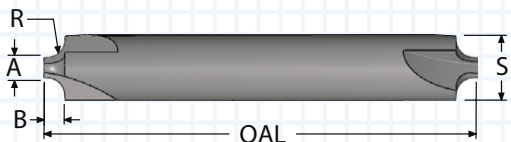


CORNER ROUNDING END MILLS - SOLID CARBIDE



- Tool diameter (A) and the cut depth (B) are held to ± 0.001 inch tolerance to provide ease of set-up
- ALTiN+ coating for higher cutting speed
- Precision ground for maximum concentricity

"R" RADIUS SIZE	"S" SHANK DIA.	OAL	"A" TOOL DIA.	"B" CUT DEPTH	FLUTES	ORDER #		EDP #	
						UNCOATED	ALTiN+	UNCOATED	ALTiN+
0.005	0.125	1.50	0.080	0.020	3	CR125005	CR125005A	500500	500593
0.008	0.125	1.50	0.080	0.023	3	CR125008	CR125008A	500503	500596
0.010	0.125	1.50	0.080	0.025	3	CR125010	CR125010A	500506	500599
0.015	0.125	1.50	0.080	0.030	3	CR125015	CR125015A	500509	500602
0.010	0.1875	2.00	0.120	0.025	3	CR187010	CR187010A	500512	500605
0.015	0.1875	2.00	0.120	0.030	3	CR187015	CR187015A	500515	500608
0.020	0.1875	2.00	0.100	0.035	3	CR187020	CR187020A	500518	500611
0.031	0.1875	2.00	0.100	0.046	3	CR187031	CR187031A	500521	500614
0.010	0.250	2.50	0.170	0.025	3	CR250010	CR250010A	500524	500617
0.015	0.250	2.50	0.170	0.030	3	CR250015	CR250015A	500527	500620
0.020	0.250	2.50	0.170	0.035	3	CR250020	CR250020A	500530	500623
0.025	0.250	2.50	0.170	0.040	3	CR250025	CR250025A	500533	500626
0.031	0.250	2.50	0.140	0.046	3	CR250031	CR250031A	500536	500629
0.035	0.250	2.50	0.140	0.050	3	CR250035	CR250035A	500539	500632
0.040	0.250	2.50	0.140	0.055	3	CR250040	CR250040A	500542	500635
0.046	0.250	2.50	0.140	0.061	3	CR250046	CR250046A	500545	500638
0.050	0.250	2.50	0.100	0.065	3	CR250050	CR250050A	500548	500641
0.055	0.250	2.50	0.100	0.070	3	CR250055	CR250055A	500551	500644
0.062	0.250	2.50	0.100	0.077	3	CR250062	CR250062A	500554	500647
0.072	0.250	2.50	0.100	0.087	3	CR250072	CR250072A	500557	500650
0.078	0.375	2.50	0.150	0.098	3	CR375078	CR375078A	500560	500653
0.085	0.375	2.50	0.150	0.105	3	CR375085	CR375085A	500563	500656
0.094	0.375	2.50	0.150	0.114	3	CR375094	CR375094A	500566	500659
0.100	0.375	2.50	0.120	0.120	3	CR375100	CR375100A	500569	500662
0.110	0.375	2.50	0.120	0.130	3	CR375110	CR375110A	500572	500665
0.118	0.375	2.50	0.100	0.138	3	CR375118	CR375118A	500575	500668
0.125	0.375	2.50	0.100	0.145	3	CR375125	CR375125A	500578	500671
0.140	0.500	3.00	0.150	0.10	3	CR500140	CR500140A	500581	500674
0.156	0.500	3.00	0.150	0.176	3	CR500156	CR500156A	500584	500677
0.172	0.500	3.00	0.100	0.192	3	CR500172	CR500172A	500587	500680
0.187	0.500	3.00	0.100	0.207	3	CR500187	CR500187A	500590	500683

