8	1-5/8	3-1/2			.030	.060	.090	.120			538-62526-(RAD)-C15	195.77	225.14	236.39
5/8	2-1/8	4			.030	.060	.090	.120			538-62534-(RAD)-C15	214.14	244.16	256.37
5/8	2-1/2	5			.030	.060	.090	.120			538-62540-(RAD)-C15	231.69	261.41	274.47
3/4	1	3			.030	.060	.090	.120	.190	.250	538-75016-(RAD)-C15	235.37	271.25	284.81
3/4	1-5/8	4			.030	.060	.090	.120	.190	.250	538-75026-(RAD)-C15	256.82	278.76	292.70
3/4	2-1/4	5			.030	.060	.090	.120	.190	.250	538-75036-(RAD)-C15	288.62	331.91	348.57
3/4	2-3/4	5			.030	.060	.090	.120	.190	.250	538-75044-(RAD)-C15	320.76	368.88	387.32
3/4	3-1/4	6			.030	.060	.090	.120	.190	.250	538-75052-(RAD)-C15	338.61	389.40	408.87
1	1-1/4	4			.030	.060	.090	.120	.190	.250	538-10020-(RAD)-C15	384.62	442.31	464.44
1	2	4			.030	.060	.090	.120	.190	.250	538-10032-(RAD)-C15	416.73	479.24	503.21
1	2-5/8	5			.030	.060	.090	.120	.190	.250	538-10042-(RAD)-C15	444.62	509.58	535.07
1	3-1/4	6			.030	.060	.090	.120	.190	.250	538-40052-(RAD)-C15	586.26	674.21	707.91
1	4-1/4	7			.030	.060	.090	.120	.190	.250	538-40068-(RAD)-C15	682.77	785.19	824.45
1-1/4	1-1/2	4-1/2			.030	.060	.090	.120	.190	.250	538-1.25024-(RAD)-C15	685.22	788.12	827.52
1-1/4	2	4-1/2			.030	.060	.090	.120	.190	.250	538-1.25032-(RAD)-C15	702.36	807.72	848.10
1-1/4	2-5/8	6			.030	.060	.090	.120	.190	.250	538-1.25042-(RAD)-C15	718.97	826.82	868.66
1-1/4	3-1/4	6			.030	.060	.090	.120	.190	.250	538-1.25052-(RAD)-C15	797.47	917.09	962.94
1-1/4	4-1/2	7			.030	.060	.090	.120	.190	.250	538-1.25072-(RAD)-C15	903.17	1038.65	1090.58



5 Flute - Variable Pitch with Radius & Reduced Neck



DIA.	LOC	OAL	NECK DIA.	LBS	.010 RAD	.020 RAD	.030 RAD	.060 RAD	.090 RAD	.120 RAD	.190 RAD	.250 RAD	PART NUMBER	SQ. LIST PRICE	RAD <= .060 LIST PRICE	RAD > .060 LIST PRICE
1/8	3/16	2	.118	3/8	.010	.020	.030						538-12503-(RAD)-NS06-C15	38.34	44.10	
1/8	3/16	2	.118	1/2	.010	.020	.030						538-12503-(RAD)-NS08-C15	48.59	55.90	
1/8	3/16	2-1/2	.118	3/4	.010		.030						538-12503-(RAD)-NS12-C15	51.77	59.54	
3/16	1/4	2	.178	1/2	.010	.020	.030						538-18704-(RAD)-NS08-C15	44.27	50.91	
3/16	1/4	2-1/2	.178	3/4	.010	.020	.030						538-18704-(RAD)-NS12-C15	52.02	59.82	
3/16	1/4	2-1/2	.178	1-1/8	.010		.030						538-18704-(RAD)-NS18-C15	54.21	62.34	
1/4	3/8	4	.237	3/4	.010	.020	.030	.060					538-25006-(RAD)-NS12-C15	47.62	54.93	
1/4	3/8	4	.237	1-1/8	.010	.020	.030	.060					538-25006-(RAD)-NS18-C15	56.72	56.72	
1/4	3/8	4	.237	2-1/8	.010	.020	.030	.060					538-25006-(RAD)-NS34-C15	59.31	68.21	
