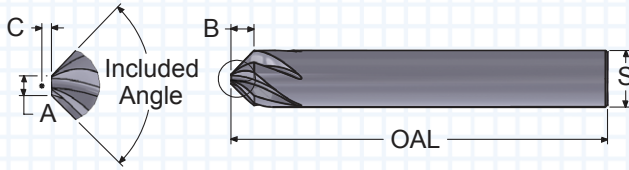


HELICAL CHAMFER MILLS

HIGH PERFORMANCE - SOLID CARBIDE



- Helical flutes for high performance
- Tool tip diameter held to + /- 0.002 for fast set-ups
- Positive high shear design for reduced cutting forces

Tool is not recommended for plunging countersinks

* C is the length from the tool tip to theoretical sharp

3 FLUTES FOR MAX CHIP EVACUATION

INCL. ANGLE	"S" SHANK DIA.	OAL	"A" TIP DIA.	"B" LENGTH OF CUT	"C" * REF.	FLUTES	ORDER #		EDP #	
							UNCOATED	ALTiN+	UNCOATED	ALTiN+
60°	0.125	1.50	0.040	0.074	0.036	3	HC12503-060	HC12503-060A	500010	500132
60°	0.187	2.00	0.050	0.119	0.045	3	HC18703-060	HC18703-060A	500013	500135
60°	0.250	2.50	0.060	0.165	0.054	3	HC25003-060	HC25003-060A	500017	500138
60°	0.375	2.50	0.070	0.264	0.062	3	HC37503-060	HC37503-060A	500023	500144
60°	0.500	3.00	0.080	0.364	0.071	3	HC50003-060	HC50003-060A	500030	500150
60°	0.625	3.00	0.090	0.463	0.080	3	HC62503-060	HC62503-060A	500037	500156
60°	0.750	3.00	0.100	0.563	0.088	3	HC75003-060	HC75003-060A	500043	500162
90°	0.125	1.50	0.040	0.043	0.021	3	HC12503-090	HC12503-090A	500050	500168
90°	0.187	2.00	0.050	0.069	0.026	3	HC18703-090	HC18703-090A	500054	500171
90°	0.250	2.50	0.060	0.095	0.031	3	HC25003-090	HC25003-090A	500057	500174
90°	0.375	2.50	0.070	0.153	0.036	3	HC37503-090	HC37503-090A	500064	500180
90°	0.500	3.00	0.080	0.210	0.041	3	HC50003-090	HC50003-090A	500071	500186
90°	0.625	3.00	0.090	0.268	0.046	3	HC62503-090	HC62503-090A	500077	500192
90°	0.750	3.00	0.100	0.325	0.051	3	HC75003-090	HC75003-090A	500084	500198
120°	0.125	1.50	0.040	0.025	0.012	3	HC12503-120	HC12503-120A	500091	500204
120°	0.187	2.00	0.050	0.040	0.015	3	HC18703-120	HC18703-120A	500094	500207
120°	0.250	2.50	0.060	0.055	0.018	3	HC25003-120	HC25003-120A	500098	500210
120°	0.375	2.50	0.070	0.088	0.021	3	HC37503-120	HC37503-120A	500105	500216
120°	0.500	3.00	0.080	0.121	0.024	3	HC50003-120	HC50003-120A	500111	500222
120°	0.625	3.00	0.090	0.154	0.027	3	HC62503-120	HC62503-120A	500118	500228
120°	0.750	3.00	0.100	0.188	0.029	3	HC75003-120	HC75003-120A	500125	500234

5 FLUTES FOR HARDER MATERIALS

INCL. ANGLE	"S" SHANK DIA.	OAL	"A" TIP DIA.	"B" LENGTH OF CUT	"C" * REF.	FLUTES	ORDER #		EDP #	
							UNCOATED	ALTiN+	UNCOATED	ALTiN+
60°	0.250	2.50	0.060	0.165	0.054	5	HC25005-060	HC25005-060A	500020	500141
60°	0.375	2.50	0.070	0.264	0.062	5	HC37505-060	HC37505-060A	500026	500147
60°	0.500	3.00	0.080	0.364	0.071	5	HC50005-060	HC50005-060A	500033	500153
60°	0.625	3.00	0.090	0.463	0.080	5	HC62505-060	HC62505-060A	500040	500159
60°	0.750	3.00	0.100	0.563	0.088	5	HC75005-060	HC75005-060A	500047	500165
90°	0.250	2.50	0.060	0.095	0.031	5	HC25005-090	HC25005-090A	500060	500177
90°	0.375	2.50	0.070	0.153	0.036	5	HC37505-090	HC37505-090A	500067	500183
90°	0.500	3.00	0.080	0.210	0.041	5	HC50005-090	HC50005-090A	500074	500189
90°	0.625	3.00	0.090	0.268	0.046	5	HC62505-090	HC62505-090A	500081	500195
90°	0.750	3.00	0.100	0.325	0.051	5	HC75005-090	HC75005-090A	500088	500201
120°	0.250	2.50	0.060	0.055	0.018	5	HC25005-120	HC25005-120A	500101	500213
120°	0.375	2.50	0.070	0.088	0.021	5	HC37505-120	HC37505-120A	500108	500219
120°	0.500	3.00	0.080	0.121	0.024	5	HC50005-120	HC50005-120A	500115	500225
120°	0.625	3.00	0.090	0.154	0.027	5	HC62505-120	HC62505-120A	500122	500231
120°	0.750	3.00	0.100	0.188	0.029	5	HC75005-120	HC75005-120A	500128	500237

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

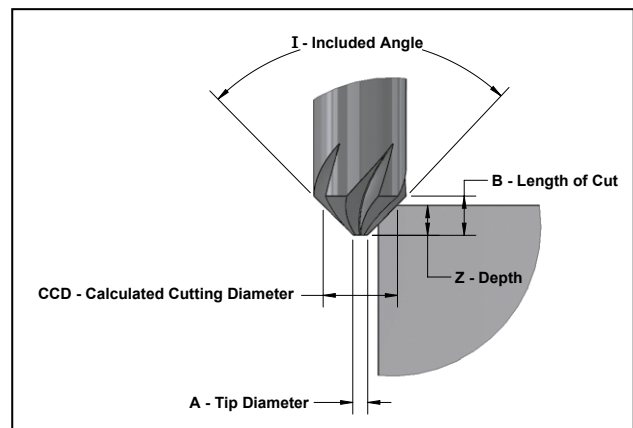
Surface footage and chip load should be calculated at the "Calculated Cutting Diameter" or CCD. The CCD is the largest diameter of the tool that engages the part.

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

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

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%.