SPECIALTY TOOL - HELICAL CHAMFER MILL

TECHNICAL INFORMATION

MATERIAL	ROCKWELL HARDNESS	SPEED (SFM) UNCOATED	SPEED (SFM) AITiN+	FEED (Inches per tooth)							
				CALCULATED CUTTING DIAMETER							
				<.125	.125-.1875	.1875-.250	.250-.3125	.3125-.375	.375-.500	.500-.625	.625-.750
Gray Cast Iron	85Rb	250	450	0.0012	0.0022	0.0035	0.0045	0.0050	0.0055	0.0070	0.0090
Ductile Cast Iron	85Rb	180	375	0.0007	0.0015	0.0020	0.0028	0.0035	0.0040	0.0055	0.0070
Carbon Steel	18Rc	225	450	0.0007	0.0015	0.0022	0.0028	0.0035	0.0045	0.0055	0.0070
Alloy Steel	20Rc	200	400	0.0006	0.0012	0.0020	0.0025	0.0030	0.0040	0.0050	0.0060
Heat Treated Alloys	40Rc	100	200	0.0003	0.0007	0.0010	0.0012	0.0018	0.0020	0.0028	0.0035
Tool Steel	20Rc	150	325	0.0006	0.0010	0.0018	0.0022	0.0028	0.0035	0.0045	0.0055
300 Stainless Steel	80Rb	120	250	0.0005	0.0009	0.0015	0.0018	0.0022	0.0028	0.0035	0.0045
400 Stainless Steel	95Rb	140	325	0.0004	0.0009	0.0012	0.0018	0.0022	0.0025	0.0035	0.0045
Nickel Alloy	20Rc	120	175	0.0005	0.0009	0.0012	0.0018	0.0022	0.0028	0.0035	0.0045
Cobalt Alloy	20Rc	140	225	0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0022	0.0030
Titanium	25Rc	160	250	0.0005	0.0009	0.0012	0.0018	0.0022	0.0028	0.0035	0.0045
Aluminum	60Rb	1000	1900	0.0010	0.0028	0.0040	0.0055	0.0070	0.0080	0.0110	0.0130
Brass, Zinc, Copper	41Rb	320	600	0.0008	0.0015	0.0022	0.0030	0.0040	0.0045	0.0060	0.0080

Determining the Calculated Cutting Diameter

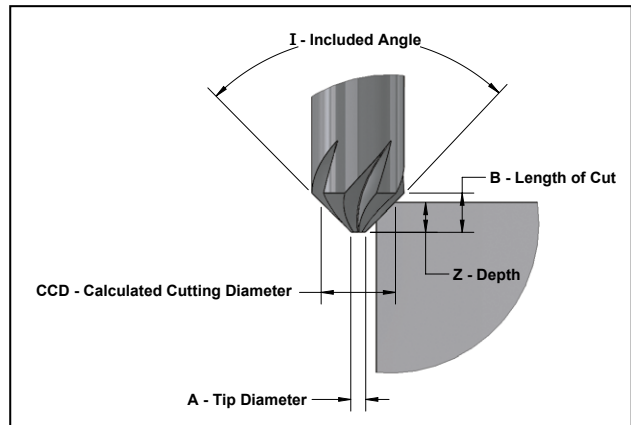
Surface footage and chip load should be calculated at the "Calculated Cutting Diameter" or CCD. The CCD is the largest diameter of the tool that engages the part.

$$\text{Calculated Cutting Diameter} = 2 \times \text{Depth} \times \tan(\text{Included Angle} / 2) + \text{Tip Diameter}$$

$$\text{CCD} = 2 \times Z \times \tan(I/2) + A$$

Choose a "Z - Depth" based on the "B - Length of Cut" of the selected tool. This should result in the part only contacting the included angle of the tool. The part should never touch the shank or tip of the tool. Using a Z - Depth that results in a larger CCD (closer to the shank) is preferred over a smaller CCD (closer to the tip). Find tool dimensions in chart on the product page.

