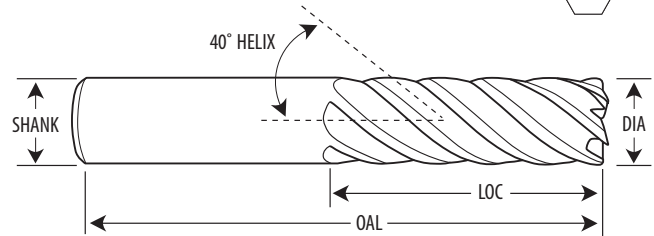
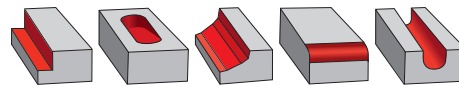
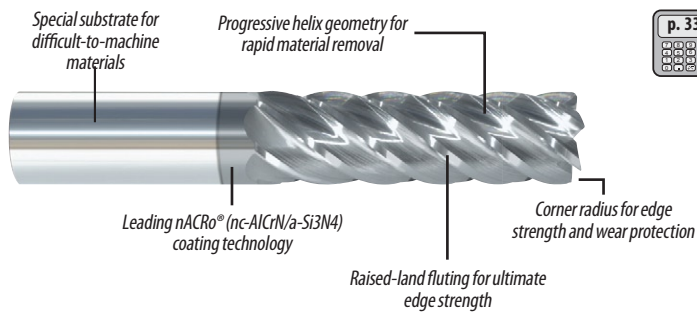
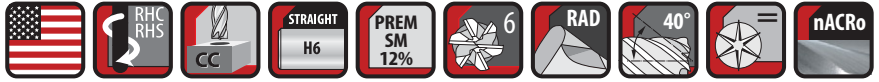


**ALPHA<sup>6</sup>**



DIA TOLERANCE: +0.000 / -0.002" SHANK TOLERANCE: +0.0000 / -0.0004"

DIA	Dec In	LOC	SHANK	OAL	LENGTH	RADIUS	NACRo®
1/4	0.2500	1/2	1/4	2	Stub	0.020	292-201133
		3/4	1/4	2-1/2	Regular	0.020	292-301133
		1-1/8	1/4	3	Long	0.020	292-401133
		1-1/2	1/4	4	X/Long	0.020	292-501133
		1-1/2	1/4	6	EXT X/Long	0.020	292-601133
5/16	0.3125	13/16	5/16	2-1/2	Regular	0.020	292-301153
		1-1/8	5/16	3	Long	0.020	292-401153
		1-1/2	5/16	6	EXT X/Long	0.020	292-601153
		1-5/8	5/16	4	X/Long	0.020	292-501153
3/8	0.3750	5/8	3/8	2	Stub	0.020	292-201173
		1	3/8	2-1/2	Regular	0.020	292-301173
		1-1/8	3/8	3	Long	0.020	292-401173
		1-1/2	3/8	6	EXT X/Long	0.020	292-601173
		1-3/4	3/8	4	X/Long	0.020	292-501173
1/2	0.5000	3	3/8	6	XX/Long	0.020	292-601193
		5/8	1/2	2-1/2	Stub	0.020	292-201203
		1	1/2	3	Regular	0.020	292-301203
		1-1/2	1/2	4	Medium	0.020	292-401193
		1-1/2	1/2	6	EXT X/Long	0.020	292-601203
		2	1/2	4	Long	0.020	292-401203
5/8	0.6250	3	1/2	6	X/Long	0.020	292-501203
		1	5/8	3	Stub	0.020	292-201223
		1-1/4	5/8	3-1/2	Regular	0.020	292-301223
		1-1/2	5/8	6	EXT X/Long	0.020	292-601223
		2-1/4	5/8	5	Long	0.020	292-401223
3/4	0.7500	3-1/4	5/8	6	X/Long	0.020	292-501223
		1	3/4	3	Stub	0.020	292-201243
		1-1/2	3/4	4	Regular	0.020	292-301243
		1-1/2	3/4	6	EXT X/Long	0.020	292-601233
		2-1/4	3/4	5	Long	0.020	292-401243
		3-1/4	3/4	6	X/Long	0.020	292-501243
		4	3/4	7	XX/Long	0.020	292-601243
1	1.0000	1-1/2	1	6	EXT X/Long	0.020	292-601253
		1-3/4	1	4	Regular	0.020	292-301263
		2-1/4	1	5	Long	0.020	292-401263
		3-1/4	1	6	X/Long	0.020	292-501263
		4	1	7	XX/Long	0.020	292-601263

MILLING RECOMMENDATIONS



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

Inches Per Tooth (IPT)