3/8	1/2	4	.356	1-1/8		.020	.030	.060	.090				538-37508-(RAD)-NS18-C15	70.49	81.06	89.16
3/8	1/2	4	.356	2-1/8		.020	.030	.060	.090				538-37508-(RAD)-NS34-C15	76.92	88.46	97.29
3/8	1/2	6	.356	3-1/8		.020	.030	.060	.090				538-37508-(RAD)-NS50-C15	80.84	91.96	102.26
3/8	1/2	6	.356	4-1/8		.020	.030	.060	.090				538-37508-(RAD)-NS66-C15	86.01	98.91	108.80
1/2	5/8	4	.475	1-1/2		.020	.030	.060	.090	.120			538-50010-(RAD)-NS24-C15	103.52	119.64	125.00
1/2	5/8	4	.475	2-1/4		.020	.030	.060	.090	.120			538-50010-(RAD)-NS36-C15	117.14	134.70	141.44
1/2	5/8	6	.475	3-3/8		.020	.030	.060	.090	.120			538-50010-(RAD)-NS54-C15	128.61	147.90	155.30
1/2	5/8	6	.475	4-1/8		.020	.030	.060	.090	.120			538-50010-(RAD)-NS66-C15	152.56	175.11	183.86
5/8	3/4	4	.593	1-5/8			.030	.060	.090	.120			538-62512-(RAD)-NS26-C15	159.80	183.75	192.95
5/8	3/4	6	.593	2-3/8			.030	.060	.090	.120			538-62512-(RAD)-NS38-C15	154.10	189.25	198.88
5/8	3/4	6	.593	3-3/8			.030	.060	.090	.120			538-62512-(RAD)-NS54-C15	171.45	197.18	207.03
5/8	3/4	6	.593	4-1/8			.030	.060	.090	.120			538-62512-(RAD)-NS66-C15	175.40	201.70	211.79
3/4	1	4	.712	2			.030	.060	.090	.120	.190	.250	538-75016-(RAD)-NS32-C15	294.83	339.05	356.00
3/4	1	6	.712	2-1/2			.030	.060	.090	.120	.190	.250	538-75016-(RAD)-NS40-C15	321.05	369.17	387.63
3/4	1	6	.712	3-3/8			.030	.060	.090	.120	.190	.250	538-75016-(RAD)-NS54-C15	334.10	384.29	403.50
3/4	1	6	.712	4-1/8			.030	.060	.090	.120	.190	.250	538-75016-(RAD)-NS66-C15	363.08	417.54	438.42
1	1-1/4	4	.950	2-1/4			.030	.060	.090	.120	.190	.250	538-10020-(RAD)-NS36-C15	480.77	552.89	580.43
1	1-1/4	6	.950	2-5/8			.030	.060	.090	.120	.190	.250	538-10020-(RAD)-NS42-C15	520.92	599.06	629.00
1	1-1/4	6	.950	3-3/8			.030	.060	.090	.120	.190	.250	538-10020-(RAD)-NS54-C15	540.14	622.60	653.78
1	1-1/4	6	.950	4-1/8			.030	.060	.090	.120	.190	.250	538-10020-(RAD)-NS66-C15	556.64	640.13	672.14
1-1/4	1-1/2	5	1.187	2-1/4			.030	.060	.090	.120	.190	.250	538-1.25024-(RAD)-NS36-C15	856.65	985.16	1034.40
1-1/4	1-1/2	6	1.187	2-5/8			.030	.060	.090	.120	.190	.250	538-1.25024-(RAD)-NS42-C15	877.95	1009.69	1016.13
1-1/4	1-1/2	6	1.187	3-3/8			.030	.060	.090	.120	.190	.250	538-1.25024-(RAD)-NS54-C15	898.71	1033.52	1085.19
1-1/4	1-1/2	6	1.187	4-1/8			.030	.060	.090	.120	.190	.250	538-1.25024-(RAD)-NS66-C15	996.53	1146.35	1203.66



MATERIAL	AXIAL	RADIAL	5 FLUTE - 538 SERIES													
	DOC	DOC	DIAMETER			1/8			1/4			3/8			1/2	