RPM and IPM should be calculated using the Calculated Cutting Diameter.



Example:

Tool: HC50003-090A

I - Included Angle: 90°

A - Tip Diameter: 0.080"

B - Length of Cut: 0.210"

Chosen Z - Depth: 0.200"

Calculation:

$$\text{CCD} = 2 \times Z \times \tan(I/2) + A$$

$$\text{CCD} = 2 \times 0.200" \times \tan(90^\circ/2) + 0.080"$$

$$\text{CCD} = 0.480"$$

SPECIALTY TOOL - CORNER ROUNDING END MILL

FEED AND SPEED CHART

MATERIAL	ROCKWELL HARDNESS	SPEED (SFM) UNCOATED	SPEED (SFM) AITiN+	FEED (Inches per tooth)				
				Tool Size				
				CR125	CR187	CR250	CR375	CR500
Cast Iron	85Rb	200	350	0.0004	0.0005	0.0009	0.0015	0.0017
Carbon Steel	18Rc	200	400	0.0004	0.0005	0.0008	0.0013	0.0015
Alloy Steel	20Rc	160	330	0.0003	0.0004	0.0007	0.0012	0.0014
Heat Treated Alloys (38-45Rc)	40Rc	60	100	0.0002	0.0003	0.0004	0.0007	0.0009
Tool Steel	20Rc	125	150	0.0002	0.0003	0.0004	0.0007	0.0009
Stainless Steel	95Rb	120	250	0.0003	0.0004	0.0007	0.0012	0.0014
Titanium	25Rc	110	150	0.0002	0.0003	0.0004	0.0007	0.0009
Aluminum	60Rb	450	750	0.0008	0.0011	0.0017	0.0028	0.0033
Brass, Zinc,	41Rb	300	500	0.0007	0.0010	0.0015	0.0025	0.0030

SPECIALTY TOOL - ENGRAVING TOOL

FEED AND SPEED CHART

MATERIAL	RPM	FEED (Inches per tooth)									
		INCLUDED ANGLE									
		30°		40°		60°		90°		120°	
		SHANK DIAMETER									
		.125-.187	.250-.500	.125-.187	.250-.500	.125-.187	.250-.500	.125-.187	.250-.500	.125-.187	.250-.500
Cast Iron	6000+	0.0011	0.0014	0.0012	0.0016	0.0016	0.0020	0.0017	0.0022	0.0019	0.0024
Carbon Steel	6000+	0.0006	0.0008	0.0007	0.0009	0.0009	0.0012	0.0010	0.0013	0.0011	0.0014
Alloy Steel	6000+	0.0005	0.0006	0.0005	0.0007	0.0007	0.0009	0.0007	0.0009	0.0008	0.0010
Heat Treated Alloys	6000+	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0004	0.0005	0.0004	0.0006
Tool Steel	6000+	0.0004	0.0005	0.0005	0.0006	0.0006	0.0008	0.0007	0.0008	0.0007	0.0009
Stainless Steel	6000+	0.0005	0.0007	0.0006	0.0008	0.0008	0.0010	0.0008	0.0011	0.0009	0.0012
Titanium	6000+	0.0005	0.0007	0.0006	0.0008	0.0008	0.0010	0.0008	0.0011	0.0009	0.0012
Aluminum	6000+	0.0011	0.0014	0.0012	0.0016	0.0016	0.0020	0.0017	0.0022	0.0019	0.0024
Plastics	6000+	0.0016	0.0021	0.0019	0.0024	0.0024	0.0030	0.0026	0.0033	0.0028	0.0036

Suggested chip loads reflect engraving depths up to .010". For depths of cut between .010"-.015", reduce suggested chip loads by 20%. For depths of cut between .015"-.020", reduce suggested chip load by 30%.

Ramping into the part is preferred but if plunge milling into the part, reduce suggested chip load by 50%.