PROFILING

Workpiece Material Group	Hardness	SFM based on RDOC					IPT* (BASELINE)							
		Cutting Diameter Engaged					Cutting Diameter							
		5%	10%	20%	30%	50%	1/8 <sup>†</sup>	1/4 <sup>†</sup>	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	600	550	500	450	400	0.0011	0.0022	0.0035	0.0042	0.0059	0.0680	0.0900
	Medium Carbon & High Carbon, 1030, 4140, 5115		600	550	500	450		0.0011	0.0020	0.0033	0.0040	0.0055	0.0650	0.0850
Tool & Die Steels	A2, D2, H13, L6, P20, S7	P 28 - 44 Rc	550	500	450	400	375	0.0011	0.0020	0.0033	0.0040	0.0055	0.0650	0.0850
Stainless Steels	Ferritic	≤ 28 Rc	360	340	300	280	260	0.0007	0.0014	0.0024	0.0030	0.0040	0.5200	0.0680
	Martensitic	≤ 28 Rc						0.0004	0.0008	0.0016	0.0018	0.0024	0.0300	0.0400
	Difficult to Machine, 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	> 28 Rc	320	300	280	260	240	0.0003	0.0006	0.0010	0.0015	0.0018	0.0240	0.0300
Super Alloys	High Temp, Nimonic, Inconel, Monel, Hastelloy	≤ 42 Rc	550	525	500	450	425	0.0010	0.0020	0.0033	0.0040	0.0055	0.0700	0.0100
	Titanium: Ti 3Al-2.5V, Ti 6Al-4V Ti 10V-2Fe-3Al	≤ 42 Rc	550	525	500	450		0.0010	0.0020	0.0033	0.0040	0.0055	0.0700	0.0100
Hardened Materials		40-50 Rc	550	525	500	450	425	0.0010	0.0020	0.0033	0.0040	0.0055	0.0700	0.0100
		50-55 Rc	165	165	130	115	100	0.0004	0.0008	0.0016	0.0018	0.0024	0.0300	0.0400
		> 55 Rc	400	375	350	300	250							
Cast-Iron	Gray, SAE J431, ASTM A48	≤ 240 HB	1625	1295	900	700	350	0.0012	0.0024	0.0039	0.0047	0.0060	0.0078	0.0100
	Ductile & Malleable, ASTM A536, ASTM 897, ASTM A47, ASTM A220 ASTM A602	> 240 HB	675	540	550	400	260							

*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

†1/4" AND SMALLER DIAMETERS: Use caution when Profiling more than 50% or Slotting more than 25%



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

Inches Per Tooth (IPT)  
† Trochoidal Milling

SLOTTING

Workpiece Material Group	Hardness	SFM			IPT (BASELINE)							
		Cutting Diameter Engaged			Cutting Diameter							
		25%	50%	100% <sup>‡</sup>	1/8 <sup>†</sup>	1/4 <sup>†</sup>	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	480	480	400	0.0005	0.0011	0.0017	0.0021	0.0029	0.0380	0.0480
	Medium Carbon & High Carbon, 1030, 4140, 5115											
Tool & Die Steels	A2, D2, H13, L6, P20, S7	P 28 - 44 Rc	420	420	380	0.0005	0.0010	0.0016	0.0020	0.0027	0.0360	0.0460
Stainless Steels	Ferritic	≤ 28 Rc	420	420	400	0.0005	0.0010	0.0016	0.0020	0.0027	0.0035	0.0045
	Martensitic	≤ 28 Rc										
	Difficult to Machine, 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	> 28 Rc	400	400	380							
Super Alloys	High Temp, Nimonic, Inconel, Monel, Hastelloy	≤ 42 Rc	120	120	95	0.0002	0.0004	0.0008	0.0009	0.0012	0.0016	0.0020
	Titanium: Ti 3Al-2.5V, Ti 6Al-4V Ti 10V-2Fe-3Al	≤ 42 Rc	200	200	175							
Hardened Materials		40-50 Rc	350	350	300	0.0003	0.0006	0.0012	0.0015	0.0020	0.0024	0.0030
		50-55 Rc	180	180	150							
		> 55 Rc	150	150	100	0.0003	0.0005	0.0007	0.0009	0.0011	0.0014	
Cast-Iron	Gray, SAE J431, ASTM A48	≤ 240 HB	375	350	325	0.0004	0.0012	0.0020	0.0024	0.0031	0.0040	0.0050
	Ductile & Malleable, ASTM A536, ASTM 897, ASTM A47, ASTM A220 ASTM A602	> 240 HB	275	260	250							