			SFM	RPM	IPM	CPT	RPM	IPM	CPT	RPM	IPM	CPT	RPM	IPM	CPT	
Med Carbon Steel <375																
Full Slot	1 x D	1 x D	250	7640	19	0.0005	3820	19	0.0010	2547	23	0.0018	1910	24	0.0025	
30% Radial	1.25 x D	.3 x D	350	10696	32	0.0006	5348	32	0.0012	3565	39	0.0022	2674	40	0.0030	
10% Radial	1.5 X D	.1 x D	500	15280	76	0.001	7640	76	0.0020	5093	92	0.0036	3820	96	0.0050	
Tool Steel <375																
A2,A6,D2,H13, Full Slot	1 x D	1 x D	225	6876	16	0.0005	3438	16	0.0010	2292	20	0.0017	1719	21	0.0024	
30% Radial	1.25 x D	.3 x D	325	9932	28	0.0006	4966	28	0.0011	3311	34	0.0021	2483	36	0.0029	
10% Radial	1.5 X D	.1 x D	475	14516	69	0.0010	7258	69	0.0019	4839	83	0.0034	3629	87	0.0048	
Cast Iron- gray <220																
Full Slot	1 x D	1 x D	105	3209	7	0.0005	1604	7	0.0009	1070	9	0.0016	802	9	0.0023	
30% Radial	1.25 x D	.3 x D	200	6112	17	0.0005	3056	17	0.0011	2037	20	0.0019	1528	21	0.0027	
10% Radial	1.5 X D	.1 x D	560	17114	77	0.0009	8557	77	0.0018	5705	93	0.0032	4278	97	0.0045	
Cast Iron- gray malleable																
Full Slot	.75 x D	1 x D	155	4737	10	0.0004	2368	10	0.0009	1579	12	0.0015	1184	13	0.0022	
30% Radial	1.25 x D	.3 x D	180	5501	14	0.0005	2750	14	0.0010	1834	17	0.0019	1375	18	0.0026	
10% Radial	1.5 x D	.1 x D	300	9168	39	0.0009	4584	39	0.0017	3056	47	0.0031	2292	50	0.0043	
SS 300 Series (303,420)																
Full Slot	.75 x D	1 x D	120	3667	7	0.0004	1834	7	0.0008	1222	9	0.0015	917	9	0.0021	
30% Radial	1.25 x D	.3 x D	185	5654	14	0.0005	2827	14	0.0010	1885	17	0.0018	1413	17	0.0025	
10% Radial	1.5 x D	.1 x D	300	9168	37	0.0008	4584	37	0.0016	3056	45	0.0029	2292	47	0.0041	
Martensitic SS (400 grades)																
Full Slot	0.5	1 x D	115	3514	7	0.0004	1757	7	0.0008	1171	8	0.0014	879	9	0.0019	
30% Radial	1.25 x D	.3 x D	180	5501	13	0.0005	2750	13	0.0009	1834	15	0.0017	1375	16	0.0023	
10% Radial	1.5 x D	.1 x D	250	7640	30	0.0008	3820	30	0.0015	2547	35	0.0028	1910	37	0.0039	
High Temp Alloys																
Inconel Full Slot	.25 x D	1 x D	60	1834	3	0.0004	917	3	0.0007	611	4	0.0013	458	4	0.0019	
Hastalloy 30% Radial	1.25 x D	.3 x D	80	2445	5	0.0004	1222	5	0.0009	815	6	0.0016	611	7	0.0022	
Waspalloy 10% Radial	1.5 x D	.1 x D	125	3820	14	0.0007	1910	14	0.0015	1273	17	0.0026	955	18	0.0037	
Titanium [6AL4V]																
Grades (5-38) Full Slot	0.5	1 x D	100	3056	5	0.0003	1528	5	0.0007	1019	6	0.0013	764	7	0.0018	
30% Radial	1.25 x D	.3 x D	135	4126	9	0.0004	2063	9	0.0008	1375	10	0.0015	1031	11	0.0021	
10% Radial	1.5 x D	.1 x D	220	6723	23	0.0007	3362	23	0.0014	2241	28	0.0025	1681	30	0.0035	

				5/8				3/4			1			
Med Carbon Steel <375				SFM	RPM	IPM	CPT	RPM	IPM	CPT	RPM	IPM	CPT	
Full Slot		1 x D	1 x D	250	1528	23	0.0030	1273	21	0.0033	955	21	0.0043	
30% Radial		1.25 x D	.3 x D	350	2139	39	0.0036	1783	36	0.0040	1337	35	0.0052	
10% Radial		1.5 X D	.1 x D	500	3056	92	0.0060	2547	85	0.0067	1910	83	0.0086	
Tool Steel <375														
A2,A6,D2,H13,		Full Slot	1 x D	1 x D	225	1375	20	0.0029	1146	18	0.0032	860	18	0.0041
		30% Radial	1.25 x D	.3 x D	325	1986	34	0.0034	1655	31	0.0038	1242	31	0.0049
		10% Radial	1.5 X D	.1 x D	475	2903	83	0.0057	2419	76	0.0063	1815	75	0.0082
Cast Iron- gray <220														
Full Slot		1 x D	1 x D	105	642	9	0.0027	535	8	0.0030	401	8	0.0039	
30% Radial		1.25 x D	.3 x D	200	1222	20	0.0033	1019	18	0.0036	764	18	0.0047	
10% Radial		1.5 X D	.1 x D	560	3423	93	0.0055	2852	86	0.0060	2139	83	0.0078	
Cast Iron- gray malleable														
Full Slot		.75 x D	1 x D	155	947	12	0.0026	789	11	0.0029	592	11	0.0037	
30% Radial		1.25 x D	.3 x D	180	1100	17	0.0031	917	16	0.0034	688	15	0.0044	
10% Radial		1.5 x D	.1 x D	300	1834	48	0.0052	1528	44	0.0057	1146	42	0.0074	
SS 300 Series (303,420)														
Full Slot		.75 x D	1 x D	120	733	9	0.0025	611	8	0.0027	458	8	0.0035	
30% Radial		1.25 x D	.3 x D	185	1131	17	0.0030	942	15	0.0033	707	15	0.0042	
10% Radial		1.5 x D	.1 x D	300	1834	45	0.0049	1528	41	0.0054	1146	40	0.0070	
Martensitic SS (400 grades)														
Full Slot		0.5	1 x D	115	703	8	0.0023	586	8	0.0026	439	7	0.0033	
30% Radial		1.25 x D	.3 x D	180	1100	15	0.0028	917	14	0.0031	688	14	0.0040	
10% Radial		1.5 x D	.1 x D	250	1528	36	0.0047	1273	33	0.0051	955	32	0.0067	
High Temp Alloys														
Inconel	Full Slot	.25 x D	1 x D	60	367	4	0.0022	306	4	0.0024	229	4	0.0032	
Hastalloy	30% Radial	1.25 x D	.3 x D	80	489	7	0.0027	407	6	0.0029	306	6	0.0038	
Waspalloy	10% Radial	1.5 x D	.1 x D	125	764	17	0.0044	637	16	0.0049	478	15	0.0064	
Titanium [6AL4V]														
Grades (5-38)		Full Slot	0.5	1 x D	100	611	6	0.0021	509	6	0.0023	382	6	0.0030
		30% Radial	1.25 x D	.3 x D	135	825	10	0.0025	688	10	0.0028	516	9	0.0036
		10% Radial	1.5 x D	.1 x D	220	1345	28	0.0042	1121	26	0.0046	840	25	0.0060

CPT: Chip per tooth
 Surface feet per
SFM: minute
IPM: Inches per minute
DOC: Depth of cut
FPT: Feed per tooth

SFM= .262 x Dia. X RPM
 RPM= 3.82 x SFM/DIA.
 IPM= FPT x No. Teeth X
 RPM
 FPT= IPM/ (No. Teeth x
 RPM)



7 Flute - Variable Pitch



DIA.	FLUTE LENGTH	OVERALL LENGTH	END STYLE	PART NUMBER	SQUARE LIST PRICE
1/4	3/8	2	SQ	738-25006-C15	63.18
1/4	1/2	2-1/2	SQ	738-25008-C15	71.46
1/4	3/4	2-1/2	SQ	738-25012-C15	73.74
1/4	1-1/4	3	SQ	738-25020-C15	86.94
1/4	1-3/4	4	SQ	738-25028-C15	93.36
5/16	7/16	2	SQ	738-31207-C15	93.06
5/16	13/16	2-1/2	SQ	738-31213-C15	101.82
5/16	1-3/8	3	SQ	738-31222-C15	111.00
5/16	2	4	SQ	738-31232-C15	128.81
3/8	1/2	2	SQ	738-37508-C15	105.40
3/8	7/8	2-1/2	SQ	738-37514-C15	114.90
3/8	1	2-1/2	SQ	738-37516-C15	125.25
3/8	1-1/2	4	SQ	738-37524-C15	136.53
3/8	2-1/2	6	SQ	738-37540-C15	153.17
7/16	9/16	2-1/2	SQ	738-43709-C15	150.03
7/16	1	2-3/4	SQ	738-43716-C15	163.87
7/16	1-1/2	3-1/2	SQ	738-43724-C15	178.62
7/16	2-3/4	5	SQ	738-43744-C15	188.20
1/2	3/4	2-1/2	SQ	738-50012-C15	167.00
1/2	1-1/4	3	SQ	738-50020-C15	182.84
1/2	2	4	SQ	738-50032-C15	198.45
1/2	3-1/4	6	SQ	738-50052-C15	216.33
5/8	3/4	3	SQ	738-62512-C15	182.27
5/8	1-5/8	3-1/2	SQ	738-62526-C15	198.18
5/8	2	5	SQ	738-62532-C15	235.11
5/8	3-1/4	6	SQ	738-62552-C15	268.16
3/4	1	3	SQ	738-75016-C15	215.82
3/4	1-5/8	4	SQ	738-75026-C15	235.29
3/4	2-1/4	5	SQ	738-75036-C15	292.00
3/4	3-1/4	6	SQ	738-75052-C15	317.46
1	1-1/4	4	SQ	738-10020-C15	714.60
1	2	5	SQ	738-10032-C15	778.92
1	3-1/4	6	SQ	738-10052-C15	849.03
1	4-1/8	7	SQ	738-10066-C15	925.45
1-1/4	2	4-1/2	SQ	738-1.25032-C15	857.52
1-1/4	2-5/8	4-1/2	SQ	738-1.25042-C15	934.71
1-1/4	3-1/4	6	SQ	738-1.25052-C15	1018.33
1-1/4	5	7-1/2	SQ	738-1.25080-C15	1110.53



MATERIAL			AXIAL DOC	RADIAL DOC	DIAMETER			7 FLUTE - 738 SERIES									
					1/8			1/4			3/8			1/2			
					SFM	RPM	IPM	CPT	RPM	IPM	CPT	RPM	IPM	CPT	RPM	IPM	CPT
Med Alloy Steel <375																	
10% Radial	1 x D	.1 x D	600	18336	64	0.0005	9168	64	0.0010	6112	77	0.0018	4584	81	0.0025		
5% Radial	1.25 x D	.05 x D	900	27504	116	0.0006	13752	116	0.0012	9168	139	0.0022	6876	146	0.0030		
2% Radial	1.5 X D	.02 x D	1200	36672	257	0.001	18336	257	0.0020	12224	308	0.0036	9168	323	0.0050		
Tool Steel <375																	
A2,A6,D2,H13, 10% Radial	1 x D	.1 x D	500	15280	51	0.0005	7640	51	0.0010	5093	61	0.0017	3820	64	0.0024		
5% Radial	1.25 x D	.05 x D	800	24448	98	0.0006	12224	98	0.0011	8149	117	0.0021	6112	123	0.0029		
2% Radial	1.5 X D	.02 x D	1000	30560	203	0.0010	15280	203	0.0019	10187	244	0.0034	7640	256	0.0048		
Cast Iron- gray <220																	
10% Radial	1 x D	.1 x D	700	21392	68	0.0005	10696	68	0.0009	7131	81	0.0016	5348	85	0.0023		
5% Radial	1.25 x D	.05 x D	1000	30560	116	0.0005	15280	116	0.0011	10187	139	0.0019	7640	146	0.0027		
2% Radial	1.5 X D	.02 x D	1300	39728	251	0.0009	19864	251	0.0018	13243	301	0.0032	9932	316	0.0045		
Cast Iron- gray malleable																	
10% Radial	.75 x D	.1 x D	550	16808	50	0.0004	8404	50	0.0009	5603	61	0.0015	4202	64	0.0022		
5% Radial	1.25 x D	.05 x D	800	24448	88	0.0005	12224	88	0.0010	8149	106	0.0019	6112	111	0.0026		
2% Radial	1.5 x D	.02 x D	1000	30560	183	0.0009	15280	183	0.0017	10187	220	0.0031	7640	231	0.0043		
SS 300 Series (303,420)																	
10% Radial	.75 x D	.1 x D	450	13752	39	0.0004	6876	39	0.0008	4584	47	0.0015	3438	49	0.0021		
5% Radial	1.25 x D	.05 x D	650	19864	68	0.0005	9932	68	0.0010	6621	82	0.0018	4966	86	0.0025		
2% Radial	1.5 x D	.02 x D	825	25212	144	0.0008	12606	144	0.0016	8404	172	0.0029	6303	181	0.0041		
Martensitic SS (400 grades)																	
10% Radial	0.5	.1 x D	450	13752	37	0.0004	6876	37	0.0008	4584	45	0.0014	3438	47	0.0019		
5% Radial	1.25 x D	.05 x D	650	19864	65	0.0005	9932	65	0.0009	6621	77	0.0017	4966	81	0.0023		
2% Radial	1.5 x D	.02 x D	825	25212	137	0.0008	12606	137	0.0015	8404	164	0.0028	6303	172	0.0039		
High Temp Alloys																	
Inconel 10% Radial	.25 x D	.1 x D	115	3514	9	0.0004	1757	9	0.0007	1171	11	0.0013	879	11	0.0019		
Hastalloy 5% Radial	1.25 x D	.05 x D	170	5195	16	0.0004	2598	16	0.0009	1732	19	0.0016	1299	20	0.0022		
Waspalloy 2% Radial	1.5 x D	.02 x D	220	6723	35	0.0007	3362	35	0.0015	2241	42	0.0026	1681	44	0.0037		
Titanium [6AL4V]																	
Grades (5-38) 10% Radial	0.5	.1 x D	280	8557	21	0.0003	4278	21	0.0007	2852	25	0.0013	2139	26	0.0018		
5% Radial	1.25 x D	.05 x D	360	11002	32	0.0004	5501	32	0.0008	3667	39	0.0015	2750	41	0.0021		
2% Radial	1.5 x D	.02 x D	450	13752	67	0.0007	6876	67	0.0014	4584	81	0.0025	3438	85	0.0035		

				5/8				3/4			1		
Med Alloy Steel <375				SFM	RPM	IPM	CPT	RPM	IPM	CPT	RPM	IPM	CPT
10% Radial	1 x D	.1 x D	600	3667	78	0.0030	3056	71	0.0033	2292	69	0.0043	
5% Radial	1.25 x D	.05 x D	900	5501	140	0.0036	4584	128	0.0040	3438	125	0.0052	
2% Radial	1.5 X D	.02 x D	1200	7334	311	0.0060	6112	285	0.0067	4584	278	0.0086	
Tool Steel <375													
A2,A6,D2,H13, 10% Radial	1 x D	.1 x D	500	3056	61	0.0029	2547	56	0.0032	1910	55	0.0041	
5% Radial	1.25 x D	.05 x D	800	4890	118	0.0034	4075	108	0.0038	3056	105	0.0049	
2% Radial	1.5 X D	.02 x D	1000	6112	246	0.0057	5093	225	0.0063	3820	220	0.0082	
Cast Iron- gray <220													
10% Radial	1 x D	.1 x D	700	4278	82	0.0027	3565	75	0.0030	2674	73	0.0039	
5% Radial	1.25 x D	.05 x D	1000	6112	140	0.0033	5093	128	0.0036	3820	125	0.0047	
2% Radial	1.5 X D	.02 x D	1300	7946	304	0.0055	6621	278	0.0060	4966	271	0.0078	
Cast Iron- gray malleable													
10% Radial	.75 x D	.1 x D	550	3362	61	0.0026	2801	56	0.0029	2101	55	0.0037	
5% Radial	1.25 x D	.05 x D	800	4890	106	0.0031	4075	98	0.0034	3056	95	0.0044	
2% Radial	1.5 x D	.02 x D	1000	6112	222	0.0052	5093	203	0.0057	3820	198	0.0074	
SS 300 Series (303,420)													
10% Radial	.75 x D	.1 x D	450	2750	47	0.0025	2292	43	0.0027	1719	42	0.0035	
5% Radial	1.25 x D	.05 x D	650	3973	82	0.0030	3311	75	0.0033	2483	73	0.0042	
2% Radial	1.5 x D	.02 x D	825	5042	174	0.0049	4202	159	0.0054	3152	155	0.0070	
Martensitic SS (400 grades)													
10% Radial	0.5	.1 x D	450	2750	45	0.0023	2292	41	0.0026	1719	40	0.0033	
5% Radial	1.25 x D	.05 x D	650	3973	78	0.0028	3311	72	0.0031	2483	70	0.0040	
2% Radial	1.5 x D	.02 x D	825	5042	165	0.0047	4202	151	0.0051	3152	148	0.0067	
High Temp Alloys													
Inconel 10% Radial	.25 x D	.1 x D	115	703	11	0.0022	586	10	0.0024	439	10	0.0032	
Hastalloy 5% Radial	1.25 x D	.05 x D	170	1039	19	0.0027	866	18	0.0029	649	17	0.0038	
Waspalloy 2% Radial	1.5 x D	.02 x D	220	1345	42	0.0044	1121	38	0.0049	840	37	0.0064	
Titanium [6AL4V]													
Grades (5-38) 10% Radial	0.5	.1 x D	280	1711	25	0.0021	1426	23	0.0023	1070	23	0.0030	
5% Radial	1.25 x D	.05 x D	360	2200	39	0.0025	1834	36	0.0028	1375	35	0.0036	
2% Radial	1.5 x D	.02 x D	450	2750	81	0.0042	2292	75	0.0046	1719	73	0.0060	

CPT: Chip per tooth
Surface feet per
SFM: minute
IPM: Inches per minute
DOC: Depth of cut
FPT: Feed per tooth

SFM= .262 x Dia. X RPM
RPM= 3.82 x SFM/DIA.
IPM= FPT x No. Teeth X
RPM
FPT= IPM/ (No. Teeth x
RPM)